



Strategic Approaches in Minimizing Cost Overruns in Private Small-Scale Construction Projects: Basis for a Proposed Action Plan in Preventing Cost Overrun

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Jonathan Jedidiah S. Ison, ORCID No. [0009-0000-6549-4900](https://orcid.org/0009-0000-6549-4900)

Master of Science in Construction Management, Polytechnic University of the Philippines, Sta. Mesa, Manila, Philippines

Abstract

Cost overruns remain a persistent challenge in private small-scale construction projects, adversely affecting project cost performance, resource utilization, and overall project success. This study examined the strategic approaches used to minimize cost overruns and developed a Cost Overrun Action Plan to support effective cost management in private small-scale construction projects. A quantitative descriptive-comparative research design was employed involving 30 construction professionals, including architects, engineers, contractors, project managers, and other practitioners in Quezon City, Philippines. Data were collected through a structured survey questionnaire and analyzed using frequency counts, percentages, weighted means, and the Kruskal-Wallis H Test. The findings revealed that respondents positively assessed cost control, risk management, financial operations, application of current technology, and lean construction and value engineering as effective approaches to minimizing cost overruns. Cost control received the strongest assessment, particularly regular budget monitoring and control measures ($M = 4.46$), while all other strategic dimensions were likewise rated favorably. Statistical analysis showed no significant differences in respondents' assessments when grouped according to profession, years of professional experience, and number of projects completed, indicating a shared perception regarding the effectiveness of these approaches. The study concludes that an integrated approach combining cost control, risk management, financial operations, technology utilization, and lean construction and value engineering can strengthen project planning, resource optimization, financial control, and decision-making. Based on these findings, a Cost Overrun Action Plan was developed to provide construction professionals with a practical framework for preventing cost overruns and improving project performance.

Keywords: Cost Overrun, Construction Management, Cost Control, Risk Management, Value Engineering



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INTRODUCTION

Effective cost management is essential to successful construction project delivery, yet cost overruns remain prevalent due to interconnected factors such as inaccurate cost estimation, scope changes, ineffective resource management, inadequate monitoring, and fluctuations in material and labor prices. These challenges are particularly significant in private small-scale construction projects in the Philippines, which typically operate with limited budgets and narrower profit margins, making them more vulnerable to unexpected expenses. Bascon et al. (2023) identified inflation, material price fluctuations, material delivery delays,

change orders, and limited client experience as major contributors to cost overruns in vertical construction projects in Pampanga. Philippine construction costs also increased by 6.8 percent in 2022, driven by rising material and labor costs and supply-chain disruptions, prompting recommendations for alternative materials, prefabrication, and digital technologies (Market Research Philippines, 2024). Resource optimization, budget monitoring, and strategic contract negotiations further support financial control. Project Management Institute [PMI] (2021), while cost overruns and delays remain widespread globally (Rezaei & Jalal, 2018). Elbashbishy et al. (2022) reported that approximately 98 percent

of modern construction projects experience cost overruns or delays, highlighting the importance of early risk identification and technological tools for timely corrective action. Given construction's contribution to employment, investment, and infrastructure development, controlling cost overruns is also important to industry and economic stability (Asante & Mills, 2020).

Recurring causes such as fluctuating material prices, unforeseen site conditions, design and scope changes, and inadequate planning continue to disrupt financial planning (Aljohani, 2017). However, existing research often examines these factors separately, limiting the development of comprehensive prevention strategies (Alhammadi, et al., 2025), while Gunduz and Maki (2018), Love et al. (2012) and other researchers emphasize the need for a more holistic approach. Thus, this study evaluates strategic approaches involving cost control, risk management, financial operations, technology adoption, and lean construction practices to identify effective measures for minimizing cost overruns and develop a Cost Overrun Action Plan. The proposed strategies aim to provide project managers, contractors, and other stakeholders with a practical framework for strengthening cost management, optimizing resources, reducing financial risks, and improving the likelihood of completing projects within approved budgets.

LITERATURE REVIEW

Construction Cost Overruns and Their Contributing Factors. Cost overruns remain a persistent challenge in construction, affecting project viability, profitability, stakeholder confidence, and overall success. The literature attributes them to interconnected factors such as inaccurate cost estimation, inadequate planning, scope and design changes, market fluctuations, supply-chain disruptions, poor contract administration, and unforeseen site conditions, highlighting the need for integrated project control, risk management, stakeholder collaboration, technology, and process improvement. In the Philippine context, Bascon

et al. (2023) identified inflation, material price volatility, production and transportation delays, supplier inefficiencies, slow approvals, limited client project management experience, and variation orders as major contributors to cost and time overruns, while Layno and Famadico (2024) emphasized inadequate budget estimates, insufficient site investigations, variation orders, and weak pre-construction planning. Similarly, Yahya et al. (2018) identified inadequate planning, inaccurate cost estimation, material price fluctuations, poor site management, and design changes as major causes of overruns in private residential projects, emphasizing communication, comprehensive planning, and continuous cost monitoring. Philippine Statistics Authority [PSA] (2022) further reported a 6.8 percent increase in Philippine construction costs, attributed largely to material shortages and rising labor costs, and recommended prefabrication, sustainable local materials, and BIM as potential cost-management strategies. Collectively, these findings demonstrate that cost overruns result from interacting planning, financial, operational, market, contractual, technological, and human factors, requiring comprehensive rather than isolated interventions.

Project Planning, Cost Control, and Financial Management. Effective project management and cost control are fundamental to preventing construction cost overruns through accurate cost estimation, scope management, contract administration, budget monitoring, financial management, and continuous evaluation throughout the project lifecycle. Modern mechanisms such as earned value analysis, financial audits, and corrective actions help identify budget deviations and maintain project performance. During initiation, feasibility assessment and a project charter establish project objectives, scope, stakeholders, and resources (PMI, 2021), while comprehensive planning through tools such as the Work Breakdown Structure (WBS), Gantt charts, cost estimates, schedules, and risk management provides the foundation for project control (Kerzner, 2017). During execution, status

tracking, Key Performance Indicators (KPIs), forecasting, and performance monitoring enable timely adjustments to budgets, schedules, resources, and quality requirements (Verzuh, 2021; Heldman, 2018). Financial management further strengthens cost control through cash-flow monitoring, budget reviews, forecasting, procurement planning, payment scheduling, and cost reporting (PMI, 2021; Kerzner, 2017), while project closure through evaluation, documentation, and lessons learned supports improved future planning and cost management (Schwalbe, 2018). Overall, cost control should be integrated throughout the project lifecycle, from feasibility and planning through execution, monitoring, financial management, and closure.

Risk Management and Uncertainty Mitigation.

Construction projects face financial, operational, environmental, market, and regulatory uncertainties, making risk management essential for preventing cost overruns through early risk identification, assessment, and mitigation. Material price fluctuations and supply-chain disruptions are major contributors to cost escalation, requiring measures such as contingency budgeting, financial reserves, and risk-sharing mechanisms (Uvarova et al., 2023; Anireddy, 2023). Quantitative techniques such as Monte Carlo simulation can further improve risk analysis by accounting for different uncertainties and developing realistic cost projections. Risk management should begin during project planning, allowing teams to anticipate threats and establish mitigation strategies before problems occur (Kerzner, 2017). In the Philippine context, inflation, material price volatility, production and transportation delays, supplier inefficiencies, and variation orders further highlight the need for flexible planning (Bascon et al., 2023). Thus, integrating early risk identification, contingency planning, financial reserves, supply-chain strategies, and continuous monitoring can reduce the financial impact of uncertainties throughout the project lifecycle.

Stakeholder Collaboration, Contract, Procurement, and Leadership. Construction cost performance depends on effective stakeholder collaboration, contract and procurement management, and leadership, as projects involve clients, contractors, architects, engineers, consultants, and suppliers with diverse responsibilities and interests. Strong stakeholder collaboration, early alignment of objectives, clear communication, and shared decision-making can reduce misunderstandings, delays, disputes, change orders, and cost overruns (Omotayo, et al., 2024), while delivery systems such as Design-Build and Integrated Project Delivery (IPD) promote early involvement and shared accountability. Effective contract management requires clearly defined scopes, responsibilities, payment terms, timelines, quality standards, and change procedures, with continuous monitoring and documentation to prevent unauthorized changes and financial problems (PMI, 2021). Similarly, strategic procurement through supplier selection, competitive bidding, long-term relationships, and performance evaluation helps ensure timely material delivery, stable prices, and reduced supply-chain disruptions (Chen, et al., 2023). Leadership also contributes to cost performance through technical competence, communication, strategic thinking, emotional intelligence, collaboration, accountability, and continuous learning (Northouse, 2022). Collectively, these factors demonstrate that effective cost management extends beyond technical and financial controls to include strong relationships, communication, contractual systems, procurement practices, and leadership.

Value Engineering and Cost Optimization. Value engineering provides a systematic approach to controlling construction costs while maintaining required quality, functionality, and project objectives by evaluating materials, methods, and design alternatives to identify cost-saving opportunities (Abdul Azis, et al., 2013; Dell'Isola, 2010). Its effectiveness depends on reliable and credible information, which supports informed decision-making and more

accurate evaluation of project conditions (Metzger & Flanagan, 2013). Function analysis helps project teams align project components with user requirements and organizational objectives, while benchmarking and use-case scenarios assess whether components provide sufficient value relative to their costs (Ulrich & Eppinger, 2016). Ideation techniques such as brainstorming, mind mapping, and SCAMPER can generate alternative solutions, materials, and methods that improve quality while reducing costs (Brown, 2009), which must then be evaluated based on feasibility, costs, benefits, resources, and alignment with project objectives. Continuous improvement, flexibility, and value creation through lean, agile, and hybrid approaches further support resource optimization throughout the project lifecycle (Lalmi, et al., 2021). Thus, value engineering complements traditional cost control by maximizing the balance among cost, quality, functionality, and project objectives rather than simply reducing expenditures.

Technological Innovation and Digital Construction Management. Technological innovation has transformed construction project management by improving planning, communication, monitoring, and decision-making, thereby supporting cost control and early identification of potential problems. Building Information Modeling (BIM) enhances project coordination, cost estimation, and risk management by integrating project information into a comprehensive digital model, enabling stakeholders to detect design conflicts, evaluate alternatives, improve cost forecasting, and reduce errors and unexpected expenditures (Gledson & Greenwood, 2017). Digital project management software such as Procore, Buildertrend, and Microsoft Project, along with predictive analytics and dashboards, facilitates real-time monitoring of schedules, resources, budgets, and expenditures, enabling timely corrective actions. BIM supports lean construction by enhancing project visualization, planning, coordination, and workflow integration, thereby contributing to more efficient construction processes (Dave et al., 2013), while digital procurement systems

enhance inventory monitoring, purchasing efficiency, and supplier performance tracking. Overall, technological innovation serves as a strategic component of cost overrun prevention by improving project visibility, accuracy, coordination, and responsiveness throughout the construction lifecycle.

Lean, Agile, and Sustainable Construction Practices. Lean construction is recognized as an effective approach to improving productivity, reducing waste, and enhancing project performance through more efficient construction processes and adherence to lean principles (Bigwanto et al., 2024; Aslam et al., 2024). Its integration with digital technologies such as BIM can further improve planning, coordination, and decision-making, resulting in greater efficiency and reduced costs (El Mounla et al., 2023). Lean tools such as the Last Planner System, visualization, huddle meetings, first-run studies, and 5S can improve workflow coordination, reduce variability, and minimize waste and inefficiencies in construction projects (Salem et al., 2006). Transparency through visual management, BIM, and collaborative communication enhances accountability and coordination, while Kaizen promotes continuous improvement and stakeholder feedback.

Prefabrication and modular construction can further reduce project duration, material waste, and inventory requirements, particularly in smaller projects (Tavares et al., 2021). Similarly, sustainable practices involving efficient material use, energy conservation, waste reduction, local materials, recycling, and energy-efficient technologies can improve resource efficiency, while life-cycle cost analysis considers construction, operation, maintenance, and other costs over the building's lifespan to support economically informed decisions (World Green Building Council, 2023; Alshamrani, 2021). Collectively, lean, agile, and sustainable approaches maximize project value while minimizing waste, inefficiency, and unnecessary expenditure, supporting both short-term cost performance and long-term project value.

Action Planning and the Need for an Integrated Cost Overrun Action Plan. Previous literature demonstrates that construction cost overruns result from interconnected factors, including project planning, cost and financial management, risk mitigation, stakeholder collaboration, contract and procurement management, leadership, value engineering, digital technology, lean construction, and sustainability, requiring equally integrated strategies. Bryson (2018) describes action planning as a coordinated set of activities that transforms strategic goals into measurable actions through clear priorities, resource allocation, responsibilities, and monitoring mechanisms, while Kotler and Keller (2015) emphasize planning, resource allocation, execution, monitoring, and performance evaluation for effective implementation. These approaches are particularly relevant to construction projects, where fluctuating prices, labor shortages, scope changes, and unforeseen conditions require proactive and adaptable strategies. Integrating project control, risk management, stakeholder collaboration, contract and procurement management, value engineering, technology, and lean practices can strengthen accountability, improve coordination, reduce waste, and enhance resource utilization. However, a significant gap remains in the Philippine private small-scale construction sector, where existing studies often examine these strategies independently rather than as an integrated system. Thus, there is a need for a context-specific Cost Overrun Action Plan that combines these approaches to support coordinated, sustainable, and effective cost management in private small-scale residential construction projects.

Theoretical Framework. The study is grounded in Project Management Theory (PMT), Triple Constraint Theory, Transaction Cost Economics (TCE), and Risk Management Theory, which provide a framework for understanding factors influencing project performance and cost overruns. PMT emphasizes effective planning, resource allocation, budget monitoring, and performance control throughout the project

lifecycle, enabling managers to identify cost concerns and implement timely corrective measures. Triple Constraint Theory, or the Iron Triangle, emphasizes the interdependence of time, cost, and scope, wherein changes in scope or schedule can increase project costs when not properly controlled. Thus, effective cost, schedule, and scope management, supported by technologies such as Building Information Modeling (BIM), Primavera P6, and Microsoft Project, can help minimize cost overruns. TCE, introduced by Ronald Coase and further developed by Oliver Williamson, explains how contractual arrangements and stakeholder relationships affect project costs. Beyond direct expenses, construction projects incur transaction costs from contract preparation, negotiation, monitoring, dispute resolution, and project modifications. Well-structured contracts, effective communication, and stakeholder coordination can therefore reduce transaction costs, disputes, delays, and unforeseen expenses.

Risk Management Theory provides a framework for identifying, assessing, and mitigating uncertainties that may affect project objectives. Classical Risk Management Theory views risk as an objective phenomenon that can be systematically measured and managed (Goto, 2013) through risk identification, analysis, and mitigation. This is particularly relevant to construction projects, where fluctuating material prices, labor shortages, adverse weather, design changes, and unforeseen site conditions can affect costs and schedules. Continuous risk assessment, monitoring, and control are therefore essential to maintaining project stability and financial performance. Modern practices further incorporate quantitative risk analysis, contractual risk-sharing, and digital technologies such as BIM to strengthen project resilience. Collectively, these theories support the strategic approaches examined in this study by emphasizing effective planning and resource management, control of time, cost, and scope, efficient contractual and stakeholder coordination, and proactive risk management to minimize cost overruns.

Conceptual Framework. This study is anchored on the Input–Process–Output (IPO) Model, which provides a systematic framework for examining strategic approaches to minimizing cost overruns in private small-scale construction projects. The Input component includes the respondents' profile as well as the construction companies' strategic approaches based on five key cost management dimensions: cost control, risk management, financial operations, application of current technology, and integration of lean construction and value engineering principles. The Process component involves systematic data collection through survey questionnaires administered to qualified construction professionals, followed by data organization, statistical analysis, interpretation, and validation to assess the effectiveness of these strategies in minimizing cost overruns and improving project cost performance.

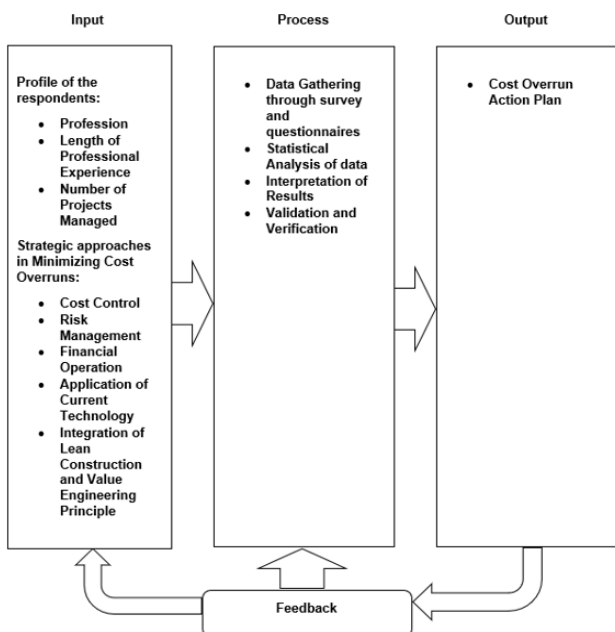


Figure 1
IPO Framework of Strategic Approaches for Minimizing Cost Overruns in Private Small-Scale Construction Projects

The Output is the development of a Cost Overrun Action Plan containing policy and process recommendations to guide construction professionals, project managers, contractors, and other stakeholders in improving cost management through effective planning,

financial control, risk mitigation, technology integration, and project monitoring. A feedback mechanism is incorporated to ensure continuous evaluation and refinement of strategies based on project outcomes, lessons learned, changing project conditions, industry trends, and organizational experiences. This cyclical process promotes continuous improvement and organizational learning, strengthening construction firms' capacity to prevent cost overruns, optimize resources, and achieve project objectives within approved budgets.

The research evaluates strategic implementations which prove effective in minimizing project costs and improving project performance. The investigation of this statement examines cost overruns' main drivers and evaluates current cost management approaches while presenting new solutions involving progressive budgeting techniques combined with risk management approaches and stakeholder participation and technological implementations. The analysis from this study will deliver critical information to construction managers along with architects, engineers, project planners, contractors and policy makers to enhance their financial and operational approaches in construction initiatives.

This study specifically aims to answer the following research questions:

1. What is the profile of the respondents when they are grouped according to their:
 - 1.1 Profession;
 - 1.2 Length of Professional Experience; and
 - 1.3 Number of Projects Managed?
2. What are the respondents' assessments of the strategic approaches in minimizing cost overruns in terms of:
 - 2.1 Cost Control;
 - 2.2 Risk Management;
 - 2.3 Financial Operations;
 - 2.4 Application of Current Technology; and
 - 2.5 Integration of Lean Construction and Value Engineering Principles?

3. Is there a significant difference in the assessment of the respondents regarding strategic approaches in minimizing the cost overruns when they are grouped according to their profile?
4. What proposed action plan may be developed in minimizing the cost overrun issues?

Hypothesis. At 0.05 level of significance, the study hypothesizes that there is no significant difference in the assessment of the respondents regarding strategic approaches in minimizing the cost overruns when they are grouped according to their profile.

METHODS

Research Design. This study employed a quantitative descriptive-comparative research design to examine the strategic approaches used by construction professionals in minimizing cost overruns in private small-scale construction projects. The descriptive component enabled the systematic identification and assessment of existing practices and strategies related to cost control, risk management, financial operations, technology adoption, and lean construction practices. Meanwhile, the comparative component allowed the determination of whether significant differences existed in the respondents' assessments of these strategic approaches when grouped according to selected profile variables. The design was appropriate because it facilitated both the comprehensive evaluation of cost overrun prevention practices and the statistical comparison of perceptions across respondent groups, thereby providing empirical evidence for the development of a Cost Overrun Action Plan aimed at strengthening cost management, optimizing resource utilization, reducing financial risks, and improving project cost performance in private small-scale residential construction projects.

Population and Sampling. The study was conducted in Quezon City, Philippines, a highly urbanized area characterized by a dynamic

construction industry and a diverse population of construction professionals, making it an appropriate setting for investigating cost management practices in bungalow and two-storey residential construction projects. The participants consisted of 30 construction professionals occupying various roles, including architects, engineers, contractors, project managers, and other practitioners engaged in the planning, design, implementation, and management of such projects. Purposive sampling was employed to select respondents who met the established inclusion criteria, specifically having at least two years of professional experience in the construction industry and involvement in a minimum of two private small-scale residential construction projects within the preceding five years. Participation was voluntary, and only respondents who provided informed consent and completed the survey questionnaire fully were included in the study.

Instrumentation. A structured survey questionnaire, developed based on the study's conceptual framework, served as the primary data collection instrument. It consisted of three sections covering respondents' demographic and professional profile; their assessment of strategic approaches for minimizing cost overruns in terms of cost control, risk management, financial operations, current technology, and lean construction and value engineering principles; and their recommendations for future cost overrun action plan strategies. To establish content validity, the questionnaire was reviewed by experts in construction management and research methodology, whose recommendations were incorporated to improve its clarity, relevance, and comprehensiveness. A pilot test was also conducted among qualified respondents to assess the instrument's reliability and understandability before full implementation. The results of the reliability analysis yielded a Cronbach's alpha coefficient of 0.91, indicating excellent internal consistency and confirming that the instrument was highly reliable for measuring the constructs included in the study.

Data Gathering Procedure. The data collection process began with the distribution of formal letters requesting permission for survey administration among construction firms, professional organizations, and individual practitioners. The letters outlined the study's objectives, significance, and scope while assuring confidentiality and anonymity. Upon approval, questionnaires were distributed through email and online survey forms, with respondents given sufficient time to provide honest answers based on their professional experiences. Retrieved questionnaires were checked for completeness, organized, encoded, and prepared for statistical analysis. Throughout the process, ethical standards were observed by ensuring voluntary participation, the right to withdraw at any time, and strict confidentiality of all information gathered.

Data Analysis. The collected data were systematically organized, tabulated, and analyzed using descriptive and inferential statistical tools. Frequency counts and percentages were used to describe the respondents' demographic profile, while weighted means determined their level of agreement on the effectiveness of strategic approaches in minimizing cost overruns using a five-point Likert scale (Table 1) ranging from "Strongly Agree" to "Strongly Disagree."

Table 1
Weighted Mean Range Interpretation

Weighted Mean Range	Interpretation
4.21-5.00	Strongly Agree
3.41 – 4.20	Agree
2.61-3.40	Neutral
1.81-2.60	Disagree
1.00-1.80	Strongly Disagree

The Kruskal-Wallis H Test was utilized to determine whether significant differences existed in respondents' assessments of strategic approaches for minimizing cost overruns when grouped according to demographic profile, such as years of experience. As a non-parametric test, it is suitable for ordinal Likert-scale data when

parametric assumptions are not met and compares the mean ranks of three or more independent groups. The null hypothesis states that no significant differences exist among groups. A p-value below 0.05 leads to rejection of the null hypothesis, whereas a p-value above 0.05 indicates insufficient evidence to reject it. The results served as the basis for identifying effective cost overrun prevention strategies and developing the proposed Cost Overrun Action Plan in relation to the study objectives, theories, and reviewed literature.

RESULTS

RQ 1. Profile of respondents in terms of profession, length of professional experience, and number of projects managed.

Table 2
Frequency and Percentage Distribution of Respondents According to Profession

Position	Frequency	Percentage (%)
Project Manager	6	20.00
Contractor	2	6.67
Engineer	2	6.67
Architect	13	43.33
Other	7	23.33
Total	30	100.00%

Table 2 presents the professional composition of the respondents. Architects accounted for 43.33% of the sample, indicating that a substantial proportion of the responses originated from professionals directly involved in the design, planning, and coordination aspects of construction projects. The remaining 56.67% consisted of project managers, contractors, engineers, and other practitioners, reflecting participation from multiple segments of the construction industry. Such distribution suggests that while architectural perspectives are strongly represented, the study also incorporates insights from professionals engaged in project supervision, technical implementation, and related construction activities. The representation of several professional groups contributes to a broader assessment of the study variables and supports the examination of issues from diverse industry viewpoints.

Table 3
Frequency and Percentage Distribution of Respondents According to Years of Experience

Years of Experience	Frequency	Percentage (%)
Less than 5 Years	19	63.33
5-10 years	4	13.33
11-15 years	1	3.33
More than 15 years	6	20.00
Total	73	100.00%

Table 3 presents the respondents' distribution according to years of professional experience. The findings indicate that the sample was composed primarily of early-career professionals, with 63.33% having less than five years of experience. In contrast, only 3.33% reported having 11 to 15 years of experience. Despite the predominance of less experienced practitioners, the inclusion of respondents with more than 15 years of experience (20.00%) suggests that the study captured insights from both emerging and seasoned professionals, providing perspectives across different stages of professional development.

Table 4
Frequency and Percentage Distribution of Respondents According to Number of Projects Completed in Previous Years

Number of Projects	Frequency	Percentage (%)
1-5	6	20.00
6-10	8	26.67
11-15	5	16.66
More than 15	11	36.67
Total	73	100.00%

Table 4 indicates the respondents' distribution according to the number of projects completed in previous years. The results indicate that a substantial proportion of the respondents (36.67%) completed more than 15 projects, suggesting considerable exposure to construction project implementation. Meanwhile, only 16.66% reported completing 11 to 15 projects. Overall, the distribution reflects a respondent pool with varying levels of project experience, enabling the study to capture perspectives from professionals with diverse degrees of practical engagement in the industry.

RQ 2. Assessment on the strategic approaches in minimizing the cost overruns.

In terms of cost control. Table 5 shows the respondents' assessment on cost control as a strategic approach to minimizing cost overruns in private small-scale construction projects.

Table 5
Respondents' Assessment on Cost Control as a Strategic Approaches in Minimizing Cost Overrun

Statement	Mean	Interpretation
1. The project team regularly monitors and updates the project budget to prevent potential cost overruns.	4.46	Strongly Agree
2. Change orders and scope modifications are properly evaluated and controlled to avoid unexpected project costs.	4.43	Strongly Agree
3. A detailed cost breakdown is prepared and reviewed regularly to track spending against budgeted allocations.	4.33	Strongly Agree
4. Accurate and realistic cost estimation is conducted before the start of construction works.	4.00	Agree
5. Procurement processes are optimized by selecting cost-efficient suppliers and negotiating favorable contract terms.	3.93	Agree

The respondents expressed favorable perceptions of cost control practices, with regular monitoring and updating of the project budget obtaining the highest mean score ($M = 4.46$), while optimizing procurement through cost-efficient supplier selection and contract negotiation received the lowest ($M = 3.93$), although both were positively assessed. These findings imply that construction managers should prioritize continuous budget monitoring while strengthening procurement practices to improve cost efficiency and reduce cost overruns. The results reinforce Project Management Theory (PMT) and Triple Constraint Theory through effective planning, monitoring, and cost control, Transaction Cost Economics (TCE) through efficient procurement and contractual decisions, and Risk Management Theory through proactive financial oversight to mitigate cost-related risks throughout the project lifecycle.

In terms of risk management. Table 6 displays the respondents' assessment on risk management as a strategic approach to minimizing cost overruns in private small-scale construction projects.

Table 6
Respondents' Assessment on Risk Management as a Strategic Approaches in Minimizing Cost Overrun

Statement	Mean	Interpretation
1. Regular risk review meetings are conducted throughout the project to update assessments and strategies.	4.16	Agree
2. Contingency plans are developed and implemented to mitigate identified risks that may affect project costs.	4.10	Agree
3. Risks such as material price fluctuations, labor shortages, and site conditions are identified and analyzed before project execution.	4.06	Agree
4. Risk responsibilities and mitigation actions are clearly assigned to ensure a timely response to emerging issues.	4.00	Agree
5. The project adopts risk management tools (e.g., Monte Carlo simulation, risk matrix) to anticipate potential cost impacts.	3.86	Agree

Respondents positively assessed risk management practices, with regular risk review meetings obtaining the highest mean score (M = 4.16) and the adoption of risk management tools, such as Monte Carlo simulation and risk matrices, the lowest (M = 3.86), although both were interpreted as Agree. These findings imply that construction managers should prioritize continuous risk assessment and monitoring while strengthening the use of systematic risk analysis tools to improve decision-making and reduce cost-related uncertainties. The results support Risk Management Theory through proactive risk identification and mitigation, Project Management Theory (PMT) and Triple Constraint Theory through effective planning and control, and Transaction Cost Economics (TCE) through informed decision-making and efficient resource coordination to minimize project costs.

Table 7
Respondents' Assessment on Financial Operations as a Strategic Approaches in Minimizing Cost Overrun

Statement	Mean	Interpretation
1. Financial performance (expenditure vs. budget) is periodically evaluated to ensure cost efficiency during project implementation.	4.33	Strongly Agree
2. Project budgets are reviewed and adjusted as needed to reflect changing financial conditions and priorities	4.27	Strongly Agree
3. Sufficient financial resources are allocated to ensure continuous project operations without delays.	4.23	Strongly Agree
4. The project utilizes effective cash flow management to meet payment schedules and financial obligations.	4.23	Strongly Agree
5. Financial audits or third-party reviews are conducted to ensure transparency and accountability in fund utilization.	3.97	Agree

In terms of financial operations. Table 7 demonstrates the respondents' assessment on financial operations as a strategic approach to

minimizing cost overruns in private small-scale construction projects.

The findings indicate favorable perceptions of financial operation practices among respondents, with periodic evaluation of financial performance obtaining the highest mean score (M = 4.33) and financial audits or third-party reviews the lowest (M = 3.97), although both were positively assessed. These findings imply that construction managers should continue prioritizing regular financial monitoring, budget reviews, and cash flow management, while strengthening financial audits and independent reviews to enhance accountability and decision-making. The results support Project Management Theory (PMT) and Triple Constraint Theory through effective financial planning and cost control, Transaction Cost Economics (TCE) through efficient financial governance, and Risk Management Theory through proactive financial oversight to minimize potential cost overruns.

In terms of application of current technology. Table 8 reflects the respondents' assessment on the application of current technology as a strategic approach to minimizing cost overruns in private small-scale construction projects.

Table 8
Respondents' Assessment on the Application of Current Technology as a Strategic Approaches in Minimizing Cost Overrun

Statement	Mean	Interpretation
1. Cost management software is integrated into the project workflow to automate tracking and improve financial decision-making.	3.96	Agree
2. The project employs digital tools such as Building Information Modeling (BIM) to enhance cost estimation and project planning accuracy.	3.86	Agree
3. Monitoring software or systems (e.g., dashboards, mobile apps) are utilized to track project costs and schedules in real time.	3.86	Agree
4. Cloud-based collaboration platforms are used to enhance communication and coordination among project stakeholders.	3.86	Agree
5. The use of technology has contributed to reducing errors, delays, and unnecessary costs in the project execution.	3.83	Agree

The results indicate a positive assessment of the use of current technology among respondents, with the integration of cost management software obtaining the highest mean score (M = 3.96), while the statement that technology reduces errors, delays, and

unnecessary costs received the lowest ($M = 3.83$), though both were interpreted as Agree. These findings imply that construction managers should continue integrating digital technologies while maximizing their effectiveness in reducing inefficiencies and cost overruns. The results support Project Management Theory (PMT) and Triple Constraint Theory, which emphasize technology's role in project planning, monitoring, and cost control, while reinforcing Transaction Cost Economics (TCE) through efficient information management and stakeholder coordination and Risk Management Theory through timely monitoring and informed decision-making to mitigate project risks.

In terms of integration of lean construction and value engineering principles. Table 9 presents the respondents' assessment on the integration of lean construction and value engineering principles in place of strategic approaches to minimizing cost overruns in private small-scale construction projects.

Table 9

Respondents' Assessment on the Integration of Lean Construction and Value Engineering Principles as a Strategic Approaches in Minimizing Cost Overrun

Statement	Mean	Interpretation
1. Continuous improvement practices are implemented to optimize workflows and eliminate non-value-adding activities	4.17	Agree
2. Value engineering principles are used to select cost-effective construction methods and materials without sacrificing quality.	4.17	Agree
3. Cross-functional teams are involved in design reviews to ensure that value and efficiency are prioritized throughout the project.	4.03	Agree
4. Lean construction techniques are applied to reduce material wastage and unnecessary labor costs.	4.00	Agree
5. Prefabrication or modular construction methods are considered to improve cost efficiency and shorten project duration.	3.90	Agree

The findings reflect a positive assessment of these practices, particularly continuous improvement initiatives aimed at optimizing workflows and eliminating non-value-adding activities, alongside the application of value engineering principles in selecting cost-effective construction methods and materials, both of which recorded the highest mean score ($M = 4.17$), while consideration of prefabrication or modular construction methods received the lowest ($M = 3.90$), though still interpreted as

Agree. These findings imply that construction managers should continue emphasizing continuous improvement and value-based decision-making while exploring alternative construction methods to enhance project efficiency and cost performance. The results support Project Management Theory (PMT) and Triple Constraint Theory through efficient planning and resource optimization, Transaction Cost Economics (TCE) through cost-efficient decision-making, and Risk Management Theory through proactive strategies that minimize waste, inefficiencies, and potential cost overruns throughout the project lifecycle.

RQ 3. Comparison of respondents' assessment on the strategic approaches in minimizing cost overrun

In terms of profession. Table 10 shows the results of the Kruskal–Wallis H Test used to determine whether there is a significant difference in the respondents' assessment of the strategic approaches in minimizing cost overruns when grouped according to profession.

Table 10

Kruskal–Wallis H Test: Comparison of the Respondents' Assessment on the Strategic Approaches in Minimizing Cost Overrun When Grouped According to Profession

Indicators	Profession	Mean Rank	p-value	Remarks
Cost Control	Project Manager	23.50	0.115	Not significant
	Contractor	16.75		
	Engineer	16.75		
	Architect	15.65		
Risk Management	Engineer	21.25	0.321	Not significant
	Architect	17.35		
	Project Manager	15.67		
	Contractor	15.50		
Financial Operation	Project Manager	18.08	0.417	Not significant
	Contractor	17.25		
	Engineer	17.25		
	Architect	16.58		
Application of Current Technology	Engineer	21.00	0.678	Not significant
	Architect	16.46		
	Project Manager	15.67		
	Contractor	10.25		
Integration of Lean Construction and Value Engineering Principles	Project Manager	17.25	0.919	Not significant
	Architect	16.04		
	Contractor	15.50		
	Engineer	15.00		

The findings revealed that all strategic approaches obtained p-values greater than 0.05, indicating no significant differences in respondents' assessments across professions.

Cost Control ($p = 0.115$) was rated highest by project managers (mean rank = 23.50), Risk Management ($p = 0.321$) by engineers (21.25), Financial Operations ($p = 0.417$) by project managers (18.08), Application of Current Technology ($p = 0.678$) by engineers (21.00), and Integration of Lean Construction and Value Engineering Principles ($p = 0.919$) by project managers (17.25). Despite these variations in mean ranks, none of the differences were statistically significant, indicating that construction professionals share comparable perceptions of these strategies in minimizing cost overruns regardless of profession. This suggests that project managers, contractors, engineers, and architects recognize the importance of these approaches, supporting consistent project management practices and collaboration across multidisciplinary teams.

In terms of years of experience. Table 11 demonstrates the results of the Kruskal–Wallis H Test used to determine whether there is a significant difference in the respondents' assessment of the strategic approaches in minimizing cost overruns when grouped according to years of experience.

Table 11

Kruskal–Wallis H Test: Comparison of the Respondents' Assessment on the Strategic Approaches in Minimizing Cost Overrun When Grouped According to Years of Experience

Indicators	Years of Experience	Mean Rank	p-value	Remarks
Cost Control	Less than 5 years	15.13	0.686	Not significant
	5–10 years	13.38		
	11–15 years	23.50		
	More than 15 years	16.75		
Risk Management	Less than 5 years	16.63	0.466	Not significant
	5–10 years	15.50		
	11–15 years	4.50		
	More than 15 years	13.75		
Financial Operation	Less than 5 years	15.21	0.443	Not significant
	5–10 years	17.25		
	11–15 years	3.50		
	More than 15 years	17.25		
Application of Current Technology	Less than 5 years	16.55	0.316	Not significant
	5–10 years	18.38		
	11–15 years	5.00		
	More than 15 years	12.00		
Integration of Lean Construction and Value Engineering Principles	Less than 5 years	15.63	0.557	Not significant
	5–10 years	15.25		
	11–15 years	4.50		
	More than 15 years	17.08		

The findings revealed that all strategic approaches obtained p-values greater than 0.05, indicating no significant differences in

respondents' assessments across experience groups. Cost Control ($p = 0.686$) was rated highest by respondents with 11–15 years of experience (mean rank = 23.50), while Risk Management ($p = 0.466$) was rated highest by those with less than 5 years (16.63), Financial Operations ($p = 0.443$) by those with 5–10 years/more than 15 years (17.25), Application of Current Technology ($p = 0.316$) by those with 5–10 years (18.38), and Integration of Lean Construction and Value Engineering Principles ($p = 0.557$) by those with more than 15 years of experience (17.08). Despite these variations, none of the differences were statistically significant, indicating that respondents share similar perceptions of these strategies in minimizing cost overruns regardless of professional experience. This suggests that both less and more experienced practitioners recognize the effectiveness of these approaches, supporting their consistent application across project teams.

Table 12

Extent of human resource management to the progression of electrical professionals in terms of Recruitment and Selection

Indicators	Project Completed in Previous Years	Mean Rank	p-value	Remarks
Cost Control	1 – 5	16.75	0.544	Not significant
	6 – 10	13.00		
	11 – 15	19.30		
	More than 15	14.91		
Risk Management	1 – 5	19.33	0.119	Not significant
	6 – 10	15.19		
	11 – 15	20.20		
	More than 15	11.50		
Financial Operation	1 – 5	17.25	0.47	Not significant
	6 – 10	15.06		
	11 – 15	19.50		
	More than 15	13.05		
Application of Current Technology	1 – 5	21.00	0.457	Not significant
	6 – 10	15.13		
	11 – 15	20.00		
	More than 15	10.73		
Integration of Lean Construction and Value Engineering Principles	1 – 5	18.83	0.083	Not significant
	6 – 10	13.38		
	11 – 15	22.10		
	More than 15	12.23		

In terms of number of projects completed in previous years. Table 12 reflects the results of the Kruskal–Wallis H Test used to determine whether there is a significant difference in the respondents' assessment of the strategic approaches in minimizing cost overruns when grouped according to the number of projects completed in previous years.

The findings revealed that all strategic approaches obtained p-values greater than 0.05, indicating no significant differences in respondents' assessments across project experience groups. Cost Control ($p = 0.544$), Risk Management ($p = 0.119$), and Integration of Lean Construction and Value Engineering Principles ($p = 0.083$) received the highest mean ranks from respondents who completed 11–15 projects, with mean ranks of 19.30, 20.20, and 22.10, respectively, while Financial Operations

these variations, none of the differences were statistically significant, indicating that respondents share similar perceptions of these management strategies regardless of the number of projects completed and supporting their consistent application across project teams.

RQ 4. Proposed action plan for cost control. The proposed cost control plan adopts an integrated approach to minimizing cost overruns in private

Table 13
Cost Control Action Plan

Area	Objective	Action Plan	Schedule	Budget	Persons Involved	Performance Indicators	Monitoring Mechanism	Evaluation
Cost Control	Strengthen budget and expenditure control.	1. Monitor cash flow. 2. Review budgets. 3. Evaluate financial performance. 4. Allocate adequate funds. 5. Allocat financial audits.	Weekly/ monthly	2-3% of administrative cost	Project Manager, Contractor, Architect, Quantity Surveyor, Procurement Officer	Controlled budget variance; timely reports; reduced overruns	Budget reports; cash-flow reviews; audits	Monthly actual-vs-budget review
Risk Management	Minimize cost-related project risks.	1. Conduct risk assessments. 2. Update contingency plans. 3. Assign risk owners. 4. Conduct risk reviews. 5. Update risk register.	Pre-project and throughout implementation	1-2% contingency	Project Manager, Contractor, Engineers, Site Supervisor	Timely risk mitigation; fewer unexpected issues; updated risk register	Risk register; meetings; site inspections; progress reports	Quarterly risk and mitigation review
Financial Operations	Ensure financial stability and accountability.	1. Monitor cash flow. 2. Review financial performance. 3. Adjust budgets as needed. 4. Allocate resources properly. 5. Audit fund utilization.	Throughout project lifecycle	Included in project management cost	Project Owner, Project Manager, Accountant, Contractor	Positive cash flow; timely payments; accurate records; audit compliance	Financial statements; cash-flow reports; audits	Monthly financial review; annual audit
Application of Current Technology	Improve efficiency through digital tools.	1. Adopt cost-management systems. 2. Use project management software. 3. Implement BIM. 4. Use real-time monitoring. 5. Train personnel.	Pre-project and quarterly	Based on project size	Project Manager, Architect, Engineers, IT Personnel	Increased technology use; accurate reports; fewer delays/errors	System reports; performance monitoring; training records	Quarterly technology and performance review
Lean Construction and Value Engineering	Reduce waste and optimize resources.	1. Reduce waste. 2. Monitor resource use. 3. Conduct value engineering. 4. Assess alternative materials/methods. 5. Promote continuous improvement.	Throughout project lifecycle	1-2% process improvement allocation	Project Manager, Architect, Engineers, Contractor	Less waste; better resource use; cost savings; maintained quality	Material reports; productivity monitoring; VE reviews; site inspections	Periodic resource, cost, and quality review

($p = 0.470$) and Application of Current Technology ($p = 0.457$) were rated highest by those who completed 1–5 projects, with mean ranks of 17.25 and 21.00, respectively. Despite

small-scale construction projects by translating evidence-based strategic approaches into practical interventions. It focuses on cost control, risk management,

financial operations, technology integration, and lean construction and value engineering as interconnected areas that strengthen project planning, improve decision-making, optimize resource utilization, and enhance project performance.

The plan was developed in response to the study findings, which showed positive assessments across these strategic areas, indicating their perceived effectiveness in managing project costs. Building on these results, the proposed interventions emphasize the establishment of systematic cost monitoring and budgeting procedures, regular risk identification and assessment activities, strengthened financial planning and cash flow management, greater utilization of digital technologies for project monitoring, and the application of lean construction and value engineering principles to reduce waste and maximize value. By integrating these strategies into project operations, the plan seeks to enhance cost efficiency, support timely project delivery, and improve the overall financial performance of private small-scale construction projects.

DISCUSSION

The study revealed that the respondents were predominantly architects, with 13 (43.33%), followed by other construction professionals with 7 (23.33%), project managers with 6 (20.00%), and contractors and engineers with 2 (6.67%) each. Most respondents had less than 5 years of professional experience (19 or 63.33%) and had managed more than 15 projects (11 or 36.67%). Despite differences in professional background and experience, respondents consistently rated cost control, risk management, financial operations, application of current technology, and lean construction and value engineering as highly effective approaches to minimizing cost overruns. This finding supports previous studies emphasizing that effective budget monitoring, risk assessment, stakeholder coordination, and resource optimization are essential mechanisms for improving project cost

performance and reducing financial inefficiencies in construction projects (Kerzner, 2017; PMI, 2021; Aghimien et al., 2020). The favorable assessment of technology-related strategies is likewise consistent with the literature highlighting the role of digital tools, data-driven decision-making, and construction technologies in improving project planning, monitoring, and cost management (Saka & Chan, 2020). Similarly, the high ratings for lean construction and value engineering reinforce findings that systematic waste reduction, process improvement, and value optimization contribute to enhanced project efficiency and cost containment (Koskela, 2020). Furthermore, the absence of significant differences in assessments across profession, years of experience, and number of projects managed suggests a shared industry perspective regarding the importance of these strategies, indicating that cost-overrun prevention is broadly recognized as a common concern among construction stakeholders. These findings provided empirical support for the development of the proposed Cost Overrun Action Plan, which integrates the five strategic areas identified by the respondents as effective in mitigating project cost overruns.

The study concludes that the identified strategic approaches collectively strengthen project planning, decision-making, resource utilization, financial management, and cost control in private small-scale construction projects. The respondents' diverse professional backgrounds and project experiences contribute to a broader understanding of cost management, while their similar assessments demonstrate that minimizing cost overruns is a shared responsibility among construction professionals. The proposed Cost Overrun Action Plan therefore provides a systematic basis for strengthening project control, reducing financial risks, improving efficiency, and achieving project completion within approved budgets.

Despite the valuable insights generated by this study, certain limitations should be acknowledged. The investigation was conducted

among only 30 construction professionals using purposive sampling within a specific geographic context, which may limit the generalizability of the findings to other construction sectors and locations. In addition, the study relied on self-reported assessments, which may be influenced by individual experiences and professional judgment. The descriptive-comparative design also focused on respondents' perceptions of strategic approaches rather than the direct measurement of actual project cost performance. These limitations should be considered when interpreting and applying the findings.

The findings have important implications for construction management practice. The consistently positive assessments across cost control, risk management, financial operations, technology utilization, and lean construction and value engineering indicate that cost overrun prevention requires an integrated rather than isolated approach.

Construction firms may use the proposed Cost Overrun Action Plan as a practical framework for standardizing cost management procedures, strengthening financial oversight, improving risk preparedness, and promoting informed decision-making throughout the project lifecycle. The results likewise highlight the potential value of investing in digital technologies and continuous process improvement initiatives to enhance cost efficiency in private small-scale construction projects.

Based on the findings, construction professionals should strengthen integrated cost management through regular budget reviews, expenditure monitoring, risk assessments, contingency planning, cash-flow management, and proper resource allocation. Construction organizations should also promote the adoption of digital technologies such as BIM and project management tools, while integrating lean construction and value engineering to reduce waste and identify cost-effective alternatives without compromising

quality. Stronger communication, regular coordination, and collaborative decision-making among project owners, contractors, architects, engineers, and other stakeholders should likewise be encouraged. Finally, the proposed Cost Overrun Action Plan should be implemented and continuously evaluated, while future researchers should validate and refine it across larger samples, different project types, and other construction settings.

DISCLOSURES

Author contributions. The sole author conceived and designed the study, developed the research instrument, collected and analyzed the data, interpreted the findings, prepared the Cost Overrun Action Plan, and wrote, reviewed, and approved the final manuscript. The author assumes full responsibility for the accuracy, integrity, and completeness of the work.

Conflict of interest. The author declares no conflict of interest. The research was conducted without any commercial, financial, personal, or professional relationships that could be construed as having influenced the conduct, analysis, or findings of the study.

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Ethics approval statement. No formal ethics approval was obtained for this study. Although this study involved human participants, the study was conducted in accordance with ethical principles for research involving human participants. Participation was voluntary, and respondents were informed of their right to withdraw from the study at any stage. The confidentiality and anonymity of all respondents

were strictly maintained, and the data collected were used solely for research purposes.

Data availability statement. The datasets generated and analyzed during the current study are not publicly available due to confidentiality and privacy considerations concerning the research participants. However, the data may be obtained from the corresponding author upon reasonable request, subject to appropriate conditions for protecting the confidentiality and anonymity of the respondents.

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