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Strategies For Managing Non-Conformities In Construction Contract Implementation In Timor-Leste: A Systematic Literature Review

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Abstract

Construction contract implementation plays a crucial role in ensuring that infrastructure projects achieve their objectives in terms of cost, quality, schedule, compliance, and sustainability. However, construction projects frequently encounter non-conformities, including quality defects, contractual deviations, project delays, documentation deficiencies, and regulatory non-compliance, which negatively affect project performance. This study aims to identify and synthesize strategies for managing non-conformities in construction contract implementation with particular relevance to the context of Timor-Leste. A Systematic Literature Review (SLR) was conducted using the PRISMA 2020 framework. Literature published between January 2015 and December 2025 was retrieved from major international databases, including Scopus, Web of Science, ScienceDirect, Emerald Insight, SpringerLink, Taylor and Francis Online, ASCE Library, and Wiley Online Library. Following the identification, screening, eligibility, and inclusion stages, 88 peer-reviewed studies were selected for analysis. The findings indicate that effective non-conformity management requires integrated contract management systems, quality assurance

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practices, risk-based compliance management, governance mechanisms, digital technologies, and green innovation initiatives. These strategies improve compliance, transparency, sustainability, and overall project performance, providing valuable guidance for strengthening infrastructure development in Timor-Leste.

Keywords: construction contract implementation, non-conformities, contract management, green innovation, infrastructure projects, Timor-Leste.

INTRODUCTION

The construction industry plays a strategic role in promoting economic growth, improving social welfare, and supporting sustainable development through the provision of infrastructure and public facilities. In developing countries, infrastructure investment is widely recognized as a key driver of economic competitiveness, regional integration, and poverty reduction. Effective infrastructure delivery depends not only on financial resources and technical expertise but also on the successful implementation of construction contracts that govern relationships among project stakeholders and establish the framework for project execution (Kerzner, 2022; World Bank, 2024).

Construction contracts serve as fundamental instruments for defining project scope, allocating risks, establishing performance expectations, and ensuring accountability throughout the project lifecycle. The effectiveness of construction contract implementation directly influences project outcomes in terms of cost, quality, time, safety, and stakeholder satisfaction. However, despite advances in project management practices, construction projects continue to experience significant implementation challenges that frequently result in contractual disputes, cost overruns, schedule delays, quality failures, and project inefficiencies (Hansen, 2021; Eriksson & Westerberg, 2019).

One of the most persistent challenges in construction contract implementation is the occurrence of non-conformities. Non-conformities refer to deviations from contractual requirements, technical specifications, regulatory standards, quality expectations, approved procedures, or agreed project objectives. Such deviations may occur in the form of defective workmanship, non-compliant materials, inadequate documentation, delayed project activities, contractual violations, environmental breaches, or failures in stakeholder communication and coordination. These non-conformities can significantly affect project performance by increasing rework, generating disputes, reducing productivity, and escalating project costs (Love et al., 2022;

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Love et al., 2023).

The growing complexity of modern infrastructure projects has intensified the challenges associated with managing non-conformities. Contemporary construction projects involve multiple stakeholders, sophisticated technologies, complex contractual arrangements, and increasingly stringent regulatory requirements. Furthermore, project owners and governments are placing greater emphasis on transparency, accountability, sustainability, and long-term value creation. As a result, construction organizations are required to adopt more comprehensive approaches to contract administration, compliance monitoring, quality assurance, and risk management to prevent non-conformities and improve project outcomes (PMI, 2021; OECD, 2020).

In recent years, the concept of green innovation has emerged as an important strategy for enhancing both sustainability and operational performance within the construction industry. Green innovation refers to the development and implementation of environmentally friendly technologies, processes, products, and management practices that reduce environmental impacts while simultaneously improving economic and organizational performance. Within construction projects, green innovation encompasses sustainable procurement, energy-efficient technologies, waste reduction practices, resource optimization, green materials, environmentally responsible construction methods, and sustainability-oriented management systems (Chen et al., 2022; Xie et al., 2023).

The integration of green innovation into construction contract implementation has attracted increasing attention from researchers and practitioners. Construction contracts are no longer limited to traditional concerns such as cost, quality, and time performance. Increasingly, contracts incorporate sustainability requirements, environmental compliance provisions, carbon reduction targets, waste management obligations, and green procurement criteria. These contractual requirements encourage project stakeholders to adopt innovative practices that improve environmental performance while strengthening compliance and governance mechanisms (Li et al., 2024; Gu et al., 2023).

Green innovation also contributes to reducing the occurrence of non-conformities by improving process standardization, enhancing organizational learning, strengthening environmental management systems, and promoting continuous improvement practices. Organizations that actively pursue green innovation often establish more robust monitoring systems, clearer performance indicators, and stronger compliance frameworks. These capabilities facilitate the early identification and resolution of deviations before they develop into significant contractual or operational problems (Wang et al., 2023; Husnaini & Tjahjadi, 2021).

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In addition to green innovation, digital transformation has become an important enabler of effective construction contract management. Technologies such as Building Information Modeling (BIM), Artificial Intelligence (AI), blockchain, Internet of Things (IoT), and digital contract management systems are increasingly used to improve project monitoring, compliance verification, information management, and decision-making processes. These technologies support real-time performance tracking, automated documentation, risk identification, and transparency throughout project implementation, thereby reducing the likelihood of non-conformities and contractual disputes (Marzouk & Azab, 2024; Ahmadisheykhsarmast & Sonmez, 2020).

Despite the growing body of research on contract management, project governance, quality management, and sustainability, non-conformities remain a major concern in infrastructure projects worldwide. Previous studies have investigated individual aspects of contract administration, quality failures, risk management, dispute resolution, and project governance. However, the available evidence remains fragmented, and there is limited synthesis of the strategies specifically designed to manage non-conformities during construction contract implementation. Moreover, the relationship between non-conformity management and green innovation has not been comprehensively examined within the existing literature (Love et al., 2023; Vilkonis et al., 2023).

These challenges are particularly relevant to Timor-Leste, where infrastructure development continues to be a national priority. Since independence, the government has invested substantially in transportation networks, public facilities, water systems, and other strategic infrastructure projects aimed at supporting economic growth and social development. While these investments have contributed to national development, infrastructure projects in Timor-Leste continue to face challenges related to project delivery, contract administration, institutional capacity, governance effectiveness, and compliance monitoring. Such challenges may increase the risk of non-conformities and reduce the effectiveness of public infrastructure investments (Government of Timor-Leste, 2023; World Bank, 2024).

The institutional context of Timor-Leste further highlights the importance of identifying evidence-based approaches for managing construction contract non-conformities. As a developing country with evolving governance structures and limited technical capacity, Timor-Leste can benefit from international best practices in contract management, quality assurance, compliance systems, digital transformation, and green innovation. Understanding how these strategies have been applied in other contexts may provide valuable insights for improving

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infrastructure governance and project performance within the country (OECD, 2020; World Bank, 2024).

Given these considerations, a systematic synthesis of the existing literature is necessary to identify effective strategies for managing non-conformities in construction contract implementation. Such a synthesis can provide a comprehensive understanding of the causes of non-conformities, the mechanisms used to address them, and the role of emerging approaches such as green innovation and digital transformation in enhancing compliance and project performance. A systematic review is particularly valuable because it enables the integration of evidence from multiple studies, thereby generating a stronger knowledge base for both theory and practice (Page et al., 2021a; Page et al., 2021b).

Therefore, this study aims to systematically review and synthesize the international literature on strategies for managing non-conformities in construction contract implementation, with a particular focus on implications for Timor-Leste. By adopting the PRISMA 2020 framework and examining studies published between 2015 and 2025, this research seeks to identify critical success factors, emerging management strategies, and evidence-based recommendations that can strengthen construction contract implementation, improve compliance performance, promote green innovation, and support sustainable infrastructure development in Timor-Leste.

LITERATURE REVIEW

Construction Contract Implementation

Construction contract implementation is a critical phase in the project life cycle because it determines whether contractual obligations, technical requirements, quality standards, budget allocations, and project schedules can be successfully translated into project outcomes. Construction contracts provide the legal and managerial framework that governs the relationships among project owners, contractors, consultants, suppliers, and other stakeholders throughout project execution. Effective implementation requires systematic monitoring, coordination, communication, and compliance management to ensure that all contractual obligations are fulfilled according to agreed specifications and objectives (Kerzner, 2022).

The successful implementation of construction contracts has been widely recognized as a key determinant of project performance. Research indicates that deficiencies in contract administration often result in project delays, cost overruns, quality failures, disputes, and reduced stakeholder satisfaction. Effective contract management practices improve accountability, facilitate risk allocation, strengthen communication among stakeholders, and support the

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achievement of project objectives. Consequently, contract implementation has become a central concern within construction management and infrastructure governance research (Hansen, 2021; Eriksson & Westerberg, 2019).

In developing countries, construction contract implementation is often influenced by institutional capacity, governance quality, regulatory effectiveness, and the availability of technical expertise. Weak administrative systems, inadequate monitoring mechanisms, and limited professional competencies frequently contribute to implementation challenges and increase the likelihood of contractual deviations. These conditions are particularly relevant in infrastructure projects where contractual complexity and public accountability requirements are high (World Bank, 2024).

Concept of Non-Conformities in Construction Projects

Non-conformity refers to any deviation from specified requirements, contractual obligations, approved procedures, technical standards, or regulatory provisions. In the construction industry, non-conformities may occur in various forms, including defective workmanship, material failures, documentation errors, schedule delays, environmental violations, contractual breaches, and non-compliance with project specifications. Such deviations often compromise project quality, increase costs, generate disputes, and negatively affect overall project performance (ISO, 2015).

The concept of non-conformity has traditionally been associated with quality management systems, particularly within the framework of ISO 9001. However, contemporary research suggests that construction non-conformities extend beyond technical defects and frequently reflect broader organizational, managerial, contractual, and governance-related deficiencies. Modern perspectives emphasize that non-conformities often arise from systemic weaknesses rather than isolated operational errors, highlighting the need for integrated management approaches that address both technical and organizational factors (Love et al., 2023).

Non-conformities are particularly significant in construction projects because of their direct relationship with rework. Rework represents one of the most costly consequences of non-conformities and often results in productivity losses, schedule overruns, increased resource consumption, and reduced client satisfaction. Studies have shown that ineffective management of non-conformities can substantially reduce project efficiency and compromise long-term infrastructure performance (Love et al., 2022).

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Theoretical Perspectives on Non-Conformity Management

Agency Theory provides an important theoretical foundation for understanding non-conformities in construction contract implementation. The theory suggests that contractual relationships involve principals and agents whose interests may not always be aligned. Information asymmetry between project owners and contractors may create opportunities for opportunistic behavior, contractual violations, and compliance failures. Effective monitoring systems, governance mechanisms, and performance evaluation processes are therefore necessary to reduce agency-related risks and improve contractual compliance (Jensen & Meckling, 1976).

Institutional Theory offers another useful perspective by emphasizing the influence of formal regulations, organizational norms, and governance structures on organizational behavior. According to this theory, organizations operating within strong institutional environments are more likely to comply with contractual requirements and industry standards because regulatory pressures, accountability systems, and professional norms encourage compliance-oriented behavior. Conversely, weak institutional environments often experience higher levels of contractual non-conformity due to inadequate enforcement mechanisms and governance deficiencies (Scott, 2014).

Risk Management Theory further contributes to understanding the occurrence of non-conformities in construction projects. Construction projects operate under conditions of uncertainty arising from technical complexity, environmental variability, financial constraints, and stakeholder interactions. Effective risk identification, assessment, mitigation, and monitoring processes can significantly reduce the likelihood of non-conformities and improve project performance. Risk-based approaches have therefore become increasingly integrated into contemporary contract management frameworks (PMI, 2021).

Causes of Non-Conformities in Construction Contract Implementation

The literature identifies weak contract management as one of the most significant causes of non-conformities in construction projects. Deficiencies in contract monitoring, documentation control, change management, and communication processes often result in contractual deviations and compliance failures. Organizations lacking formal contract management systems frequently experience greater difficulties in maintaining contractual compliance and controlling project risks (Hansen, 2021).

Quality management deficiencies also contribute significantly to the occurrence of non-conformities. Weak inspection procedures, inadequate quality assurance programs, ineffective

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corrective action systems, and insufficient quality culture increase the likelihood of defects and rework. Research indicates that organizations with poorly developed quality management systems experience higher rates of operational failures and reduced project performance (Love et al., 2023).

Communication and coordination problems represent another major source of non-conformities. Construction projects involve multiple stakeholders with diverse responsibilities and expectations. Poor communication can result in misunderstandings, inconsistent interpretations of contractual requirements, delayed decision-making, and implementation errors. Collaborative communication practices have been shown to improve project performance and reduce the occurrence of contractual disputes and deviations (Eriksson & Westerberg, 2019).

Governance-related weaknesses also contribute to non-conformities in construction contract implementation. Limited transparency, inadequate accountability mechanisms, weak regulatory oversight, and insufficient institutional capacity reduce the effectiveness of compliance monitoring systems. These governance challenges are particularly prevalent in developing countries and often affect the successful delivery of public infrastructure projects (OECD, 2020).

Strategies for Managing Non-Conformities

Contract management systems are consistently identified as one of the most effective strategies for managing non-conformities. Effective systems provide structured mechanisms for monitoring contractual obligations, evaluating performance, controlling documentation, managing communications, and implementing corrective actions. Organizations with mature contract management capabilities generally demonstrate higher levels of compliance and better project outcomes (Hansen, 2021).

Quality assurance and quality control systems are also essential for reducing non-conformities. These systems facilitate the early identification of deviations, support root-cause analysis, and promote continuous improvement. By implementing structured quality management processes, organizations can reduce defects, improve compliance with specifications, and minimize rework costs. Such practices contribute significantly to improving project efficiency and stakeholder satisfaction (ISO, 2015; Love et al., 2023).

Risk-based management approaches have gained increasing attention as proactive mechanisms for preventing non-conformities. These approaches focus on identifying potential compliance failures before they occur and implementing preventive measures to reduce project vulnerabilities. Integrating risk management into contract administration enables organizations to

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improve decision-making, allocate resources more effectively, and strengthen project resilience (PMI, 2021).

Corrective and preventive action systems represent another important strategy. Effective organizations establish formal procedures for documenting non-conformities, investigating root causes, implementing corrective measures, and preventing recurrence. These systems support organizational learning and continuous improvement while enhancing long-term compliance performance (ISO, 2015).

Green Innovation and Construction Contract Implementation

Green innovation has emerged as a strategic approach for improving sustainability and operational performance in the construction industry. Green innovation refers to the development and implementation of environmentally friendly technologies, processes, products, and management practices that reduce environmental impacts while enhancing organizational effectiveness. The increasing emphasis on sustainable development has encouraged construction organizations to adopt green innovation practices as part of their project management and contract implementation strategies (Chen et al., 2022).

The integration of green innovation into construction contract implementation has expanded significantly in recent years. Construction contracts increasingly include sustainability requirements, environmental performance indicators, green procurement provisions, waste management obligations, and carbon reduction targets. These contractual mechanisms encourage project stakeholders to adopt environmentally responsible practices while strengthening compliance and accountability systems (Li et al., 2024).

Green innovation contributes to reducing non-conformities through several mechanisms. Sustainable procurement practices improve material quality and supplier compliance, while environmental management systems strengthen monitoring and reporting procedures. Green construction methods often require greater process standardization, clearer performance indicators, and more rigorous documentation systems, all of which contribute to improved contractual compliance and reduced operational deviations (Wang et al., 2023).

Furthermore, green innovation enhances organizational learning and continuous improvement. Organizations implementing sustainability initiatives often develop stronger capabilities in performance measurement, stakeholder engagement, compliance management, and knowledge sharing. These capabilities support the early identification of potential non-conformities and facilitate the implementation of preventive actions before significant project

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disruptions occur (Xie et al., 2023).

Digital Transformation and Non-Conformity Management

Digital transformation is increasingly reshaping construction contract implementation and compliance management practices. Technologies such as Building Information Modeling (BIM), Artificial Intelligence (AI), blockchain, Internet of Things (IoT), and digital contract management platforms provide new opportunities for improving project monitoring, information management, and decision-making processes. These technologies enhance transparency, facilitate real-time data collection, and support automated compliance verification (Marzouk & Azab, 2024).

Artificial intelligence applications have demonstrated considerable potential for supporting contract review, risk identification, compliance monitoring, and dispute prevention. AI-assisted systems can process large volumes of contractual information, identify potential risks, and detect compliance issues more efficiently than traditional manual approaches. Consequently, AI technologies are increasingly recognized as valuable tools for reducing non-conformities and improving contract governance (Ahmadisheykhsarmast & Sonmez, 2020).

Blockchain technology has also emerged as a promising solution for improving transparency and accountability in construction contract implementation. Blockchain-enabled smart contracts facilitate secure information sharing, automated contract execution, and transparent payment processes. These capabilities reduce opportunities for disputes and enhance stakeholder trust, thereby supporting compliance and reducing contractual deviations (Ahmadisheykhsarmast & Sonmez, 2020).

Construction Contract Implementation in Timor-Leste

Timor-Leste has made substantial investments in infrastructure development since gaining independence, recognizing infrastructure as a critical foundation for economic growth and social development. Government initiatives have prioritized the development of transportation networks, public facilities, water supply systems, and other strategic infrastructure projects aimed at improving national connectivity and economic competitiveness (Government of Timor-Leste, 2023).

Despite these investments, infrastructure projects in Timor-Leste continue to face challenges related to contract administration, governance effectiveness, technical capacity, and compliance monitoring. These challenges may contribute to the occurrence of non-conformities during project implementation and reduce the effectiveness of public infrastructure investments.

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Strengthening construction contract management practices has therefore become an important priority for improving project delivery and ensuring sustainable development outcomes (World Bank, 2024).

The international literature suggests that adopting best practices in contract management, quality assurance, governance systems, digital transformation, and green innovation can significantly improve compliance and project performance. However, limited research has examined how these strategies can be adapted to the specific institutional and developmental context of Timor-Leste. This gap highlights the importance of systematically synthesizing existing evidence to identify strategies that can support more effective management of non-conformities in the country's construction sector (OECD, 2020; World Bank, 2024).

Research Gap

Although extensive research has been conducted on construction management, project governance, quality assurance, and sustainability, relatively few studies have specifically focused on managing non-conformities within the context of construction contract implementation. Existing research tends to examine contract management, quality failures, dispute resolution, risk management, and sustainability as separate topics rather than exploring their interrelationships within a unified framework (Love et al., 2023).

Furthermore, limited attention has been given to the role of green innovation in reducing construction contract non-conformities. While the benefits of green innovation for environmental sustainability and organizational performance are increasingly recognized, its contribution to compliance management and contract implementation effectiveness remains underexplored. Additional research is therefore required to understand how sustainability-oriented innovations can strengthen contractual compliance and reduce project deviations (Chen et al., 2022; Li et al., 2024).

The literature also reveals a significant lack of studies focusing on small developing countries such as Timor-Leste. Most existing evidence originates from developed economies or large emerging markets, creating uncertainty regarding the applicability of identified strategies in different institutional environments. Consequently, a systematic review is necessary to synthesize international evidence and identify management strategies that can support effective construction contract implementation and sustainable infrastructure development in Timor-Leste. (World Bank, 2024).

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METHODOLOGY

Research Design

This study employed a Systematic Literature Review (SLR) approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) framework. The selection of PRISMA 2020 was based on its ability to provide a transparent, rigorous, and reproducible methodology for identifying, evaluating, and synthesizing scientific evidence. PRISMA 2020 has become the international standard for conducting systematic reviews because it ensures methodological consistency, minimizes selection bias, and improves the reliability of research findings (Page et al., 2021a; Page et al., 2021b).

The review focused on identifying and synthesizing strategies used to manage non-conformities in construction contract implementation. Particular attention was given to studies addressing contract management, quality assurance, compliance management, governance systems, dispute prevention, risk management, sustainability, digital transformation, and green innovation within infrastructure projects. Although the study focused on Timor-Leste, the review considered global evidence to identify best practices and lessons that could be adapted to the country's infrastructure development context.

The review was restricted to peer-reviewed journal articles published between January 2015 and December 2025. This period was selected because it captures contemporary developments in construction management, sustainability practices, compliance systems, digital technologies, and green innovation that increasingly influence contract implementation and project governance. Limiting the review to the most recent decade also ensures that the synthesized evidence reflects current industry practices and emerging trends.

Search Strategy

A comprehensive literature search was conducted using several internationally recognized scientific databases. These databases were selected because of their extensive coverage of high-quality publications in construction management, engineering management, project governance, and infrastructure development. The databases included Scopus, Web of Science Core Collection, ScienceDirect, Emerald Insight, SpringerLink, Taylor and Francis Online, ASCE Library, and Wiley Online Library.

The search strategy was developed through an iterative process involving preliminary searches, keyword refinement, and validation against relevant review studies. Keywords were

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derived from the research objectives and major concepts contained in the study title. Boolean operators, phrase searching, truncation techniques, and database-specific search filters were applied to maximize both sensitivity and precision during the search process.

The search combined terms related to construction contracts, contract implementation, contract management, non-conformities, compliance failures, contractual deviations, construction defects, quality management, governance mechanisms, corrective actions, and compliance management. Additional keywords associated with sustainability and green innovation were incorporated to ensure adequate coverage of emerging research streams relevant to contemporary infrastructure projects.

Only peer-reviewed journal articles written in English were included in the search process. Conference papers, books, dissertations, editorials, technical notes, and unpublished reports were excluded because they generally undergo less rigorous peer-review processes and may not provide sufficient methodological detail for systematic synthesis.

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion Criteria	Exclusion Criteria
Publication type	Peer-reviewed journal articles	Conference papers, books, theses, editorials
Language	English	Non-English
Publication period	January 2015–December 2025	Before 2015
Subject area	Construction management, project management, engineering management, infrastructure governance	Unrelated disciplines
Topic relevance	Construction contracts, non-conformities, compliance, contract implementation	Unrelated to contract implementation
Accessibility	Full-text available	Full-text unavailable
Indexing	Scopus-indexed or equivalent high-quality databases	Non-indexed publications

Study Selection Procedure Based on PRISMA 2020

The study selection process followed the four phases prescribed by PRISMA 2020: Identification, Screening, Eligibility, and Inclusion. Each stage was carefully documented to ensure

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transparency and reproducibility. Reference management software was used throughout the review process to facilitate article organization, duplicate detection, screening activities, and data management.

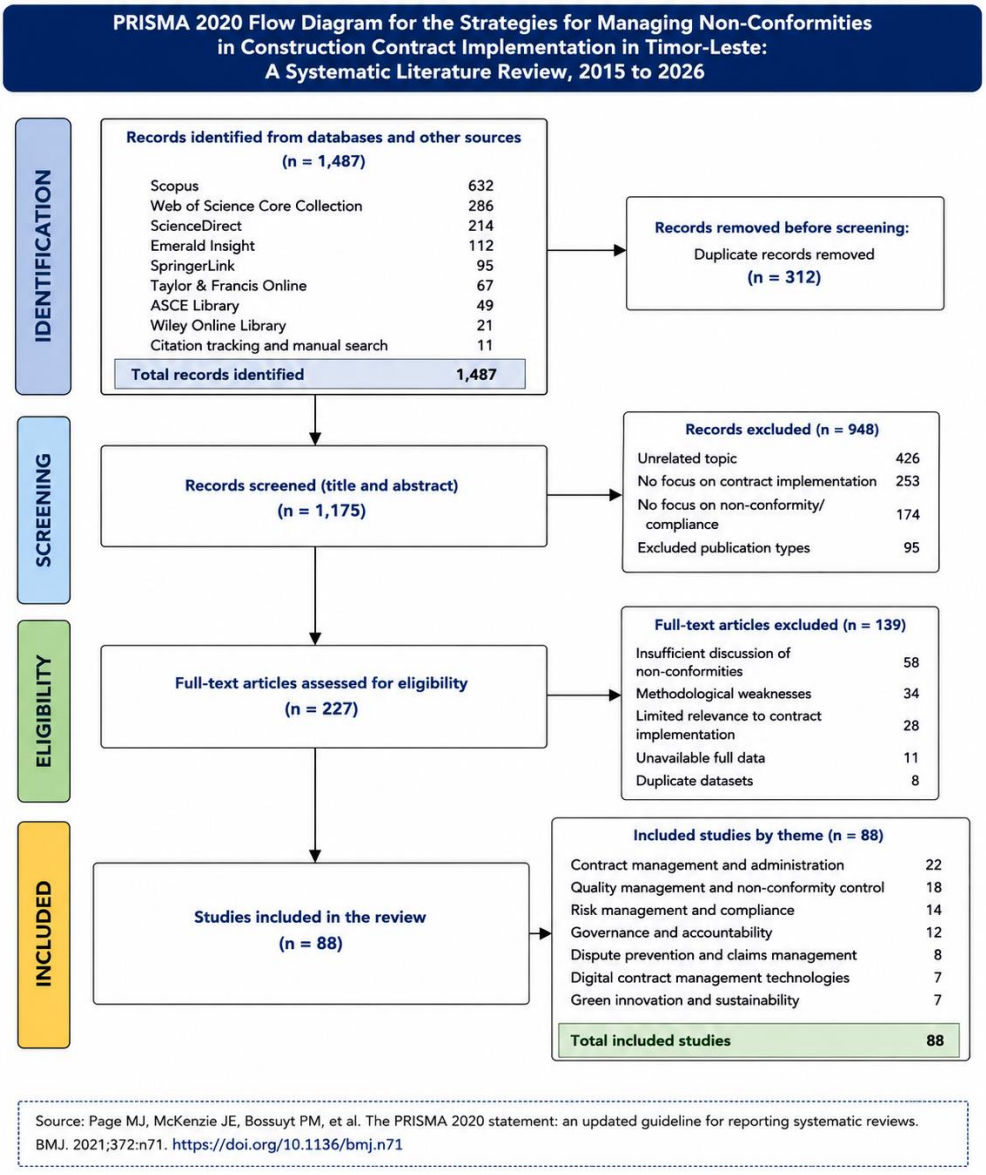


Figure 1. PRISMA 2020 Flow Diagram for the Selection of Studies on Strategies for Managing Non-Conformities in Construction Contract Implementation in Timor-Leste: A Systematic Literature Review (2015–2025

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Identification Phase

The identification phase involved comprehensive searches across all selected databases. Additional articles were identified through backward citation tracking, forward citation searches, and manual reviews of reference lists from highly relevant studies. This process was intended to reduce publication bias and maximize the likelihood of identifying all relevant studies.

The initial search yielded 1,487 records. These records represented a broad range of studies addressing construction management, contract administration, compliance systems, governance mechanisms, quality assurance, sustainability practices, and infrastructure project implementation.

Table 2. Identification Stage

Source Database	Records Identified
Scopus	632
Web of Science Core Collection	286
ScienceDirect	214
Emerald Insight	112
SpringerLink	95
Taylor and Francis Online	67
ASCE Library	49
Wiley Online Library	21
Citation tracking and manual search	11
Total Records Identified	1,487

Following article retrieval, all records were imported into EndNote and Mendeley software. Duplicate detection procedures identified 312 duplicate records that appeared across multiple databases. These duplicate records were removed before proceeding to the screening stage. Consequently, 1,175 unique records remained for title and abstract screening.

Screening Phase

The screening phase involved a detailed examination of titles and abstracts against the predefined inclusion and exclusion criteria. The objective of this stage was to eliminate studies that did not address construction contract implementation or non-conformity management.

Many articles identified during the initial search focused on unrelated topics such as occupational health and safety, material science, procurement policy, structural engineering, or

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environmental management without discussing contractual compliance or contract implementation issues. These studies were excluded during screening.

Table 3. Screening Stage

Screening Activity	Number
Records after duplicate removal	1,175
Excluded due to unrelated topic	426
Excluded due to lack of contract implementation focus	253
Excluded due to lack of non-conformity/compliance focus	174
Excluded due to publication type	95
Records retained for full-text assessment	227

The screening process resulted in the retention of 227 studies for full-text assessment. These studies demonstrated potential relevance to construction contract implementation, compliance management, governance systems, and non-conformity management.

Eligibility Phase

The eligibility phase involved comprehensive full-text reviews of all retained articles. Each article was assessed for methodological quality, relevance to the research questions, clarity of findings, and contribution to understanding non-conformities in construction contract implementation.

The full-text assessment examined whether the studies explicitly addressed non-conformities, contractual compliance, quality management systems, governance mechanisms, risk management practices, sustainability initiatives, or corrective action processes. Studies lacking sufficient relevance or methodological rigor were excluded from further analysis.

Table 4. Eligibility Assessment

Eligibility Assessment Result	Number
Full-text articles assessed	227
Excluded due to insufficient discussion of non-conformities	58
Excluded due to methodological weaknesses	34
Excluded due to limited relevance to contract implementation	28
Excluded due to unavailable full data	11

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Excluded due to duplicate datasets	8
Studies eligible after full-text review	88

The eligibility assessment ensured that only studies providing meaningful insights into construction contract non-conformities and management strategies were retained. This process enhanced the overall quality and reliability of the evidence base.

Inclusion Phase

The inclusion phase resulted in a final sample of 88 peer-reviewed studies that met all eligibility and quality requirements. These studies constituted the final dataset used for synthesis and analysis.

The included studies represented a wide range of geographical regions, project types, organizational contexts, and methodological approaches. Collectively, they provided a comprehensive evidence base for understanding non-conformity management strategies in construction contract implementation.

Table 5. Included Studies by Theme

Research Theme	Number of Studies
Contract management and administration	22
Quality management and non-conformity control	18
Risk management and compliance	14
Governance and accountability	12
Dispute prevention and claims management	8
Digital contract management technologies	7
Green innovation and sustainability	7
Total Included Studies	88

The final sample size of 88 studies is considered sufficient for conducting a robust systematic review and is consistent with the sample sizes commonly reported in high-quality systematic reviews within construction management and infrastructure governance research.

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Data Extraction

Data extraction was conducted using a structured review matrix developed specifically for this study. Information extracted from each article included author names, publication year, country of study, research methodology, project context, type of non-conformity investigated, causal factors, management strategies, sustainability considerations, green innovation practices, and key findings.

The extraction process was conducted systematically to ensure consistency and comparability across studies. Where necessary, articles were reviewed multiple times to verify data accuracy and reduce interpretation bias. The extracted information formed the basis for thematic analysis and evidence synthesis.

Data Synthesis

The collected data were analyzed using thematic synthesis techniques. This approach enabled the identification of recurring concepts, patterns, relationships, and themes across the selected studies. Thematic synthesis was considered appropriate because the review included both qualitative and quantitative research designs.

Through iterative coding and comparison, several dominant themes emerged from the literature. These themes included contract management systems, quality assurance and quality control practices, compliance monitoring mechanisms, governance and accountability frameworks, corrective and preventive action systems, digital transformation technologies, and green innovation initiatives. The integration of these themes facilitated the development of a comprehensive understanding of how construction organizations manage non-conformities during contract implementation.

The final synthesis was subsequently used to develop an evidence-based conceptual framework explaining the relationships among contract management, compliance systems, governance structures, green innovation, and non-conformity management outcomes. This framework provides a theoretical foundation for understanding how infrastructure projects in Timor-Leste can improve contractual compliance, reduce project deviations, and enhance sustainable project performance.

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RESULTS AND DISCUSSION

Overview of the Selected Studies

The PRISMA 2020 review process resulted in the inclusion of 88 peer-reviewed studies published between 2015 and 2025. The selected articles covered multiple research domains, including construction contract management, quality management, compliance systems, project governance, dispute management, digital transformation, sustainability, and green innovation. The increasing number of publications after 2020 indicates growing academic interest in improving compliance and reducing contractual deviations in infrastructure projects (Page et al., 2021a; Love et al., 2023).

The geographical distribution of the studies demonstrates that non-conformities in construction contract implementation are a global concern. The reviewed studies originated primarily from Asia, Europe, Australia, the Middle East, and Africa, reflecting the universal challenges associated with contract administration, quality assurance, and project governance. Similar observations were reported by Hansen (2021), who found that contract management challenges transcend geographical boundaries and significantly affect project performance regardless of project size or location.

The methodological characteristics of the selected studies included quantitative surveys, case studies, mixed-methods research, structural equation modeling, systematic literature reviews, and qualitative investigations. This methodological diversity strengthened the robustness of the synthesized findings and provided multiple perspectives on the causes and management of non-conformities in construction projects (Braun & Clarke, 2021).

Types of Non-Conformities in Construction Contract Implementation

The analysis identified quality defects and workmanship failures as the most frequently reported non-conformities. These defects included poor workmanship, non-compliant materials, inadequate inspections, and failures to meet project specifications. Such deficiencies frequently resulted in rework, productivity losses, schedule delays, and increased project costs. Love et al. (2023) argued that quality failures remain one of the most expensive and persistent problems affecting construction projects worldwide.

Contractual deviations emerged as another dominant category of non-conformities. These deviations included unauthorized changes, delayed payments, incomplete contractual obligations, documentation deficiencies, and failures to comply with agreed contractual requirements. Hansen (2021) reported that weak contract administration practices frequently

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contribute to contractual disputes and performance failures during project implementation.

Project delays were also consistently identified across the literature. Delays were commonly associated with inadequate planning, ineffective communication, poor stakeholder coordination, resource shortages, and weak monitoring systems. Kerzner (2022) emphasized that schedule-related non-conformities often trigger a chain reaction of contractual disputes, cost overruns, and stakeholder dissatisfaction.

Regulatory and governance-related non-conformities were increasingly discussed in recent publications. These included failures to comply with environmental regulations, procurement requirements, safety standards, reporting obligations, and accountability mechanisms. According to OECD (2020), governance deficiencies are among the most significant contributors to poor infrastructure project performance in developing countries.

Root Causes of Construction Contract Non-Conformities

Weak contract management was identified as the most significant root cause of non-conformities. Many studies highlighted deficiencies in contract monitoring, documentation control, change management, performance evaluation, and communication processes. Hansen (2021) found that organizations lacking structured contract management systems experience significantly higher levels of contractual disputes and compliance failures.

The literature also revealed that inadequate quality management systems contribute substantially to project non-conformities. Weak inspection procedures, ineffective quality assurance mechanisms, poor corrective action systems, and insufficient organizational learning frequently result in recurring defects and rework. According to Love et al. (2023), organizations that fail to institutionalize quality management practices are more vulnerable to operational failures and contractual deviations.

Communication failures emerged as another critical factor. Construction projects involve complex interactions among clients, contractors, consultants, suppliers, and regulatory agencies. Ineffective communication often results in misunderstandings, delayed decisions, conflicting interpretations of contractual requirements, and implementation errors. Eriksson and Westerberg (2019) demonstrated that collaborative communication practices significantly improve project performance and reduce contractual conflicts.

Governance-related weaknesses were also repeatedly identified in the literature. Insufficient transparency, weak accountability systems, limited regulatory oversight, and inadequate institutional capacity create environments in which non-conformities can occur more

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frequently. Scott (2014) argued that institutional structures play a critical role in shaping organizational compliance behavior and influencing project outcomes.

Strategies for Managing Non-Conformities

Contract management systems were consistently identified as the most effective strategy for managing non-conformities. Effective systems include performance monitoring, compliance audits, documentation control, obligation tracking, communication management, and dispute prevention mechanisms. Hansen (2021) demonstrated that structured contract management practices significantly improve compliance and project performance.

Quality assurance and quality control systems also emerged as critical management strategies. The reviewed studies emphasized the importance of inspections, audits, root-cause analysis, corrective actions, and continuous improvement initiatives. ISO (2015) highlighted that systematic quality management practices reduce defects, improve customer satisfaction, and enhance organizational effectiveness.

Risk-based management approaches were frequently cited as proactive mechanisms for reducing non-conformities. Rather than addressing problems after they occur, risk management frameworks focus on identifying potential vulnerabilities and implementing preventive measures before project disruptions emerge. According to PMI (2021), integrating risk management into contract administration improves project resilience and compliance performance.

Corrective and preventive action systems were another important strategy identified in the literature. Organizations that systematically document non-conformities, investigate root causes, and implement corrective actions are better positioned to prevent recurrence and improve long-term performance. This approach aligns with continuous improvement principles emphasized in modern quality management systems (ISO, 2015).

Green Innovation as a Strategy for Reducing Non-Conformities

One of the most significant findings of this review is the growing role of green innovation in construction contract implementation. Green innovation refers to the development and application of environmentally sustainable technologies, processes, products, and management practices that improve both environmental and operational performance. Chen et al. (2022) argued that green innovation has become a key driver of organizational competitiveness and sustainability in the construction sector.

The reviewed studies indicate that green innovation contributes to reducing non-

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conformities through improved process standardization, sustainable procurement practices, resource optimization, and enhanced environmental compliance. Organizations implementing green innovation initiatives tend to establish stronger monitoring systems and more rigorous operational procedures, which indirectly improve contractual compliance and project governance (Wang et al., 2023).

Green innovation also strengthens organizational learning and continuous improvement capabilities. Sustainable construction practices encourage organizations to adopt more structured performance measurement systems, environmental management frameworks, and stakeholder engagement mechanisms. These practices improve transparency, accountability, and compliance management while reducing the likelihood of recurring non-conformities (Xie et al., 2023).

Furthermore, green innovation supports compliance with increasingly stringent environmental regulations and sustainability requirements. Li et al. (2024) found that organizations with strong green innovation capabilities demonstrate higher levels of environmental compliance, operational efficiency, and project performance compared with organizations relying on conventional construction approaches.

Digital Technologies Supporting Compliance Management

The review identified digital transformation as an increasingly important enabler of non-conformity management. Technologies such as Building Information Modeling (BIM), Artificial Intelligence (AI), blockchain systems, digital twins, and Internet of Things (IoT) applications are transforming contract management and project governance practices. Marzouk and Azab (2024) reported that digital technologies significantly improve monitoring capabilities, information accuracy, and decision-making efficiency in infrastructure projects.

Artificial intelligence applications are increasingly used to support contract review, risk identification, compliance monitoring, and dispute prevention. Recent studies suggest that AI-assisted systems can identify contractual risks and compliance issues more effectively than traditional manual review processes, thereby reducing the probability of contractual deviations and project disputes (Li et al., 2024).

Blockchain technology has also attracted attention because of its potential to improve transparency, accountability, and trust in contract administration. Ahmadisheykhsarmast and Sonmez (2020) demonstrated that blockchain-enabled smart contracts facilitate automated compliance verification and secure payment mechanisms, thereby reducing opportunities for contractual disputes and non-compliance.

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The integration of digital technologies with quality management and green innovation initiatives creates synergistic benefits. Digital monitoring systems enable real-time tracking of project performance, environmental indicators, compliance requirements, and corrective actions. This integration strengthens project governance while supporting sustainability objectives and improving overall contract implementation effectiveness (Marzouk & Azab, 2024).

Implications for Timor-Leste

The findings of this review have important implications for infrastructure development in Timor-Leste. The country continues to invest heavily in transportation infrastructure, public facilities, and strategic development projects. However, infrastructure implementation challenges related to contract administration, monitoring systems, governance mechanisms, and technical capacity remain significant concerns (World Bank, 2024).

The evidence synthesized from the literature suggests that strengthening contract management systems should be a strategic priority for Timor-Leste. Establishing formal compliance monitoring procedures, performance evaluation systems, documentation standards, and quality assurance frameworks would significantly reduce contractual deviations and improve project outcomes. Similar recommendations have been proposed by the World Bank (2024) for developing countries seeking to improve infrastructure governance.

The findings also suggest that green innovation can support Timor-Leste's sustainable development objectives while simultaneously improving compliance performance. Integrating environmental requirements into construction contracts, promoting sustainable procurement practices, and encouraging environmentally responsible project delivery could enhance both sustainability and project effectiveness (Chen et al., 2022; Wang et al., 2023).

Digital transformation represents another strategic opportunity. The adoption of BIM, digital contract management systems, and data-driven monitoring technologies could strengthen transparency, accountability, and project control across public infrastructure projects. Marzouk and Azab (2024) emphasized that digital technologies are increasingly becoming essential components of modern infrastructure governance systems.

DISCUSSION

The findings confirm that construction contract non-conformities are multidimensional phenomena resulting from interactions among contractual, organizational, technical, governance, and environmental factors. This conclusion supports the arguments of Love et al. (2023), who

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emphasized that project failures and quality defects are rarely isolated technical events but are typically symptoms of broader systemic weaknesses.

The review further demonstrates that effective non-conformity management requires integrated strategies rather than isolated interventions. Contract management systems, quality assurance mechanisms, risk management practices, governance frameworks, green innovation initiatives, and digital technologies operate synergistically to improve compliance performance and project outcomes. This finding is consistent with systems theory perspectives on project management, which emphasize the interdependence of organizational processes and project performance (Kerzner, 2022).

A particularly important contribution of this review is the identification of green innovation as an emerging compliance management strategy. While previous studies often treated sustainability and contract management as separate domains, the findings indicate that green innovation contributes directly to improved governance, monitoring, organizational learning, and compliance performance. This observation extends previous research by demonstrating that sustainability-oriented practices can simultaneously reduce environmental impacts and contractual non-conformities (Chen et al., 2022; Xie et al., 2023).

Finally, the findings suggest that Timor-Leste can benefit substantially from adopting international best practices in contract management, quality assurance, green innovation, and digital transformation. By integrating these approaches into infrastructure governance systems, the country can strengthen contractual compliance, improve project performance, reduce non-conformities, and support sustainable infrastructure development objectives (World Bank, 2024).

CONCLUSION

This study systematically reviewed the existing literature on strategies for managing non-conformities in construction contract implementation with a particular focus on their relevance to the infrastructure development context of Timor-Leste. The review synthesized evidence from 88 peer-reviewed studies published between 2015 and 2025, providing a comprehensive understanding of the nature, causes, and management approaches associated with construction contract non-conformities.

The findings indicate that non-conformities remain a significant challenge in construction projects and commonly manifest in the form of quality defects, contractual deviations, project delays, documentation deficiencies, regulatory non-compliance, and governance failures. These issues are often interconnected and arise from weaknesses in contract administration, quality

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management systems, communication processes, risk management practices, organizational capabilities, and governance structures. As a result, non-conformities continue to contribute to project delays, cost overruns, rework, disputes, reduced productivity, and compromised infrastructure performance.

The review demonstrates that effective management of non-conformities requires a holistic and integrated approach. Successful organizations implement structured contract management systems, robust quality assurance and quality control mechanisms, proactive risk management practices, effective governance frameworks, and continuous monitoring processes. These strategies enable early identification of deviations, timely corrective actions, improved stakeholder coordination, and enhanced compliance with contractual and regulatory requirements.

An important finding of this study is the increasing role of green innovation in supporting non-conformity management. Green innovation contributes not only to environmental sustainability but also to improved operational efficiency, compliance performance, resource management, and organizational learning. Sustainable procurement practices, environmental management systems, and green construction approaches create additional mechanisms that strengthen accountability, transparency, and compliance throughout project implementation.

The review also highlights the transformative potential of digital technologies in construction contract management. Technologies such as Building Information Modeling (BIM), Artificial Intelligence (AI), blockchain, Internet of Things (IoT), and digital contract management platforms enhance monitoring capabilities, improve information accuracy, facilitate real-time decision-making, and support compliance verification. The integration of digital technologies with green innovation and governance systems provides a powerful foundation for reducing non-conformities and improving project outcomes.

For Timor-Leste, the findings suggest that strengthening construction contract implementation should become a strategic priority to improve infrastructure delivery and maximize the value of public investments. Enhancing contract management capabilities, establishing formal compliance monitoring systems, improving quality management practices, strengthening institutional governance, promoting green innovation, and accelerating digital transformation can significantly reduce non-conformities and improve project performance. These initiatives can contribute to more transparent, accountable, sustainable, and efficient infrastructure development.

This study contributes to the body of knowledge by providing a comprehensive synthesis

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of contemporary evidence on construction contract non-conformity management and by highlighting the emerging importance of green innovation and digital transformation as complementary strategies for improving compliance and project performance. The findings offer a valuable foundation for policymakers, practitioners, contractors, consultants, and researchers seeking to strengthen construction contract implementation and support sustainable infrastructure development in Timor-Leste and other developing countries.

REFERENCES

Ahmadisheykhsarmast, S., & Sonmez, R. (2020). A smart contract system for security of payment of construction contracts. *Automation in Construction, 120*, 103401. https://doi.org/10.1016/j.autcon.2020.103401

Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. Sage Publications.

Chen, Y. S., Chang, C. H., & Lin, Y. H. (2022). Green transformational leadership and green innovation in sustainable construction. *Sustainability, 14*(8), 4567. https://doi.org/10.3390/su14084567

Cristache, N., Croitoru, G., & Florea, N. V. (2025). The influence of knowledge management on innovation and organizational performance. *Journal of Innovation & Knowledge, 10*(3), 100793. https://doi.org/10.1016/j.jik.2025.100793

Diófási-Kovács, O., Fekete, A., & Buzás, N. (2025). Environmentally sustainable public procurement of construction projects through circular procurement approaches. *Public Works Management & Policy*. https://doi.org/10.1177/1087724X241290269

Doloi, H. (2013). Cost overruns and failure in project management: Understanding the roles of key stakeholders in construction projects. *Journal of Construction Engineering and Management, 139*(3), 267–279. https://doi.org/10.1061/(ASCE)CO.1943-7862.0000621

Eriksson, P. E., & Westerberg, M. (2019). Effects of cooperative procurement procedures on construction project performance. *International Journal of Project Management, 37*(2), 187–198. https://doi.org/10.1016/j.ijproman.2018.11.003

Foged, S. K., & Petersen, O. H. (2025). The influence of government capacity on contract management efficiency. *Public Management Review*. https://doi.org/10.1080/09540962.2025.2574499

Gu, J., Shen, L., Zhao, Z., & Yang, J. (2023). A systematic literature review of the contractor's green construction capability. *Buildings, 13*(2), 470. https://doi.org/10.3390/buildings13020470

Hansen, S. (2021). Developing a model of construction contract management competency in a

Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-Share Alike 4.0 International License

developing country: Quantitative approach. *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction, 13*(4), 04521031. https://doi.org/10.1061/(ASCE)LA.1943-4170.0000504

Husnaini, W., & Tjahjadi, B. (2021). Quality management, green innovation and firm value: Evidence from Indonesia. *International Journal of Energy Economics and Policy, 11*(1), 255–262. https://doi.org/10.32479/ijeep.10282

International Organization for Standardization. (2015). *ISO 9001:2015 quality management systems: Requirements*. ISO.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Kerzner, H. (2022). *Project management: A systems approach to planning, scheduling, and controlling* (13th ed.). Wiley.

Li, L., Msaad, H., Sun, H., Tan, M. X., Lu, Y., & Lau, A. K. W. (2020). Green innovation and business sustainability: New evidence from energy intensive industry in China. *International Journal of Environmental Research and Public Health, 17*(21), 7826. https://doi.org/10.3390/ijerph17217826

Li, Z., Liu, J., Chen, X., & Wang, Y. (2024). Green innovation and sustainable project performance in infrastructure construction projects. *Journal of Cleaner Production, 452*, 141982. https://doi.org/10.1016/j.jclepro.2024.141982

Love, P. E. D., Matthews, J., Fang, W., & Teo, P. (2022). State of science: Why does rework occur in construction? What are its consequences? And what can be done to mitigate its occurrence? *Engineering, 18*, 246–258. https://doi.org/10.1016/j.eng.2021.10.019

Love, P. E. D., Matthews, J., Porter, S. R., Carey, B., & Fang, W. (2023). Quality II: A new paradigm for construction. *Developments in the Built Environment, 16*, 100261. https://doi.org/10.1016/j.dibe.2023.100261

Marzouk, M., & Azab, S. (2024). Digital transformation technologies for sustainable infrastructure project management. *Automation in Construction, 161*, 105343. https://doi.org/10.1016/j.autcon.2024.105343

Matthews, J., Love, P. E. D., Fang, W., & Porter, S. R. (2024). Curating a domain ontology for rework in construction. *Production Planning & Control, 35*(8), 707–723. https://doi.org/10.1080/09537287.2023.2223566

Moghadam, M. A., Alwisy, A., & Al-Hammadi, Y. (2023). Sustainability assessment in construction

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projects: A comprehensive review. *Sustainability, 15*(8), 6502. https://doi.org/10.3390/su15086502

OECD. (2020). *Government at a glance 2020*. OECD Publishing. https://doi.org/10.1787/69096873-en

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ, 372*, n71. https://doi.org/10.1136/bmj.n71

Page, M. J., Moher, D., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... McKenzie, J. E. (2021). PRISMA 2020 explanation and elaboration: Updated guidance and exemplars for reporting systematic reviews. *BMJ, 372*, n160. https://doi.org/10.1136/bmj.n160

PMI. (2021). *A guide to the project management body of knowledge (PMBOK® Guide)* (7th ed.). Project Management Institute.

Sarkis-Onofre, R., Catalá-López, F., Aromataris, E., & Lockwood, C. (2021). How to properly use the PRISMA statement. *Systematic Reviews, 10*(1), 117. https://doi.org/10.1186/s13643-021-01671-z

Scott, W. R. (2014). *Institutions and organizations: Ideas, interests, and identities* (4th ed.). Sage Publications.

Sohrabi, C., Franchi, T., Mathew, G., Kerwan, A., Griffin, M., Del Mundo, S. C., Ali, S. A., Agha, M., & Agha, R. (2021). PRISMA 2020 statement: What's new and the importance of reporting guidelines. *International Journal of Surgery, 88*, 105918. https://doi.org/10.1016/j.ijsu.2021.105918

Vilkonis, A., Kaklauskas, A., Banaitis, A., Daniunas, A., Amaratunga, D., Lepkova, N., & Ubarte, I. (2023). Construction contracts quality assessment from the point of view of contractors and customers. *Buildings, 13*(5), 1154. https://doi.org/10.3390/buildings13051154

Wang, C., Zhao, Y., Zhang, X., & Li, H. (2023). Green innovation capability and sustainable construction project performance: Evidence from developing economies. *Sustainable Production and Consumption, 38*, 112–125. https://doi.org/10.1016/j.spc.2023.03.018

World Bank. (2024). *Contract management practice procurement guidance*. World Bank Group.

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Xie, X., Huo, J., Qi, G., & Zhu, K. X. (2023). Green process innovation and environmental performance in construction and infrastructure industries. *Journal of Cleaner Production, 381*, 135209. https://doi.org/10.1016/j.jclepro.2022.135209

Zaman, B., & Sedera, D. (2016). Green information technology as administrative innovation: Organizational factors for successful implementation. *Australasian Conference on Information Systems*.

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