Jurnal Ilmiah
TELSINAS

Volume 8, No. 1 April 2025
e-ISSN 2621-5276 (online)

Evaluating Contractor Performance through Cost-Time Management Strategies in Educational Building Project

*Me Me Maw[1], Sang Kompiang Rizki Putra Atmaja[2], I Wayan Murtika[3]

[1]Department of Civil and Environmental Engineering, Faculty of Engineering, Mahidol University, Thailand
[2]Program Studi Teknik Lingkungan, Fakultas Teknik, Universitas Udayana, Indonesia
3Program Studi Teknik Sipil, Universitas Pendidikan Nasional, Indonesia
*E-mail: mememaw29@gmail.com

DOI:	**Received**:	**Accepted**:	**Publish**:
https://doi.org/10.38043/telsinas.v8i1.6229	07 February 2025	25 Maret 2025	25 April 2025

ABSTRACT: Project performance is a critical indicator in assessing the effectiveness and efficiency of construction projects, particularly in terms of cost and time management. This study aims to analyze the key factors influencing contractor performance in the classroom rehabilitation project in Bali, focusing on cost and time aspects. Data were collected through questionnaires distributed to 30 respondents, including contractors and consultants directly involved in the project. The findings indicate that thorough cost planning, strict budget control, and effective cost risk management significantly contribute to project success. Likewise, realistic scheduling, regular progress monitoring, and inter-team coordination are essential in ensuring timely project delivery. The use of technology and active stakeholder engagement further enhance operational efficiency. These results contribute to strengthening project management strategies, particularly for small-scale educational rehabilitation projects in Indonesia. These insights underline the importance of integrating cost and time strategies into project planning and execution, particularly for contractors and public agencies aiming to improve performance outcomes in small-scale infrastructure projects.

Keyword: *Performance; Contractor Management; Cost Control; Time Efficiency.*

I. INTRODUCTION

Project performance is a key indicator for measuring the success of construction project implementation [1]. It is not only assessed based on the physical output achieved, but also by evaluating the effectiveness and efficiency in resource utilization, timely completion, cost control, quality of outcomes, and stakeholder satisfaction [2]. Companies with strong performance typically exhibit high levels of profitability, growth, sustainability, and competitiveness.

In practice, project delays and cost overruns remain major challenges in the construction industry, particularly in the rehabilitation of educational buildings in Indonesia [3]. Previous studies have discussed various factors influencing project performance, including project management practices, contractor capacity, and external factors [4] [5][6]. However, there is still a limited number of studies that specifically examine the integrated impact of cost and time factors in small-scale educational rehabilitation projects, which often face tight budget constraints and limited execution time.

In practice, many public construction projects in Indonesia still suffer from underperformance, particularly in the education sector. A report by Indonesia's Ministry of Public Works and Housing (2022) indicated that nearly 34% of school infrastructure rehabilitation projects experienced delays, while cost overruns of up to 20% were reported in more than half of the projects. For example, in 2021, the rehabilitation of SDN 03 Cipayung in West Java faced a four-month delay due to budgeting miscalculations and procurement inefficiencies. Similarly, in Denpasar, the classroom renovation program in early 2023 exceeded its initial budget by nearly 18%, mainly due to inadequate cost forecasting and late design revisions. These cases reflect broader systemic issues in planning and managing small-scale educational construction.

This study aims to analyze the factors influencing contractor performance in terms of cost and time management in the rehabilitation project of classrooms at Bali. Emphasis is placed on budget planning, cost risk control, time management, as well as the implementation of technology and team coordination during project execution. By identifying the key elements that contribute to project efficiency, the findings

Volume 8, No. 1 April 2025
e-ISSN 2621-5276 (online)

of this research are expected to provide theoretical insights to strengthen project management frameworks and offer practical contributions for contractors and stakeholders in improving performance in similar rehabilitation projects. Accordingly, this study seeks to investigate which cost and time management strategies most significantly influence contractor performance in the context of educational facility rehabilitation

II. THEORETICAL FRAMEWORK

Performance in construction projects reflects the ability to meet project objectives in terms of cost, time, quality, and resource management. According to project management standards, project performance indicators typically include time, cost, scope, and stakeholder satisfaction [7]. Effective performance is achieved through optimal planning, coordination, and control processes.

Contractor Performance

Contractor performance is influenced by internal and external factors, such as resource capacity, experience, and the ability to adapt to project dynamics. However, in field practice, contractor performance is often influenced by dynamic and uncontrollable factors. Mobilization delays, for instance, are common in government-funded projects due to bureaucratic procurement procedures or late fund disbursement. Weather unpredictability, especially in tropical regions like Indonesia, can halt construction activities for days or weeks, affecting both time and quality outcomes. Moreover, inaccurate or under-scoped Bill of Quantities (BoQ) frequently leads to scope creep, unanticipated change orders, and disputes over contract variations all of which disrupt contractor workflow and performance.

Therefore, in evaluating contractor performance, it is critical to assess both internal capabilities, such as planning execution and external disruptions. High-performing contractors are characterized by their effectiveness in executing work schedules, managing costs, and maintaining quality standards [8]. Project success largely depends on the contractor's capability to integrate technical planning with managerial functions [9].

Cost Management

Cost management includes budgeting, cost estimation, financial tracking, and control mechanisms throughout the project lifecycle. Ineffective cost management can result in budget overruns, material shortages, and conflicts between stakeholders [10]. Key strategies for cost control include risk-based budgeting, transparent reporting systems, and the use of digital tools for real-time monitoring [11].

Time Management

Time management refers to planning and monitoring project schedules to ensure timely completion. It encompasses activity sequencing, duration estimation, and schedule control. Delays in construction projects often arise due to poor coordination, inadequate resource planning, and frequent design changes [12]. The application of scheduling tools such as Gantt charts and Critical Path Method (CPM) helps in mitigating potential time-related risks.

Use of Technology and Stakeholder Involvement

The adoption of project management technologies such as Building Information Modeling (BIM), digital dashboards, and integrated scheduling systems enhances visibility and control across all project phases. Moreover, stakeholder involvement ensures alignment of expectations and facilitates timely decision-making, which contributes to better risk handling and performance improvement [13].

III. METHODS

This study employs a quantitative descriptive approach aimed at identifying and analyzing the cost and time factors that influence contractor performance in the classroom rehabilitation project. In assessing contractor performance, the complexity, scope, and budget scale of the rehabilitation project were explicitly considered. The selected project rehabilitation of classroom is classified as a small-scale, low-complexity public infrastructure project, typically funded under local government budget allocations. The

Volume 8, No. 1 April 2025
e-ISSN 2621-5276 (online)

scope of work involved non-structural classroom improvements, including flooring, roofing, painting, ventilation upgrades, and minor electrical installations, without altering the structural layout.

Findings derived from this context are not intended to generalize across all construction types but rather to shed light on performance dynamics within budget-constrained, fast-paced, and regulation-bound rehabilitation projects, which represent a significant portion of infrastructure spending in Indonesia's education sector. The methodological steps include the design of research instruments, data collection from field respondents, and statistical analysis of findings.

Research Design and Location

The research was conducted as a case study within the rehabilitation project located in Denpasar, Bali. The scope of the study is limited to contractor performance related to cost management and time efficiency during project execution.

Population and Sample

The population consists of stakeholders involved in the project, specifically contractors and consultants. A purposive sampling method was applied to select 30 respondents who were directly engaged in the planning, execution, and supervision of the project.

Research Instrument

Data were collected using structured questionnaires designed to assess perceptions of cost and time factors influencing project performance. The instrument comprises two sets of questions:

1) 11 items focused on cost planning, financial risk, vendor selection, and technology utilization.
2) 11 items focused on time scheduling, coordination, progress monitoring, and change management.

Each item was presented in a binary format (Yes/No), aimed at capturing the respondent's agreement with specific statements related to project execution practices.

Data Analysis

The responses were analyzed using descriptive statistics, including frequency distributions and percentage analysis. Results were interpreted based on the proportion of agreement among respondents, highlighting critical factors perceived to affect contractor performance. Data processing was performed using Microsoft Excel, and the visual representation was prepared using bar charts to display aggregate trends in cost and time variables.

Validity and Ethical Considerations

The questionnaire underwent face validation through expert review from academic staff in civil engineering to ensure content relevance and clarity. All respondents participated voluntarily, and confidentiality of responses was assured throughout the research process.

IV. DISCUSSION

This section presents the analysis of the primary findings derived from questionnaire responses and interprets them in light of previous studies on project performance in the construction sector. The focus is on two key dimensions: cost and time both of which significantly influence contractor performance and overall project success.

Cost Factors and Their Influence on Contractor Performance

Cost is a fundamental element in construction project performance. Based on the findings of this study, 90% of respondents emphasized the importance of comprehensive cost planning, strict budget control, and transparent expenditure monitoring. These findings align with Gbahabo [14], who asserted that poor cost management leads to budget overruns and threatens both the quality and schedule of the project.

Furthermore, 83.33% of respondents acknowledged that cost risk identification and mitigation are essential to contractor efficiency. This finding is consistent with Rahim [15], who noted that

Volume 8, No. 1 April 2025
e-ISSN 2621-5276 (online)

integrating risk-based budgeting practices reduces uncertainties in financial execution. Transparent cost tracking also supported unanimously by respondents is in line with Adham [16], who emphasized that project cost transparency is vital in improving accountability and decision-making.

Interestingly, only 76.67% of respondents reported a structured plan for technology utilization to manage cost performance. This highlights a potential limitation in adopting digital cost control systems. According to Rashidi [17], technologies such as cost estimation software BIM and digital dashboards significantly improve cost forecasting and minimize manual errors. The limited adoption of technology can be attributed to several contextual barriers. Firstly, budget limitations in small-scale public projects often lead to prioritization of physical execution over investment in software systems or IT training. Contractors tend to allocate available funds toward labor and materials, perceiving digital platforms as non-essential overhead. Secondly, digital literacy among local contractors remains inconsistent, especially in regions where project execution relies on traditional management practices. Thirdly, the absence of mandatory digital reporting policies in government-funded rehabilitation projects reduces institutional pressure to adopt such tools. Hence, limited implementation may inhibit the ability to optimize resource allocation and real-time budget adjustments.

The importance of vendor selection was also highlighted by all respondents, aligning with Wang [18], who stressed that contractor-supplier alignment in cost strategy ensures stability in pricing, material availability, and quality outcomes. These findings suggest that while the awareness of cost management practices is high, the execution—especially in technology adoption—still shows variability. Contractor performance in similar rehabilitation projects could be significantly enhanced by integrating digital cost monitoring tools and adopting adaptive procurement strategies.

Time Factors and Their Influence on Contractor Performance

Time is another key determinant of project success. Based on the findings of this study, all respondents affirmed the importance of realistic scheduling, progress monitoring, and time risk management. This is consistent with the Ribeiro [19], which identifies time planning and control as critical knowledge areas in project success.

Inadequate time control has been found to directly impact cost, quality, and stakeholder satisfaction. According to Slaeat [20], common causes of delay in construction projects include poor planning, weak coordination, and delayed material deliveries all issues mitigated by proactive time management, as practiced in this study.

Notably, only 66.7% of respondents confirmed the existence of a structured change management process. This is a red flag, as the absence of such a mechanism can result in schedule disruptions and rework. Ahmad [21] emphasizes the importance of having formal change management frameworks to absorb project dynamics without compromising overall timelines. Meanwhile, 93.3% of respondents acknowledged the role of technology in supporting coordination and monitoring. The positive response reflects a growing recognition of tools such as scheduling software, Gantt charts, and real-time dashboards. However, the 6.7% gap suggests the presence of either digital literacy challenges or inadequate infrastructure.

The strong emphasis on planning and scheduling in this project has yielded a structured project flow. Yet, time-related risks especially regarding change management—require additional attention. Future similar projects should incorporate dynamic scheduling systems that allow for better responsiveness to unforeseen events.

Synthesis: Integrated Impact of Cost and Time Factors

The analysis reveals that cost and time dimensions are interdependent in determining contractor performance. In projects with limited budget and tight schedules, such as classroom rehabilitations, success hinges on the balance between precise financial planning and adaptable time execution. These findings reinforce the theoretical perspective that project success is a multi-dimensional construct involving scope, time, cost, quality, and stakeholder engagement [22], [23]. Contractor performance, as a central axis, can be strengthened by:

1. Embracing technology for both cost and time control
2. Establishing clear communication and change management protocols

Volume 8, No. 1 April 2025
e-ISSN 2621-5276 (online)

3. Enhancing capacity in risk anticipation and mitigation

The novelty of this study lies in its focus on a small-scale public education project an area often overlooked in large-scale project performance analyses. The results provide practical insights for local governments and construction stakeholders managing educational infrastructure projects.

V. CONCLUSION

This study aimed to analyze the key cost and time-related factors influencing contractor performance in the rehabilitation project of classrooms in Denpasar, Bali. The findings confirm that contractor performance is highly dependent on the integration of effective cost management and precise time scheduling. Comprehensive cost planning, financial transparency, risk mitigation strategies, and vendor selection emerged as critical components in maintaining budgetary control and operational efficiency. On the other hand, successful time management was strongly associated with realistic scheduling, continuous progress monitoring, and coordinated teamwork. However, the study also identified a significant gap in change management practices, which may lead to potential delays if not addressed proactively. The limited use of digital tools, although acknowledged as valuable by most respondents, represents an opportunity for improvement in future project implementations.

This research contributes both theoretically and practically to the body of knowledge on construction project performance. Theoretically, it validates the interdependence between cost and time management and their influence on contractor outcomes. Practically, it offers actionable recommendations for contractors, consultants, and public institutions involved in educational infrastructure projects, particularly in settings with budget and time constraints. Future research is encouraged to adopt a mixed-methods approach to further explore qualitative aspects such as organizational behavior, leadership, or stakeholder dynamics that may also affect contractor performance. Expanding the sample size and applying the framework to other types of construction projects would also enhance the generalizability of the findings.

REFERENCES

[1] M. Jahangirian, S. J. Taylor, T. Young, and S. Robinson, “Key performance indicators for successful simulation projects,” *Journal of the Operational Research Society*, vol. 68, no. 7, pp. 747–765, 2017.

[2] K. O. Obuo and S. P. Nyang’au, “Project Cost Management Process And Performance Of Road Projects In Nairobi City County, Kenya,” *International Journal of Social Sciences Management and Entrepreneurship (IJSSME)*, vol. 8, no. 4, 2024.

[3] I. N. I. Kumara, I. K. A. Ariana, I. G. F. S. Tapa, D. C. Indrashwara, L. P. M. K. Putri, and I. K. A. D. A. Putra, “Synergy of Value Engineering and Green Energy Systems in Innovating Building Construction,” in *2024 10th International Conference on Smart Computing and Communication (ICSCC)*, pp. 203–207, 2024.

[4] D. Girma, “Internal Factors Affecting Contractors’ Performance and the Improvement Mechanisms: Construction Technology and Management,” *Ethiopian Journal of Engineering and Technology*, vol. 3, no. 1, pp. 128–145, 2023.

[5] I. N. I. Kumara, “Penerapan Metode Least Cost Analysis Untuk Optimasi Percepatan Waktu Pelaksanaan Proyek,” *Reinforcement Review in Civil Engineering Studies and Management*, vol. 2, no. 1, pp. 8–24, 2023.

[6] I. Dharmayasa, M. Y. Anggreni, P. Anantanasakul, and I. P. Sugiana, “Geotechnical Evaluation of Landslide Risks in Bali’s Tourism Zones–A Case Study from Candidasa, Bali, Indonesia,” *Ecological Engineering & Environmental Technology*, vol. 25, 2024.

[7] I. K. A. Ariana, N. P. M. S. P. Wirawan, I. N. I. Kumara, and I. K. Nuraga, “Characteristics and Analysis of Factors Affecting the Performance of Service Providers (Contractors) in Denpasar City in 2023,” *Formosa Journal of Science and Technology*, vol. 3, no. 10, pp. 2255–2270, 2024.

[8] M. Ershadi, M. Jefferies, P. Davis, and M. Mojtahedi, “Modeling the capabilities of high-performing project management offices in general contracting companies,” *Project Management Journal*, vol. 54, no. 3, pp. 268–284, 2023.

Volume 8, No. 1 April 2025
e-ISSN 2621-5276 (online)

[9] I. N. I. Kumara, I. G. F. S. Tapa, D. C. Indrashwara, I. W. D.Pancane, & M. A. Predana, "Value Engineering in Enhancing Green Building Innovation", *Journal of Geoscience, Engineering, Environment, and Technology*, vol.10, no 1, pp. 64-70, 2025.
[10] A. Kumar and Y. Hooda, "Assessing Cost Overrun in Construction Industry: A Review," in *International Conference on Structural Engineering and Construction Management*, pp. 561–576, Cham: Springer Nature Switzerland, June 2024.
[11] N. R. Vyas, "Future of risk-based monitoring in clinical trials," *International Journal of Clinical Trials*, vol. 7, no. 3, pp. 221–228, 2020.
[12] I. K. A. Ariana, D. A. P. A. G. Putri, and M. D. C. Boavida, "Analisa Deskriptif Keterlambatan Pekerjaan Proyek Konstruksi Eto Tower Dili, Timor-Leste," *Jurnal Ilmiah Telsinas Elektro, Sipil dan Teknik Informasi*, vol. 5, no. 2, pp. 105–111, 2022.
[13] F. Sarifah, N. Fauziah, S. Evana, R. Pertiwi, A. Z. Fadhlurrahman, and R. Nugraha, "Kontribusi PTPP Terhadap Sustainable Development Goals Pada Tahun 2020–2022," *Jurnal Ilmiah Telsinas Elektro, Sipil dan Teknik Informasi*, vol. 7, no. 1, pp. 14–28, 2024.
[14] P. Gbahabo and A. O. Samuel, "Effects of infrastructure project cost overruns and schedule delays in sub-Saharan Africa," in *11th International Conference on Social Sciences*, Helsinki, pp. 20–21, Jan. 2017.
[15] M. S. Ab Rahim, G. Reniers, M. Yang, and P. Siwayanan, "Integrating Process Safety and Process Security Risk Management: Practitioner Insights for a Resilience-Oriented Framework," *Processes*, vol. 13, no. 2, article 392, 2025.
[16] T. K. I. Adham and A. Sukkar, "Effective Management of Construction Project Team: Identifying Leadership Qualities and Responsibilities," *Scholars Journal of Economics, Business and Management*, vol. 11, no. 2, pp. 63–73, 2024.
[17] A. Rashidi, D. W. Chan, M. Ravanshadnia, H. Sarvari, and A. Tajaddini, "Applying building information modelling (BIM) technology in pre-tender cost estimation of construction projects: a case study in Iran," *Buildings*, vol. 14, no. 5, article 1260, 2024.
[18] R. Wang, D. A. S. Samarasinghe, L. Skelton, and J. O. B. Rotimi, "A study of design change management for infrastructure development projects in New Zealand," *Buildings*, vol. 12, no. 9, article 1486, 2022.
[19] A. Ribeiro, A. Amaral, and T. Barros, "Project Manager Competencies in the context of the Industry 4.0," *Procedia Computer Science*, vol. 181, pp. 803–810, 2021.
[20] F. Slaeat, "The impact of poor planning on the duration and cost of the projects: The implications of poor planning on the projects," *Mesopotamian Journal of Civil Engineering*, pp. 60–81, 2024.
[21] T. Ahmad, J. Boit, and A. Aakula, "The role of cross-functional collaboration in digital transformation," *Journal of Computational Intelligence and Robotics*, vol. 3, no. 1, pp. 205–242, 2023.
[22] I. Vrečko, P. Tominc, and K. Širec, "Enhancing the performance of high-growth small-and medium-sized enterprises through effective project-management processes and stakeholder engagement: a systems perspective," *Systems*, vol. 11, no. 10, article 511, 2023.
[23] G. Dimech, R. D. Gonzi, and A. Wild, "Multi-dimensional Modelling for Mapping Project Trade-offs in Construction: A Maltese Perspective," in *Managing Risk and Decision Making in Times of Economic Distress, Part A*, vol. 108, pp. 51–67, Emerald Publishing Limited, 2022