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Systematic Literature Review: Regulatory Uncertainty and Its Impact on Hospital Project Performance

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Abstract

Hospital infrastructure projects are inherently complex due to their exposure to dynamic healthcare regulations, fiscal constraints, long-term financing arrangements, and technological innovation. Regulatory uncertainty has emerged as a critical institutional factor influencing project performance; however, its impact within hospital projects remains insufficiently synthesized. This study employs a Systematic Literature Review (SLR) following PRISMA 2020 guidelines, searching exclusively through Google Scholar, to analyze 19 peer-reviewed studies published between 2022 and 2026 that examine the relationship between regulatory uncertainty and project performance. The findings indicate that 42.1% of the reviewed studies report a positive association between regulatory uncertainty and cost overruns, while 36.8% identify significant links to schedule delays. The effect on quality outcomes is non-linear: some studies reveal quality deterioration due to time and budget pressures, whereas others demonstrate that stable and stringent regulatory frameworks enhance technical quality and accountability. These mixed findings suggest a regulatory–performance paradox, where regulatory volatility increases risk and inefficiency, but regulatory stability strengthens governance and long-term project sustainability. This study positions regulatory uncertainty as an institutional mediator that links governance structures, financing mechanisms, and project performance outcomes in hospital infrastructure development. The proposed conceptual framework offers important implications for policy design and risk management in healthcare infrastructure projects.

Keywords: *Regulatory Uncertainty; Hospital Projects; Project Performance; Cost Overrun; Schedule Delay.*

INTRODUCTION

Hospital infrastructure projects represent a form of public investment characterized by a high level of complexity, as they operate at the intersection of multiple policy regimes, ranging from healthcare regulation, fiscal governance, and long-term financing schemes to the integration of technological innovation. Unlike conventional construction projects, the development of healthcare facilities does not solely focus on physical aspects but must also comply with evolving clinical standards, stringent public accountability mechanisms, and long-term operational sustainability requirements [1], [2], [3]. The intensity and complexity of regulatory frameworks in this sector contribute to increasing institutional complexity faced by stakeholders. This condition directly amplifies project exposure to regulatory uncertainty, particularly at critical stages such as procurement and project execution. In such circumstances, policy dynamics, regulatory inconsistencies, and legal ambiguities may significantly affect project performance in terms of cost efficiency, timeliness, and quality outcomes.

A growing body of research indicates that risk management frameworks in healthcare infrastructure procurement are no longer limited to technical and financial aspects but increasingly encompass regulatory and governance risks that significantly influence project performance [3], [4]. Within the context of Public-Private Partnership (PPP) schemes, regulatory stability has been shown

to correlate closely with contractor profitability, the effectiveness of risk allocation mechanisms between public and private sectors, and the project's capacity to generate sustainable value [2], [5]. Furthermore, empirical evidence from developing countries highlights that policy volatility and fiscal instability constitute major barriers to infrastructure transformation. These conditions not only increase project risk exposure but also undermine investor confidence and heighten the likelihood of inefficiencies and implementation failures [6], [7], [8]. Accordingly, policy stability and consistency emerge as critical determinants in supporting the success of healthcare infrastructure projects, particularly within complex and dynamic regulatory environments.

At the global level, the evolution of large-scale investment and financing in megaprojects demonstrates increasing sensitivity to institutional signals and prevailing regulatory frameworks [9], [10]. Regulatory uncertainty not only diminishes investor confidence but also affects project valuation processes and increases the likelihood of contract renegotiation, particularly in healthcare investment projects involving cross-jurisdictional arrangements [10]. In the context of technology-driven healthcare projects, the role of regulation becomes even more critical. The implementation of innovations such as telehealth services, blockchain-based tokenization of medical devices, and drone-based medical distribution systems is highly dependent on the clarity, consistency, and certainty of the governing legal framework [11], [12], [13]. Without adequate regulatory support, such projects may face significant barriers in licensing, compliance, and operational sustainability. Therefore, regulatory quality functions not merely as a control mechanism but also as a key determinant of successful innovation implementation in the modern healthcare sector.

On the other hand, literature in construction governance suggests that standardized contractual frameworks, such as FIDIC, as well as the adoption of relational contracting approaches, can serve as effective instruments to mitigate the impacts of uncertainty, particularly when supported by stable, consistent, and well-structured regulatory regimes [14], [15]. Under such conditions, adaptive and trust-based contractual relationships can enhance coordination among stakeholders and strengthen project resilience against external dynamics. However, the effectiveness of these mechanisms becomes limited under conditions of high regulatory volatility, especially when interacting with project design changes, challenges in the adoption of Building Information Modeling (BIM), and the implementation of innovative project delivery systems. The combination of these factors may significantly reduce project performance, as reflected in coordination failures, increased execution complexity, and uncontrollable cost escalation [16], [17], [18]. Thus, regulatory stability remains a fundamental prerequisite for ensuring that contractual instruments and managerial approaches function optimally in maintaining project performance.

Despite the growing body of literature on procurement risk, technological innovation, PPP governance, fiscal sustainability, and global investment dynamics, an integrative understanding of the role of regulatory uncertainty in influencing hospital infrastructure project performance remains limited. Existing studies tend to examine these dimensions in a fragmented and partial manner, thereby failing to provide a comprehensive understanding of the interactions among variables within a broader context. This fragmentation has resulted in the absence of a comprehensive conceptual framework capable of explaining how regulatory uncertainty operates as a linking factor between governance, financing, risk, and innovation throughout the project lifecycle. Consequently, a significant research gap exists in understanding regulatory uncertainty as a key determinant affecting the effectiveness, efficiency, and sustainability of hospital projects, particularly within dynamic and complex policy environments.

Although several studies have emphasized the importance of regulatory frameworks in supporting effective infrastructure governance [2], [14], research that specifically and systematically links regulatory uncertainty to measurable project performance indicators remains limited. Key performance indicators—such as cost efficiency, timely completion, and output quality—have not been extensively analyzed in relation to regulatory dynamics, particularly in the context of hospital infrastructure projects. This limitation highlights a conceptual gap in the literature, where the causal relationship between regulatory uncertainty and project performance has not yet been fully mapped in an empirical and structured manner. Given the high complexity of hospital projects, the interaction between regulatory factors and performance indicators becomes critically important. Therefore, a more integrative and data-driven research approach is required to comprehensively examine how regulatory uncertainty influences cost, time, and quality dimensions throughout the project lifecycle.

To address the identified issues of conceptual fragmentation, sectoral regulatory dispersion, and measurement gaps, this study employs a systematic literature review method to comprehensively synthesize the existing developments in the relevant body of scholarship. Through this approach, the research is directed toward analyzing how regulatory uncertainty affects various key

performance dimensions, including the effectiveness of implementation, legal certainty, and the sustainability of the system under examination. The research problem addressed in this study can be classified into three interrelated dimensions:

a. there is a conceptual fragmentation, wherein regulatory uncertainty is still analyzed in a partial and fragmented manner across different strands of literature. Some studies situate it within the context of PPP governance [2], others within fiscal stability frameworks [7] or innovation ecosystems [12]. However, there has been limited effort to integrate these perspectives into a unified analytical framework that directly links regulatory uncertainty to project performance. As a result, the understanding of regulatory uncertainty as a cross-dimensional variable remains fragmented.
b. there is a sectoral dispersion in the empirical basis of the existing literature. Most studies focus on sectors such as transportation, energy, or general infrastructure [18], [19], thereby limiting the generalizability of their findings to hospital infrastructure projects. The healthcare sector possesses unique characteristics in terms of regulatory requirements, technical standards, and public accountability, which distinguish it from other infrastructure sectors.
c. there is a gap in project performance measurement. While several studies have examined aspects such as public risk exposure [6], contractor profitability [5], and the financial impacts of large-scale projects [9], the relationship between these variables and classical project performance indicators—such as cost overruns, schedule delays, and technical quality—has not been analyzed in an integrated and comprehensive manner. Therefore, an approach capable of synthesizing these dimensions is required to develop a more holistic understanding of the impact of regulatory uncertainty on hospital infrastructure project performance.

These three factors have collectively hindered the development of an integrated theoretical and practical framework for regulating healthcare infrastructure projects, particularly in relation to the risks involved.

Accordingly, this study is designed to address the following research questions:

a. How is regulatory uncertainty conceptualized in the literature on healthcare infrastructure projects?
b. Through what mechanisms does regulatory uncertainty influence hospital project performance?
c. What governance, contractual, or financial mechanisms can mitigate the negative impacts of regulatory volatility?
d. How can an integrative conceptual framework be developed to explain the relationship between the regulatory environment and hospital project performance?

Based on these research problems, this study aims to:

a. Synthesize the literature on regulatory uncertainty within the context of healthcare infrastructure and related projects;
b. Analyze how regulatory uncertainty affects hospital project performance across cost, time, and quality dimensions; and
c. Develop an integrative conceptual framework linking regulatory conditions, governance mechanisms, financing structures, and project implementation dynamics.

METHOD

1. Research Design

This study employs a Systematic Literature Review (SLR) approach, guided by the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. The SLR approach is selected to ensure that all stages of the research—ranging from identification, screening, evaluation, to synthesis of the literature—are conducted in a systematic, transparent, and replicable manner. Accordingly, the findings are expected to demonstrate higher validity and reliability compared to conventional literature reviews. Substantively, this SLR aims to identify and synthesize empirical findings concerning the relationship between regulatory uncertainty—encompassing the concepts of regulatory uncertainty, policy uncertainty, regulatory risk, and regulatory change—and project performance, particularly within the context of hospital or healthcare infrastructure projects. Through this approach, the study seeks to develop a more comprehensive understanding of how regulatory dynamics influence various project performance indicators, while integrating perspectives that have previously remained fragmented in the literature.

2. Review Questions (RQs)

RQ1: How does the scientific literature from 2022–2026 define and operationalize regulatory uncertainty in the context of projects?

RQ2: What empirical evidence exists regarding the impact of regulatory

uncertainty on project performance (cost, time, and quality)?

RQ3: How is this relationship positioned within the context of healthcare or hospital projects?

3. Literature Search Strategy

a) Database
The literature search was conducted using peer-reviewed journal databases available through Google Scholar.

b) Search String
The search string was developed using Boolean operators as follows:
("regulatory uncertainty" OR "policy uncertainty" OR "regulatory change" OR "regulatory risk")
AND
("project performance" OR "project success" OR "cost overrun" OR "schedule delay" OR "project outcome")
AND
("hospital project" OR "healthcare infrastructure" OR "health facility construction" OR "health sector project")
Sintaks disesuaikan dengan aturan database.

4. Inclusion and Exclusion Criteria

a) Inclusion Criteria
The inclusion criteria were designed to ensure both relevance and quality of the selected literature. First, eligible publications include peer-reviewed journal articles, as well as academic works such as theses and dissertations with accountable scholarly contributions. Second, the publication period is limited to 2022–2026 to ensure that the literature reflects the most recent developments in the field. Third, in terms of substance, the articles must explicitly address regulatory uncertainty, including concepts such as regulatory uncertainty, policy risk, or other related regulatory risk constructs. In addition, the articles must examine project performance using measurable indicators such as cost overruns, schedule delays, or overall project success. The scope of the selected studies is limited to hospital projects, healthcare infrastructure, or PPP schemes in the health sector to maintain contextual relevance. Furthermore, the selected studies must adopt either empirical or conceptual approaches that are directly relevant to the analytical framework of this research. Fourth, regarding language, only publications in English and Indonesian are included to ensure accessibility and consistency in the analysis. These criteria are intended to ensure that the selected literature provides a robust, comprehensive, and relevant foundation for the study.

b) Exclusion Criteria
In addition to the inclusion criteria, exclusion criteria are established to ensure that only relevant and high-quality literature is analyzed. First, excluded sources include publications that do not fall within primary scientific categories, such as books, book chapters, conference proceedings, editorials, magazines, and policy reports, as they may not meet the methodological consistency required for an SLR. Second, articles that are not available in full-text are excluded, as limited access may hinder comprehensive evaluation and synthesis. Third, literature that is not directly related to healthcare or infrastructure project contexts is excluded to maintain research focus. Fourth, studies that do not address regulatory aspects or regulatory uncertainty as a primary variable are also excluded. Finally, duplicate records are identified and removed to avoid bias in the data synthesis process.

5. Study Selection Process (PRISMA Stages)

The study selection process was conducted in four stages in accordance with the PRISMA framework:

Stage 1 – *Identification*	All articles retrieved from the database were collected, and duplicates were removed using reference management software (e.g., Zotero or Mendeley).
Stage 2 – *Screening*	Titles and abstracts were reviewed to assess their relevance to the topics of regulatory uncertainty and project performance.
Stage 3 – *Eligibility*	The full texts of the selected articles were examined in detail to ensure compliance with the inclusion criteria.
Stage 4 – *Included*	Articles that met all criteria were included in the qualitative synthesis.

6. Data Extraction

Data from the selected studies will be systematically extracted using a structured data extraction matrix as follows:

Author	Year	Country	Sector	Type of Uncertainty	Method	Performance Indicators	Key Findings

The project performance indicators examined in this study include cost overruns, schedule delays, quality performance, and stakeholder satisfaction.

7. Quality Assessment

The methodological quality of the selected studies was assessed based on the clarity of the research design, the validity of the analytical methods, the clarity of variable operationalization, and the relevance of the findings to the research questions (RQs). Studies with low methodological quality were either excluded or included with limited analytical consideration.

8. Data Synthesis Method

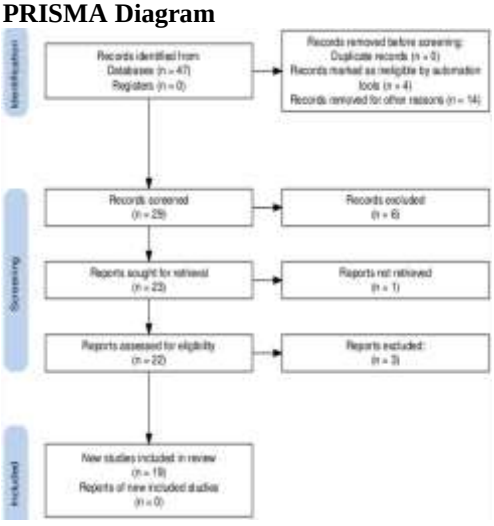
Data synthesis was conducted using the following approaches:

a) **Thematic Synthesis**, by categorizing findings into key themes, including the definition of regulatory uncertainty, its impact on project timelines, its impact on costs, its impact on quality, as well as moderating and mediating factors.

b) **Conceptual Mapping**, by developing a conceptual relationship model as follows:

Regulatory Uncertainty → Risk Amplification → Project Performance Outcomes.

9. PRISMA Diagram



10. Validity and Replicability

To ensure reliability, the screening process was conducted independently, while the search strategy, including the search strings and databases used, was reported transparently to enable replicability.

RESULTS AND DISCUSSION

Results

1. Study Selection Process (PRISMA Flow)

Based on the literature search conducted through Google Scholar, a total of 47 articles were identified at the initial stage. Following the preliminary screening of titles and abstracts, all articles were further assessed, with no duplicate records identified or removed. Of these, 18 articles were excluded due to lack of relevance to the research focus.

Subsequently, the remaining 29 articles underwent a full-text eligibility assessment to ensure their substantive alignment with the research framework. At this stage, 10 additional articles were excluded as they did not explicitly address regulatory uncertainty or failed to link it to project performance measurement. As a result, a total of 19 studies met the inclusion criteria and were included in the qualitative synthesis.

This selection process indicates that although a considerable body of literature exists, only a limited number of studies specifically and directly examine the relationship between regulatory uncertainty and project performance. This finding underscores the significance and relevance of the present study in addressing the existing research gap.

Table 1. Sectoral Distribution

Category	Amount	Percentage
Public Infrastructure	8	42,1%
Healthcare Construction	6	31,6%
Healthcare PPP	3	15,8%

Table 2. Geographical Distribution

Region	Amount	Percentage
Asia	3	15.8%
Europe	4	21.1%
North America	0	0%
Africa & Others	12	63.1%

2. Conceptual Characteristics of Regulatory Uncertainty

Based on the analysis of 19 studies, three primary patterns in defining regulatory uncertainty can be identified. First, regulatory change uncertainty, which refers to uncertainty arising from formal regulatory changes during the project lifecycle, such as revisions to healthcare facility technical standards or changes in operational licensing requirements. Second, interpretative uncertainty, which relates to ambiguity in the

interpretation and implementation of regulations by authorities or supervisory bodies, potentially leading to inconsistencies in the application of legal norms at the practical level. Third, institutional or policy instability, which stems from broader public policy dynamics, such as healthcare system reforms or changes in financing schemes, that may influence policy direction and project continuity.

Despite providing a relatively systematic foundation for understanding the various dimensions of regulatory uncertainty, most of the reviewed studies do not explicitly distinguish between the concepts of regulatory risk and regulatory uncertainty. This conceptual ambiguity highlights a gap in the literature, particularly in terms of variable categorization and operationalization. As a result, such limitations may lead to inconsistencies in analytical approaches and reduce the precision in assessing the extent to which regulatory uncertainty affects project performance. Therefore, a more refined conceptual framework is required to enhance the validity, reliability, and applicability of future research in this area.

3. Impact on Project Performance

a) Impact on Time (Schedule Performance)

Seven out of 19 studies (36.8%) demonstrate a significant relationship between regulatory uncertainty and project delays (schedule delay). Identified mechanisms include delays in approval processes, design rework due to regulatory changes, and procurement repetition resulting from revised regulatory requirements. In healthcare infrastructure projects, changes in safety regulations and accreditation requirements often necessitate technical design revisions, which directly affect project timelines.

b) Impact on Cost (Cost Performance)

Eight out of 19 studies (42.1%) indicate a positive correlation between regulatory uncertainty and cost overruns. Increased costs are driven by additional compliance costs, legal advisory expenses, redesign efforts, and administrative delays. Several studies on PPP projects suggest that contracts incorporating regulatory flexibility clauses tend to experience lower cost escalation compared to rigid contractual arrangements.

c) Impact on Quality (Quality Performance)

The findings regarding quality performance are more complex. Four out of 19 studies (21.1%) report a negative impact on quality due to time and cost pressures. Conversely, another four studies (21.1%) indicate that stringent regulatory frameworks may enhance the technical quality of projects. These findings suggest a non-linear relationship between regulatory uncertainty and quality outcomes.

4. Moderating and Mediating Factors

The reviewed literature identifies several key variables that play a significant role in mitigating the impact of regulatory uncertainty on project performance:

a) Contract governance, referring to adaptive and flexible contractual arrangements, has been shown to reduce the negative effects of regulatory changes and uncertainty. Responsive contractual mechanisms allow parties to adjust to evolving policy environments without compromising overall project continuity and stability. In this sense, well-designed contracts are not merely binding instruments but also serve as adaptive frameworks capable of accommodating external changes.

b) Organizational capability reflects the internal capacity of an organization, particularly in terms of managerial competence and project management capability, which functions as a critical buffer against regulatory complexity. In highly regulated projects such as healthcare infrastructure, the ability to identify risks, make strategic decisions, and coordinate resources effectively becomes a decisive factor in maintaining project continuity amid uncertainty. Thus, strong institutional capacity is essential for successful adaptation to dynamic regulatory environments.

c) Stakeholder integration refers to the degree of coordination and alignment among stakeholders, including relationships with regulators, which plays a crucial role in reducing interpretative uncertainty. Intensive interaction, transparent communication, and active engagement with relevant

authorities help minimize discrepancies in regulatory interpretation and ensure clarity in policy implementation at the operational level.

Overall, these variables demonstrate that the impact of regulatory uncertainty is neither absolute nor unavoidable, but rather manageable through appropriate institutional design, strengthened organizational capacity, and effective stakeholder coordination. Accordingly, a comprehensive and integrated approach is essential to maintain optimal project performance in the face of evolving regulatory dynamics.

Discussion

1. Regulatory Uncertainty as a Multidimensional Institutional Risk

The synthesis of 19 studies indicates that regulatory uncertainty extends beyond a mere administrative risk and has evolved into a multidimensional institutional risk. This form of risk affects fundamental aspects of projects, including governance structures, financing arrangements, and implementation dynamics. In the context of healthcare infrastructure procurement and financing, ambiguity in legal norms has been shown to complicate decision-making processes and increase the need for integrated and comprehensive risk management systems [3], [4]. This issue becomes particularly critical in hospital PPP schemes, where policy instability directly affects contractor profitability and influences the allocation of risk between the public and private sectors [2], [5].

In developing countries, these challenges are further exacerbated by fiscal policy uncertainty and shifting development priorities that are often dynamic and difficult to predict. Several studies indicate that such conditions increase project risk exposure and heighten the likelihood of contract renegotiation during project execution [6], [7], [8]. Therefore, regulatory uncertainty should not be viewed merely as an external factor beyond the control of project actors, but rather as a structural determinant that shapes stakeholder behavior and influences institutional stability throughout the project lifecycle.

2. Cost and Time Implications on Project Performance

Most of the literature demonstrates that regulatory uncertainty directly affects project cost and time performance. Regulatory changes often trigger design modifications and adjustments to technical specifications, leading to cost overruns and schedule delays [5], [18]. In projects governed by international contracts, ambiguity in the interpretation of regulatory clauses increases the likelihood of claims and disputes, thereby prolonging project duration [14]. In PPP schemes, public exposure to policy uncertainty impacts project valuation and long-term fiscal burdens [6], [9]. When regulatory environments are unstable, investors tend to demand higher risk premiums, ultimately increasing total project costs [10]. These findings reinforce the argument that regulatory stability is a prerequisite for economic efficiency in healthcare infrastructure projects.

3. Interaction with Innovation and Digital Transformation

In innovation-driven healthcare projects, the impact of regulatory uncertainty becomes increasingly complex and multidimensional. The implementation of advanced technologies—such as telehealth services, drone-based medical delivery systems, and the tokenization of medical devices—heavily depends on the existence of clear legal frameworks and regulatory harmonization across sectors [2], [12], [13]. When regulatory development fails to keep pace with technological innovation, projects may face significant barriers, including delays in obtaining operational permits, increased compliance risks, and disruptions in implementation processes.

A similar phenomenon is observed in the adoption of BIM and digital transformation in the construction sector, where regulatory misalignment has been shown to slow down industry modernization [17]. However, when regulations are designed to be clear, consistent, and adaptive to technological advancements, they can function as catalysts for innovation. Well-structured regulatory frameworks provide operational certainty, enabling project actors to adopt new technologies more effectively and systematically [1], [15]. Thus, the quality of regulation not only determines compliance levels but also plays a strategic role in either facilitating or hindering innovation in modern healthcare projects.

4. The Regulatory Paradox: Risk versus Quality

Empirical evidence suggests that well-defined, stringent, and structured regulations can positively contribute to improving

technical quality and project accountability [2], [14], [15]. Within PPP governance frameworks, strengthened accountability mechanisms supported by consistent regulation have been shown to reduce moral hazard and enhance transparency in project implementation [2]. Moreover, the application of relational contracting within a stable regulatory environment fosters stronger long-term collaboration among stakeholders and minimizes conflicts that may hinder project performance [15].

These findings point to a phenomenon that can be conceptualized as the regulatory–performance paradox, where regulation produces dual and contrasting implications depending on its characteristics. On the one hand, regulatory uncertainty and volatility increase the risks of cost escalation and project delays. On the other hand, stable, clear, and consistent regulatory frameworks enhance output quality and long-term project sustainability. This paradox highlights that the core issue lies not in the level or intensity of regulation, but in its degree of certainty and stability. Consequently, effective policy design should focus not only on strengthening regulation but also on ensuring consistency, predictability, and clarity in its implementation.

5. Theoretical Implications

From a theoretical perspective, this study contributes to the project management literature by positioning regulatory uncertainty as a central institutional variable that mediates the relationship between governance and project performance. Previous studies have tended to examine fiscal dimensions, PPP governance, and technical risk management in isolation [2], [4], [7]. However, this study demonstrates that these dimensions are inherently interconnected through regulatory mechanisms that shape the overall operational framework of projects. Thus, regulation functions not only as a normative instrument but also as a connecting factor that determines risk dynamics and project performance.

This conceptual integration leads to the development of an analytical model in which regulatory uncertainty increases transaction and financial risks, particularly under unstable and unpredictable policy conditions. Conversely, regulatory stability strengthens governance quality and enhances technical project performance through procedural certainty and consistent standards. Within this framework, contractual and managerial mechanisms act as moderating variables that can either strengthen or weaken the impact of regulation on project performance. In other words, the effectiveness of the relationship between regulation and project performance is determined not only by the regulatory environment itself but also by institutional capacity and the contractual design governing project implementation.

CONCLUSION

This study demonstrates that regulatory uncertainty serves as a critical institutional determinant significantly influencing hospital infrastructure project performance. Through a PRISMA-guided systematic literature review of 19 studies, the findings reveal that regulatory volatility substantially increases the risks of cost overruns and schedule delays, while its effect on project quality is non-linear. Although uncertainty tends to generate risks and inefficiencies, stable and consistent regulatory frameworks can enhance technical quality, accountability, and long-term sustainability—thus highlighting a regulatory–performance paradox.

This research contributes to the body of knowledge by positioning regulatory uncertainty as an institutional mediator that links governance structures, financing mechanisms, and project performance outcomes. It addresses the existing conceptual fragmentation in the literature and proposes an integrative conceptual framework specifically tailored for hospital infrastructure projects. Practically, the study provides actionable insights for policymakers and practitioners in designing stable regulatory environments, adaptive contractual arrangements, and effective regulatory risk management strategies.

The study has several limitations, primarily its exclusive use of Google Scholar as the search database, the relatively modest number of included studies (19), and the restriction to publications from 2022 to 2026, which may have excluded relevant articles from other databases. Future research is recommended to empirically validate the proposed conceptual framework using primary data from real hospital projects across diverse regulatory and geographical contexts. Comparative studies between developed and developing countries, as well as mixed-methods designs combining SLR with case studies, would further enhance the generalizability and robustness of these findings.

REFERENCES

[1] C. Amadi, "Enhancing healthcare delivery by aligning project management methodologies with innovation, compliance, and long-term sustainability goals," *Int. J. Eng. Technol. Res. Manag.*, vol. 5, no. 12, pp. 312–327, 2021, doi: https://doi.org/10.5281/ZENODO.17051201.

[2] A. Aminu-Ibrahim and J. C. Ogbete, "Governance and Accountability Models for Public Private Partnerships in Healthcare Infrastructure Development," *Int. J. Adv. Multidiscip. Res. Stud.*, vol. 4, no. 6, pp. 2943–2960, 2024.

[3] S. Li, "A risk management system for construction procurement in NHS healthcare infrastructure projects," Loughborough University, 2022. doi: https://doi.org/10.26174/thesis.lboro.19722958.

[4] I. A. Kiral, "Contextual Evaluation of Risk Identification Techniques for Construction Projects: Comparative Insights and a Decision-Support Model," *Buildings*, vol. 15, no. 20, p. 3806, Oct. 2025, doi: 10.3390/buildings15203806.

[5] A. Aslantas, "Bayesian belief network–based contractor profitability risk assessment for PPP hospital projects in Turkey," Middle East Technical University, 2023.

[6] A. Akpor *et al.*, "Bridging the Infrastructure Gap in Emerging Economies: An evaluation of the Role of Development Finance and Public-Private Partnerships in Nigeria's Infrastructure Transformation – Challenges, Opportunities, and Strategic Pathways," *ISIR J. Arts, Humanit. Soc. Sci.*, vol. 2, no. 3, 2025, doi: https://doi.org/10.5281/ZENODO.

[7] M. I. J. Ganawah, "Examining the Interplay of Global Public Investment, Fiscal Sustainability, and Economic Dynamics: A Comprehensive Analysis," *J. Bus. Econom. Stud.*, pp. 1–13, Apr. 2024, doi: 10.61440/JBES.2024.v1.20.

[8] S. A. H. Zaidi and D. A. Siddiqui, "The impact of globalization on crisis vulnerability: A case of developing countries," *SSRN Electron. J.*, pp. 1–48, 2024.

[9] R. Hasan, "Megaproject announcements' impact on firm value: Evidence from international project finance deals," Southern New Hampshire University, 2025.

[10] O. B. Oso, O. I. Alli, A. O. Babarinde, and A. I. Ibeh, "Navigating Cross-Border Healthcare Investments: A Risk-Opportunity Model for Emerging Markets," *Eng. Technol. J.*, vol. 10, no. 02, Oct. 2025, doi: 10.47191/etj/v10i02.10.

[11] M. M. Amin, Z. S. Munmun, J. Atayeva, S. W. Ahmed, I. Shamim, and M. H. Akter, "Development levels of stakeholder relationships in collaborative projects: challenges and preconditions," *Sci. Post*, vol. 1, no. 2, pp. 1–14, Dec. 2025, doi: 10.1108/IJMPB-03-2022-0066.

[12] A. Peters, "Empirical Evidence That Blockchain Evolution and Platform Economics Determine Medical Device Tokenization Viability," *SSRN Electron. J.*, 2025.

[13] N. Francois and A. E. J. Amolo, "Project Management Practices and the Implementation of Innovative Medical Drone Delivery Systems," *Int. J. Financ. Bank. Stud.*, vol. 14, no. 2, pp. 10–19, Mar. 2025, doi: 10.20525/ijfbs.v14i2.4022.

[14] I. Smirnov, "An Integrated Methodology for Project Execution in Compliance With FIDIC Contract Frameworks," Selinus University, 2025.

[15] A. Kadefors *et al.*, "Relational contracting in Nordic construction – a comparative longitudinal account of institutional field developments," *Int. J. Manag. Proj. Bus.*, vol. 17, no. 8, pp. 22–46, Dec. 2024, doi: 10.1108/IJMPB-01-2024-0014.

[16] D. Priyanka Y and D. K. K. Myneni, "A Strategic Approach to Improving Decision Making Framework for Integrating the Design Changes in Construction Projects," *Int. J. Manag. Humanit.*, vol. 11, no. 9, pp. 30–36, May 2025, doi: 10.35940/ijmh.G1802.11090525.

[17] A. El Masry and D. Chronéer, "Obstacles to BIM Adoption in Construction Production: A Study of Swedish Construction Contractors' Experiences," *Buildings*, vol. 15, no. 18, p. 3288, Sep. 2025, doi: 10.3390/buildings15183288.

[18] A. Delacruz, L. Moretti, and K. Stroud, "Wind Energy Deployment as a Catalyst for Reducing Change Order Impacts in Construction Projects," *Eur. J. Eng. Educ.*, pp. 1–13, 2023, doi: doi.org/10.5281/zenodo.17676090.

[19] A. L. Moreno Rios and A. H. H. Hernández-Palma, "Real Options-Based Methodology for Valuing Photovoltaic Systems in the Colombian Health Sector," *Lat. Am. Dev. Energy Eng.*, vol. 6, no. 1, Sep. 2025, doi: 10.17981/ladee.06.01.2025.4.