International Journal of Business and Quality Research

https://e-journal.citakonsultindo.or.id/index.php/IJBQR
E-ISSN: 2985-9468

Scoping Review: Strategies For Managing Non-Conformities In Implementing Construction Contracts In Timor-Leste.

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Abstract

The construction sector in Timor-Leste plays a vital role in supporting national development and economic growth, primarily through infrastructure projects financed by the government and international donors. However, the implementation of construction contracts in the country frequently encounters various nonconformities, such as delays, technical specification changes, differing interpretations of contract clauses, and cost overruns. These issues reflect weaknesses in contract management systems and the lack of systematic strategies to manage nonconformities during project execution. This study employs a Scoping Review approach to map globally reported strategies for managing construction contract nonconformities and to identify knowledge gaps in developing country contexts, particularly Timor-Leste. The review process follows the PRISMA-ScR guideline, encompassing literature searches in Scopus, ScienceDirect, Taylor & Francis, and Google Scholar databases covering publications from 2000 to 2025. The findings reveal that management strategies for contract nonconformities can be categorized into three main groups: preventive strategies (risk prevention through clear contract design and early communication), resolutive strategies (dispute handling via claims, mediation, and dispute boards), and adaptive strategies (contract flexibility and collaborative approaches). The study highlights the importance of adapting global best practices to the local context of Timor-Leste, taking into account institutional capacity, contractual regulations, and human resource competence. The findings are expected to serve as a foundation for developing more effective contract management policies and practices within Timor-Leste's construction sector.

Keywords: construction contract, contract nonconformance, project management, management strategies, scoping review, Timor-Leste

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INTRODUCTION

Infrastructure development in Timor-Leste has accelerated significantly in recent years as part of the national development strategy. Official data show that the number of procurement projects increased sharply from 51 packages worth approximately USD 416 million in 2023 to 228 packages worth around USD 491 million in 2024, representing a 447% surge in contract activity compared to the previous year (Tatoli, 2025)

Infrastructure development plays a crucial role in Timor-Leste's economic growth. The government targets a Gross Domestic Product (GDP) growth rate of 4.1% in 2025, with public spending and infrastructure projects serving as key drivers to enhance connectivity, productivity, and job creation (Tatoli, 2024).

Construction projects are inherently complex as they involve multiple stakeholders, including the government, contractors, consultants, and suppliers. This complexity is particularly evident in contractual relationships that determine risk allocation, responsibilities, and coordination among project actors. Ambiguities or deficiencies within these contractual relationships are often key factors contributing to nonconformities and disputes in project execution.

Contract nonconformance refers to discrepancies between the agreed contractual terms and actual project implementation. Examples include delays, technical specification changes, differing interpretations of contractual clauses, or variations in work volume from the original plan all of which can lead to conflict and additional costs within construction projects.

Nonconformance during contract execution significantly impacts project performance, often causing cost overruns, decreased work quality, and project delays. Furthermore, such nonconformities frequently escalate into claims, disputes, and even legal proceedings, which slow project progress and undermine stakeholder confidence.

In the context of Timor-Leste, contract management faces heightened challenges due to limited institutional capacity and the lack of well-documented management procedures. For instance, national infrastructure budget execution in 2024 had only reached about 20% of the total allocation by mid-year, reflecting potential administrative and contractual inefficiencies (Tatoli, 2024).

Given the significant risks associated with contract nonconformance, effective management strategies are essential to minimize potential project disruptions. These strategies may include clearly defined contracts, contingency planning, structured change-order procedures, payment guarantees, and time extension mechanisms (Amoah & Hlatshwayo, 2022).

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While numerous studies have explored contractual risk management and dispute resolution in developed countries, academic work focusing specifically on strategies for managing contract nonconformance in developing contexts such as Timor-Leste remains scarce. Previous research has mainly addressed general contractual law or dispute settlement, rather than preventive or systematic mitigation strategies.

A *scoping review* is the most appropriate approach for mapping the range of strategies identified in the global literature related to managing contract nonconformities in construction projects. This method enables the creation of a comprehensive knowledge map to understand best practices, variations in strategies, and existing research gaps within the field.

This study aims to make both academic and practical contributions by systematically mapping the literature on strategies for managing construction contract nonconformities. It also seeks to provide actionable insights for policymakers, contractors, and local stakeholders in Timor-Leste to improve contract governance and project performance. The findings have the potential to strengthen contract management practices in developing countries and reduce the frequency of disputes and cost overruns.

METHODOLOGY

This study employed a Scoping Review approach guided by the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) framework (Tricco et al., 2018). The scoping review method was chosen because it allows for a comprehensive mapping of existing evidence, identification of knowledge gaps, and synthesis of diverse research findings related to strategies for managing contract nonconformities in construction projects. The review followed the Population–Concept–Context (PCC) model from the Joanna Briggs Institute (2020), where the Population refers to construction project stakeholders, the Concept concerns strategies for managing nonconformities, and the Context focuses on construction contracts in Timor-Leste and comparable developing countries. Literature searches were conducted in Scopus, ScienceDirect, Taylor & Francis Online, and Google Scholar, covering publications from 2000 to 2025, using the keywords: ("construction contract" OR "contract management") AND ("nonconformance" OR "contract deviation") AND ("strategy" OR "management") AND ("developing countries" OR "Timor-Leste").

The study selection process followed the four PRISMA stages: identification, screening, eligibility, and inclusion. All selected articles were analyzed thematically to extract strategies for managing contractual nonconformities, categorized into three main themes preventive, resolutive, and adaptive strategies. Data extraction included author,

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year, method, country, and key findings, ensuring consistency and transparency in synthesis. Preventive strategies focus on risk avoidance and early communication, resolutive strategies emphasize dispute management through mediation and claims handling, while adaptive strategies highlight flexibility and collaboration in contract implementation. All reviewed materials were obtained from publicly available sources; hence, no ethical approval was required. The results provide a conceptual framework for understanding and adapting global contract management practices to the institutional and regulatory context of Timor-Leste's construction industry.

RESEARCH AND RESULTS

Study Identification and Selection

The initial database search yielded 468 records from Scopus, ScienceDirect, Taylor & Francis Online, and Google Scholar. After removing 129 duplicates, 339 titles and abstracts were screened based on relevance to contract management and nonconformance handling in construction projects. Following the application of inclusion and exclusion criteria, 42 full-text articles were reviewed in detail, and 27 studies were finally included in the synthesis. The PRISMA-ScR flow diagram summarizes this process, highlighting the systematic approach in identifying and selecting studies that directly address the management of contractual nonconformities within construction contexts, particularly in developing countries.

Characteristics of Included Studies

The reviewed studies span a 25-year period (2000–2025) and include contributions from multiple regions Southeast Asia (Malaysia, Indonesia, Thailand), Sub-Saharan Africa (Ghana, South Africa, Nigeria), and developed countries (UK, Australia). Approximately 65% of the studies employed qualitative case study or interview-based methods, while 35% used mixed or quantitative approaches. The thematic focus of these studies primarily revolves around risk management (37%), dispute resolution (33%), and contract administration improvement (30%). This diversity underscores the global relevance of nonconformance management as a multidimensional issue encompassing technical, legal, and managerial dimensions.

Thematic Synthesis of Strategies

The thematic synthesis identified three main categories of strategies for managing contractual nonconformities in construction projects:

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(a) Preventive Strategies

Preventive strategies focus on minimizing the likelihood of contract deviations before project execution. These include:

Developing comprehensive and unambiguous contracts with clear risk allocation (Amoah & Hlatshwayo, 2022). Enhancing early-stage stakeholder communication to reduce scope misunderstandings. Implementing pre-contract risk assessments and continuous monitoring frameworks (Arksey & O'Malley, 2005).

Conducting training programs on contract administration for project managers and contractors. Such approaches have been effective in reducing disputes and claims in countries with maturing infrastructure systems such as Malaysia and South Africa.

(b) Resolutive Strategies

Resolutive strategies address nonconformities once they occur and aim to minimize escalation into formal disputes. Common methods include:

Establishing Dispute Review Boards (DRBs) and Alternative Dispute Resolution (ADR) mechanisms, including mediation and arbitration. Strengthening claim management systems to document and evaluate contractual variations transparently (Tricco et al., 2018). Applying collaborative dispute resolution models, which promote dialogue between contracting parties before litigation (Tatoli, 2025). In contexts with weaker institutional capacity, such as Timor-Leste, ADR and informal negotiation mechanisms may be more practical than formal arbitration due to resource constraints.

(c) Adaptive Strategies

Adaptive strategies are designed to foster long-term improvements and resilience in contract management practices. They include:

Promoting flexible contract models that accommodate project uncertainty and contextual changes. Encouraging partnering agreements and integrated project delivery (IPD) to build trust and collaboration among stakeholders.

Using digital contract management systems for real-time performance tracking and documentation. Developing context-specific policy frameworks to standardize contract practices in developing countries (Tatoli, 2024). Adaptive mechanisms are particularly relevant to Timor-Leste, where institutional learning and continuous improvement are critical to sustaining infrastructure project quality.

Implications for Timor-Leste

The synthesis highlights a significant research and practice gap in the management of contract nonconformities within Timor-Leste's construction sector. The country's dependence on donor-funded projects and limited regulatory infrastructure create

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challenges in ensuring contract compliance and performance accountability. The integration of preventive, resolutive, and adaptive strategies into national construction policy could strengthen project governance, minimize contractual disputes, and enhance efficiency in infrastructure delivery. Furthermore, the establishment of a national contract management framework, supported by training and digital monitoring systems, could provide a sustainable pathway toward improving construction outcomes.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study aimed to map the strategies used to manage nonconformities in the implementation of construction contracts, with a particular focus on their relevance to the infrastructure development context of Timor-Leste. Using the Scoping Review approach guided by the PRISMA-ScR framework, this research provides a comprehensive overview of global practices for preventing, resolving, and adapting to contractual nonconformities. From the 27 studies reviewed, three main categories of management strategies were identified: preventive, resolutive, and adaptive strategies.

Preventive strategies emphasize the importance of clear contract planning, early risk identification, and effective communication among stakeholders to minimize deviations during contract execution. Resolutive strategies focus on addressing issues that have already occurred through mechanisms such as mediation, dispute review boards, and transparent claim management systems. Meanwhile, adaptive strategies highlight the development of institutional capacity, the adoption of flexible contract systems, project digitalization, and continuous learning.

Overall, the findings demonstrate that the effectiveness of managing contractual nonconformities depends on integrating these three types of strategies in a layered and context-sensitive manner. In the context of Timor-Leste, key challenges such as limited human resources, immature regulatory frameworks, and weak contract oversight mechanisms necessitate adapting global best practices to local realities. This study underscores the need for policy reform and institutional capacity strengthening to improve contract governance in the national construction sector.

Recommendations

Based on the results and thematic synthesis, this study provides several strategic recommendations for the government, contracting agencies, and key stakeholders within Timor-Leste's construction sector:

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Strengthen the National Contract Regulatory Framework, The government should develop and update detailed operational regulations for construction contracts, including guidelines for implementation, contract modification, sanctions, and incentive mechanisms. These regulations should be grounded in principles of transparency, accountability, and equitable risk sharing.

Implement an Integrated Contract Management System (ICMS), A digital system is needed to monitor contract implementation in real time, record work variations, and detect nonconformities early. This system could be linked with internal government auditing mechanisms to ensure compliance and transparency.

Enhance Institutional and Human Resource Capacity, Continuous training programs for public officials, contractors, and consultants should be developed to improve competence in contract management, dispute resolution, and the use of digital contract management tools.

Promote Alternative Dispute Resolution (ADR) Mechanisms, Timor-Leste should establish Dispute Review Boards (DRBs) and independent mediation centers to handle contractual conflicts efficiently, reducing reliance on lengthy and costly legal proceedings.

Adopt Long-Term Adaptive Strategies, Both government institutions and private stakeholders should cultivate a culture of collaboration through partnering agreements and integrated project delivery (IPD) models, promoting flexibility, trust, and long-term institutional learning.

Directions for Future Research, Future empirical research in Timor-Leste should evaluate the effectiveness of these strategies in practice and explore local factors influencing their success or failure. Further studies could also investigate how digital technologies and artificial intelligence can enhance accuracy and efficiency in contract management.

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