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Identification of Key Causes of Disputes in Construction Projects and Preventive Strategies: A Systematic Review

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A B S T R A C T

Construction disputes affect costs, timelines, and relationships among stakeholders. Therefore, the purpose of this study to collate the latest strategies for construction dispute resolution from various primary sources, using a systematic literature review method. The author conducted a structured query on Scopus, Web of Science, and Google Scholar for literature published for the years 2023-2026. Overall, the query returned 518 records, which after multiple iterations, were narrowed to 12 studies, which formed the basis of this review. The study identifies five predominant categories of dispute management strategies: preventive strategies, contractual and management strategies, alternative dispute resolution (ADR), technological strategies, and risk and context components. The findings suggest that the literature is moving from a focus on reactive dispute resolution to a focus on proactive dispute prevention, especially in the pre-contract and early phases of a project. The ability to reduce disputes was linked to communication, documentation, and a clearly defined scope. Concern around standardization and contractual risk allocation remains valid given that contractual issues continue to be a source of conflict. In addition, this study validates the increased use of negotiation and adjudication as alternative methods of dispute resolution that provide varying degrees of flexibility and legal certainty. Emerging technologies, including smart contracts and artificial intelligence, have the potential to improve transparency, automate parts of contracts, and address the issues of payment delays and unclear contractual obligations. Additionally, macro-level factors such as regional legal risks and technical uncertainties, particularly ground conditions, were found to significantly influence dispute occurrence.

Keywords: *Construction disputes; Dispute management; Dispute prevention; Alternative dispute resolution (ADR)*

1. Introduction

The construction industry is widely recognized as one of the most complex, dynamic, and risk-intensive sectors of the global economy, characterized by multifaceted stakeholder interactions, large-scale financial commitments, and significant technical uncertainties. This complexity inherently predisposes construction projects to disputes, which emerge as a persistent challenge affecting project performance, stakeholder relationships, and overall industry efficiency. Disputes in construction projects are not merely isolated legal disagreements but are systemic phenomena rooted in the structural, contractual, managerial, and technological dimensions of project execution. As a result, the study of construction disputes has evolved into a critical area of research within construction management and engineering disciplines, emphasizing the need for integrated, proactive, and technology-enabled strategies for dispute prevention and resolution (Asiedu & Ameyaw, 2021; Damoah et al., 2020; Francis et al., 2022).

At the core of construction disputes lies the inherent fragmentation of the industry, where multiple stakeholders—including clients, contractors, subcontractors, consultants, and regulatory authorities—operate with differing objectives, risk perceptions, and contractual obligations. This fragmentation often leads to misalignment in expectations, communication breakdowns, and conflicting interpretations of project requirements, thereby increasing the likelihood of disputes. Empirical and conceptual studies have consistently identified key drivers of disputes such as contractual ambiguities, inadequate risk allocation, design changes, payment delays, and unforeseen site conditions (Cakmak, 2022; Ebekozien et al., 2024; Gurumayum, 2025). These factors are further compounded by external influences such as regulatory complexities, economic volatility, and technological disruptions, which collectively create an environment conducive to conflict escalation.

The consequences of construction disputes are substantial and far-reaching. Disputes can lead to project delays, cost overruns, reduced productivity, and deterioration of trust among stakeholders. In severe cases, disputes may result in project abandonment, legal battles, and reputational damage, thereby undermining the sustainability and resilience of construction projects (Bell, 2023; Damoah et al., 2020). Moreover, disputes impose significant transaction costs on the industry, diverting resources away from productive activities and hindering innovation and collaboration. These adverse outcomes underscore the necessity of developing effective strategies to manage and mitigate disputes throughout the project lifecycle.

Traditionally, dispute resolution in construction has been dominated by litigation and arbitration, which, although legally binding, are often time-consuming, costly, and adversarial in nature. Recognizing these limitations, the industry has increasingly shifted towards alternative dispute resolution (ADR) mechanisms such as negotiation, mediation, and adjudication, which offer more flexible, efficient, and relationship-preserving approaches to conflict resolution (Loke et al., 2025; Sebastian et al., 2024; Singh, 2023). Negotiation, in particular, has emerged as a critical tool for resolving disputes by facilitating dialogue, fostering mutual understanding, and enabling collaborative problem-solving. However, the effectiveness of negotiation is often constrained by power imbalances, cognitive biases, and behavioral dynamics among stakeholders, necessitating structured and strategic approaches to enhance negotiation outcomes (Sabri, 2025).

In parallel with the evolution of dispute resolution mechanisms, there has been a growing emphasis on dispute prevention as a more sustainable and cost-effective strategy. Preventive approaches focus on identifying and addressing potential sources of conflict at early stages of the project, particularly during the pre-contract and planning phases. Key preventive measures include clear definition of project scope, comprehensive documentation, effective communication, and robust risk management practices (Jagannathan et al., 2025; Liyanawatta et al., 2024; Silva et al., 2025). The adoption of lean construction principles and collaborative project delivery methods has further reinforced the importance of early stakeholder engagement and continuous communication in minimizing disputes. These approaches reflect a paradigm shift from reactive dispute resolution to proactive dispute avoidance, highlighting the strategic importance of early intervention in enhancing project outcomes.

Contractual frameworks play a central role in shaping the dynamics of construction disputes. Poorly drafted contracts, ambiguous terms, and inadequate risk allocation mechanisms are among the most common sources of conflict in construction projects. Standardized contracts and proactive contract design have been identified as effective tools for reducing uncertainties and aligning stakeholder expectations (Hietanen-Kunwald & Haapio, 2021; Senaratne & Farhan, 2023). Furthermore, advancements in contract management practices, including the integration of

digital tools and real-time monitoring systems, have enhanced the ability of project managers to identify and address potential issues before they escalate into disputes. These developments underscore the critical role of contractual clarity and management in mitigating dispute risks.

The rapid advancement of digital technologies has introduced new opportunities and challenges in construction dispute management. Technologies such as Building Information Modeling (BIM), artificial intelligence (AI), blockchain, and smart contracts are transforming the way construction projects are planned, executed, and monitored. Smart contracts, in particular, have gained significant attention for their potential to automate contractual processes, enhance transparency, and reduce ambiguities in contract interpretation (Nada & Othman, 2025; Ru, 2026). Similarly, AI-based tools enable efficient analysis of large volumes of project data, facilitating early detection of potential disputes and supporting informed decision-making. Despite their promising potential, the adoption of these technologies is hindered by challenges related to legal enforceability, regulatory uncertainty, and integration with existing systems (Regona et al., 2022; Zeberga et al., 2024).

In addition to technological innovations, the integration of digital technologies into dispute resolution processes has facilitated the emergence of hybrid approaches that combine traditional ADR methods with advanced analytical tools. For instance, technology-assisted review (TAR) and digital dispute platforms have enhanced the efficiency and accuracy of dispute resolution processes by enabling faster data analysis and evidence evaluation (Abeywickrama et al., 2026; Kalogeraki & Antoniou, 2024). These developments reflect a broader trend towards digital transformation in the construction industry, where technology is increasingly leveraged to improve project performance and reduce conflict.

Another critical dimension of construction disputes relates to macro-level and contextual factors, which extend beyond the immediate control of project stakeholders. These factors include regional legal frameworks, socio-economic conditions, and environmental uncertainties, which significantly influence the occurrence and resolution of disputes. For example, variations in legal systems and enforcement mechanisms across different regions can create challenges in contract execution and dispute resolution, particularly in international projects (Bell, 2023). Similarly, technical uncertainties such as ground conditions and environmental risks can lead to disputes if not adequately addressed during the planning and design stages (Davis, 2025). These insights highlight the need for a holistic approach to dispute management that considers both micro-level project factors and macro-level contextual influences.

Risk management has also been identified as a fundamental component of dispute prevention and mitigation in construction projects. Effective risk management involves the identification, assessment, and allocation of risks among stakeholders, ensuring that potential issues are addressed proactively. The transition from traditional risk management approaches to more sustainable and integrated frameworks has enhanced the ability of project teams to manage uncertainties and reduce disputes (Almashhour et al., 2025). Furthermore, the adoption of system dynamics and lifecycle-based risk assessment models has provided deeper insights into the complex interactions among project variables, enabling more effective decision-making (Koc & Gurgun, 2021).

The literature also emphasizes the importance of stakeholder collaboration and communication in minimizing disputes. Effective communication fosters transparency, trust, and mutual understanding among stakeholders, reducing the likelihood of misunderstandings and conflicts. Collaborative approaches, supported by digital tools and integrated project delivery methods, have been shown to enhance coordination and alignment among project participants (Fobiri et al., 2022; Zhang et al., 2024). These approaches are particularly relevant in complex projects involving multiple stakeholders and high levels of uncertainty.

Despite the extensive body of research on construction disputes, there remains a lack of comprehensive frameworks that integrate the various dimensions of dispute management, including prevention, contractual design, ADR mechanisms, technological innovations, and contextual factors. Existing studies often focus on specific aspects of dispute management in isolation, limiting their applicability in addressing the multifaceted nature of construction disputes. This fragmentation highlights the need for systematic reviews and integrative studies that synthesize existing knowledge and provide a holistic understanding of dispute management strategies.

In this context, recent research has increasingly adopted systematic literature review methodologies to identify and classify the key causes of disputes and evaluate the effectiveness of various management strategies. Such approaches enable the consolidation of diverse findings from empirical, conceptual, and case-based studies, providing a

comprehensive perspective on the state of knowledge in the field. The uploaded manuscript exemplifies this trend by categorizing dispute management strategies into preventive, contractual, ADR, technological, and contextual clusters, thereby offering a structured framework for understanding and addressing construction disputes.

Building on this evolving body of knowledge, it is essential to develop integrated models that combine traditional and modern approaches to dispute management, leveraging the strengths of each to enhance project performance. The convergence of proactive planning, robust contractual frameworks, effective ADR mechanisms, and advanced digital technologies presents a promising pathway for reducing disputes and improving the sustainability of construction projects. Furthermore, the incorporation of contextual and risk-based considerations into dispute management strategies can enhance their adaptability and effectiveness across different project environments.

Ultimately, the growing complexity of construction projects and the increasing adoption of digital technologies necessitate a paradigm shift in the way disputes are managed in the industry. Moving beyond reactive approaches, there is a need to embrace proactive, data-driven, and collaborative strategies that address the root causes of disputes and promote long-term stakeholder alignment. This shift requires not only technological innovation but also changes in organizational culture, governance structures, and professional practices.

Therefore, the aim of this study is to systematically identify and synthesize the key causes of disputes in construction projects and to evaluate integrated preventive and resolution strategies across contractual, managerial, technological, and contextual dimensions.

Figure 1

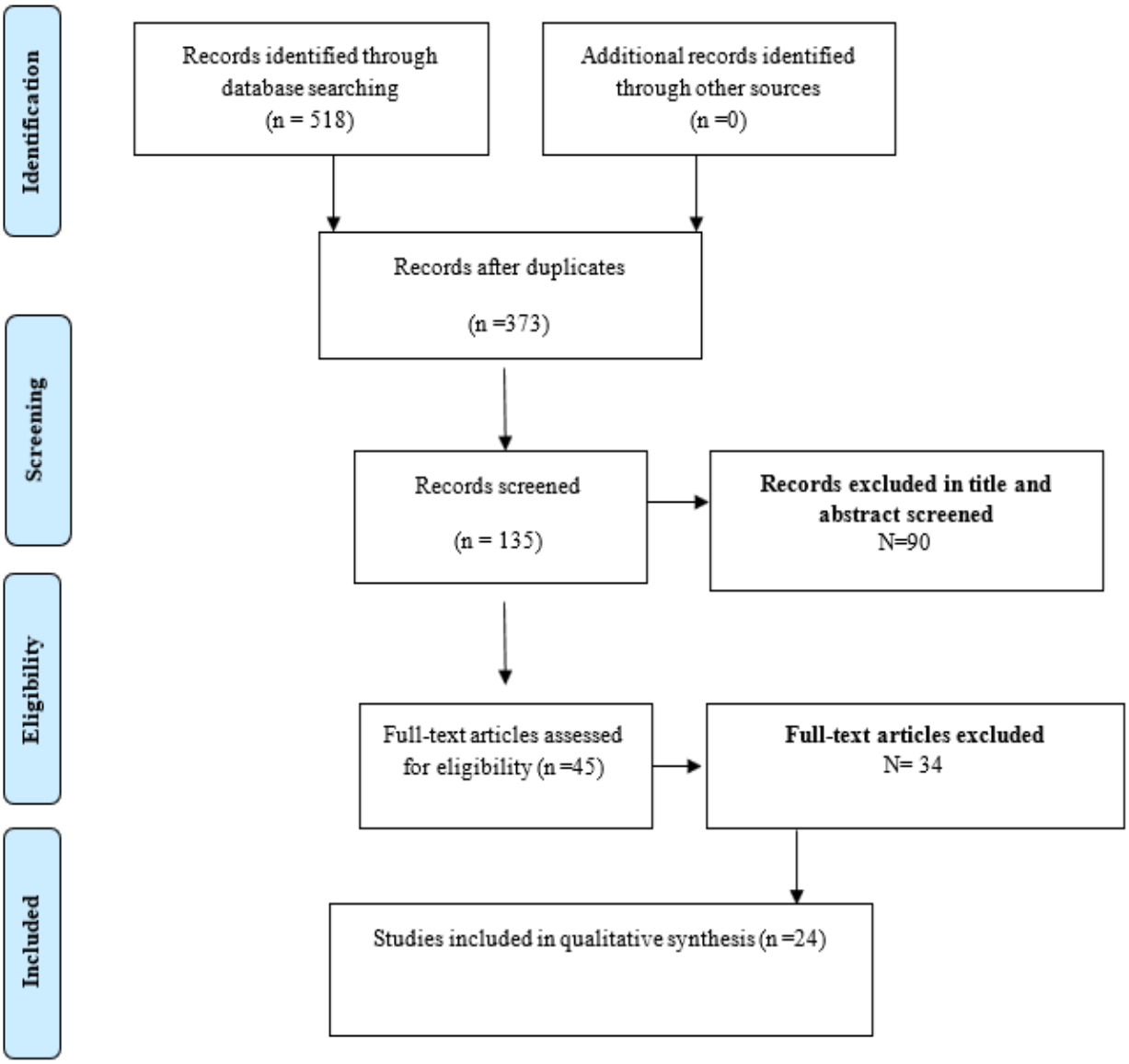
Diagram of Study Selection Process

2. Methods and Materials

This study uses the systematic literature review (SLR) method to pinpoint, categorize, and scrutinize various strategies to resolve disputes in construction. Comprehensive construction of the review involved a systematic route to ensure rigor, transparency, and the possibility of replication. The authors meticulously searched three major academic databases: Scopus, Web of Science, and Google Scholar. These three were used in other to have an extensive access to quality peer-reviewed journals and pertinent academic articles.

The search focused on studies published between 2023 and 2026 to capture the most recent developments in construction dispute management. A combination of keywords and Boolean operators was used, including “construction disputes”, “dispute resolution”, “ADR”, “arbitration”, “adjudication”, “negotiation”, “dispute avoidance”, “prevention strategies”, and “smart contracts”. These keywords were applied to the titles, abstracts, and keywords of publications to ensure the relevance of the retrieved studies.

The initial search yielded 518 articles. A multi-stage screening process was then conducted to refine the dataset. First, a title and abstract screening was performed, during which irrelevant studies, duplicates, and non-English publications were removed, reducing the number of articles to 135. Subsequently, a full-text screening was carried out to evaluate the relevance of the remaining studies in relation to the research objectives. After applying the inclusion and exclusion criteria, a final set of 12 articles was selected for detailed analysis. A PRISMA flow diagram illustrating this process is presented in the study (Figure 1).



Articles were included when they explicitly addressed construction-related disputes and conflicts management concerning strategies for dispute prevention, mitigation, and resolution. Only publications from the years 2023 to 2026 were included, with a priority for peer-reviewed journal articles and high-quality conference papers in English. Furthermore, selected articles needed to offer precise methodological or conceptual clarifications within the defined scope of the research. Conversely, articles were excluded if they were not related to the construction industry, focused solely on legal theory without practical implications, lacked sufficient methodological clarity or full-text availability, or were duplicates across databases. Studies that did not address dispute-related strategies, such as purely technical construction research without linkage to disputes, were also excluded.

3. Findings and Results

To systematically synthesize the findings from the selected studies, a structured data extraction matrix was developed, as presented in Table 1. This table summarizes key characteristics of the included studies, including research design, strategy categories, project stages, and main contributions, providing a comprehensive overview of the existing literature on construction dispute management.

Table 1

Data Extraction Matrix of Selected Studies on Construction Dispute Causes and Management Strategies

No.	Author	(Year)	Study Design / Method	Strategy Category	Key Strategies / Findings	Project Stage	Main Contribution
1	C. Amoah & H. Nkosazana [22]	2023	Quantitative (Survey)	Management / Mitigation Strategies	Strategies include reducing uncertainties, contingency planning, contract guarantees, payment guarantees, and contractual clauses (e.g., escalation, retention)	Construction Phase	Offers practical contract management strategies to mitigate disputes
2	O. K. Sabri [23]	2025	Conceptual / Analytical	Negotiation Strategies	Strategic negotiation approaches: power balancing, behavioral insights, structured bargaining models, and AI-assisted decision-making	Dispute Resolution	Develops advanced negotiation models to improve dispute resolution outcomes
3	T. N. Liyanawatta et al. [24]	2024	Qualitative (Interviews)	Preventive Strategies	Identified 104 dispute avoidance strategies: communication, documentation, risk management, stakeholder responsibility	Pre-construction Phase	Proposes a comprehensive framework for dispute prevention in early project stages
4	M. K. Loke et al. [25]	2025	Quantitative (Survey) + Validation Interviews	Adjudication / ADR Strategies	Identifies practical strategies for selecting adjudication for specific dispute types (e.g., payment issues, variation orders, retention sums)	Dispute Resolution	Provides a practical guide for selecting adjudication as an effective dispute resolution strategy
5	R. R. Sebastian et al. [26]	2024	Qualitative (Case Study)	Negotiation Strategies	Effective negotiation supported by communication, adaptive leadership, and data-driven decision-making	Dispute Resolution	Demonstrates real-world application of negotiation as an effective dispute resolution mechanism
6	S. Senaratne & S. Farhan [27]	2023	Case Study (Legal Cases Review)	Contractual / Mitigation Strategies	Use of standard contract clauses, clarity in terms, and proper contract management to reduce disputes	Pre-construction & Construction	Highlights the role of standard contracts in mitigating contractual disputes
7	M. Jagannathan et al. [28]	2025	Mixed Method (Survey + Interviews)	Preventive Strategies (Lean-based)	Lean principles: open communication, stakeholder collaboration, early conflict identification, training and awareness	Early Construction Phase	Shows how lean construction practices can proactively prevent disputes
8	P. M. Silva et al. [29]	2025	Qualitative (Interviews)	Preventive / Pre-contract Strategies	84 pre-contract measures including communication clarity, risk management, documentation, collaboration, and scope definition	Pre-contract Stage	Provides a comprehensive framework of pre-contract dispute avoidance measures
9	Y. Ru [30]	2026	Conceptual / Legal Analysis	Technology-enabled Resolution Strategies	Smart contracts and AI-based document review to automate enforcement and improve dispute resolution efficiency	Dispute Resolution	Examines legal implications and benefits/risks of digital dispute resolution technologies
10	J. Davis [31]	2025	Conceptual / Technical Perspective	Technical Mitigation Strategies	Improved geotechnical models, updated desk studies, training, and better contractual awareness in ground engineering	Design / Early Project Stage	Highlights technical and documentation-based strategies to reduce disputes from ground conditions
11	H. C. Bell [32]	2023	Conceptual	Risk Management / Contextual Mitigation Strategies	Managing region-specific legal risks, contract enforcement challenges, arbitration risks, and local regulatory constraints	Execution & Dispute Resolution	Provides strategies for managing external legal and regional risks in large infrastructure projects
12	Nada & Othman [33]	2025	Qualitative (Literature + Case Study Analysis)	Technology-enabled / Smart Contract Strategies	Smart contracts using blockchain technology automate contractual execution and payments, reduce ambiguity in contract interpretation, and improve transparency. Identified reduction in disputes caused by contractual complexity, communication breakdowns, and payment delays.	Contracting / Execution / Payment Stage	Demonstrates potential of smart contracts to reduce disputes through automation, transparency, and reduced contractual ambiguity

The synthesis of the reviewed literature indicates that construction dispute management strategies can be systematically grouped into five major thematic clusters, reflecting the inherently multi-dimensional nature of dispute prevention and resolution across the lifecycle of construction projects. These clusters collectively demonstrate a shift in the industry toward more integrated, proactive, and technologically supported approaches to managing disputes.

The first cluster highlights the critical importance of preventive strategies, particularly during the pre-contract and early project phases. The findings reveal a clear transition from reactive dispute resolution toward proactive dispute avoidance, where the primary objective is to prevent conflicts before they arise. Early-stage interventions—such as thorough project planning, precise scope definition, and effective stakeholder coordination—play a decisive role in minimizing the likelihood of dispute escalation. A consistent pattern across the literature is the central role of communication, documentation, and clarity of scope in preventing disputes. Inadequate communication channels, incomplete or ambiguous documentation, and poorly defined project responsibilities are repeatedly identified as primary triggers of conflict. Consequently, establishing transparent communication systems, maintaining accurate and comprehensive documentation, and ensuring clear delineation of roles and responsibilities emerge as essential preventive mechanisms. These findings further suggest that investments in early project stages not only reduce the incidence of disputes but also enhance overall project efficiency, coordination, and stakeholder alignment.

The second cluster focuses on contractual and management strategies, emphasizing that contract-related issues remain a dominant source of disputes in construction projects. The findings demonstrate that ambiguities in contractual terms—particularly those related to scope, penalty provisions, and variation orders—are major contributors to disagreements among project stakeholders. In many cases, insufficient specification of roles and responsibilities, coupled with the absence of structured procedures for managing changes, leads to misunderstandings that escalate into formal disputes. To mitigate these risks, the literature consistently underscores the importance of robust contract management practices. These include the use of standardized contract forms, explicit risk allocation mechanisms, and clearly defined clauses for handling variations, payments, and potential dispute scenarios. Effective contract design serves not only to reduce uncertainty but also to establish a shared framework for managing expectations and obligations among stakeholders. Overall, the findings reinforce the notion that strong contractual foundations are essential for both preventing disputes and facilitating their efficient resolution when they arise.

The third cluster addresses dispute resolution mechanisms, particularly the growing reliance on alternative dispute resolution (ADR) approaches. The findings reveal a significant shift away from traditional litigation toward more flexible and efficient mechanisms such as negotiation and adjudication. This transition is driven by the need for faster, less costly, and less adversarial methods of resolving disputes. Negotiation is characterized by its flexibility and reliance on communication, trust, and mutual problem-solving, making it particularly effective for preserving relationships among stakeholders. At the same time, structured negotiation approaches—incorporating behavioral insights, strategic bargaining, and data-driven decision-making—are shown to enhance the effectiveness of this method. In contrast, adjudication offers a more formalized process, providing relatively quick decisions with a degree of legal certainty, especially in disputes involving payments and contractual obligations. However, the findings also highlight key challenges associated with ADR, particularly in negotiation-based processes. Power imbalances among stakeholders, combined with cognitive biases and adversarial behaviors, can undermine negotiation outcomes and lead to suboptimal resolutions. This underscores the importance of managing relational and behavioral dynamics in dispute resolution processes and suggests that the effectiveness of ADR mechanisms depends on their alignment with the specific characteristics of the dispute and stakeholder context.

The fourth cluster centers on technology-driven dispute management, reflecting the increasing influence of digital transformation in the construction industry. The findings indicate that emerging technologies—such as smart contracts and artificial intelligence—are fundamentally reshaping how disputes are prevented and resolved. Smart contracts, enabled by blockchain technology, allow for the automatic execution of contractual terms, particularly in areas such as payments, thereby reducing reliance on manual processes and subjective interpretation. This enhances transparency, accuracy, and trust among project stakeholders, while simultaneously minimizing disputes arising from contractual ambiguity and payment delays. Similarly, AI-based tools improve the efficiency of document analysis and dispute evaluation, enabling faster

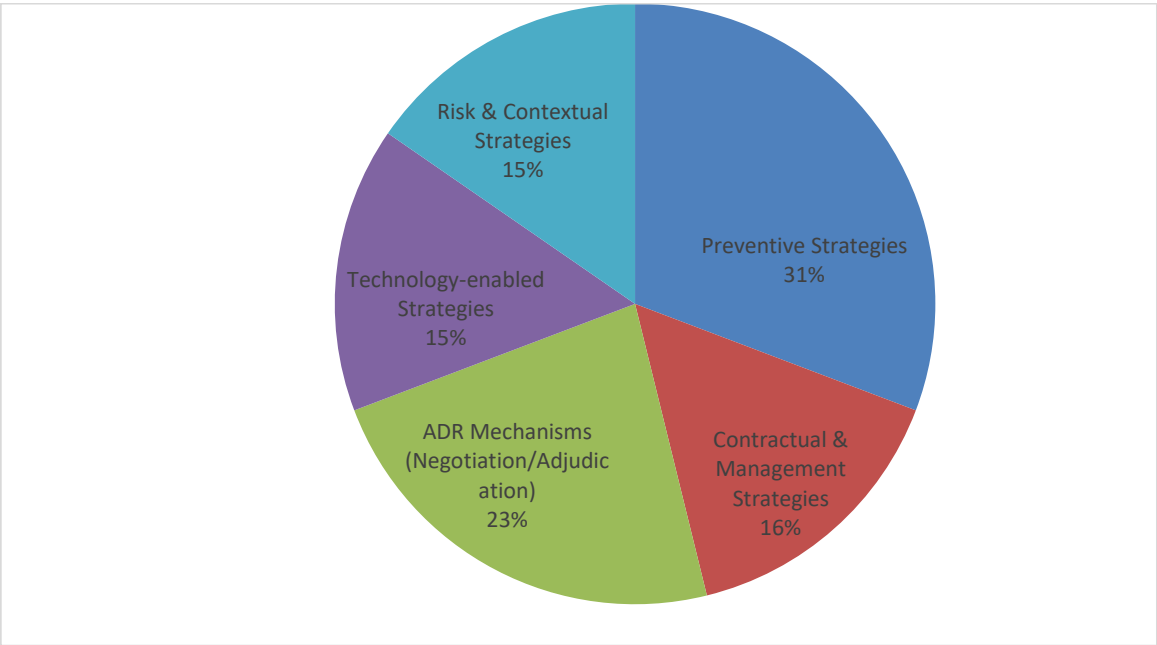
and more informed decision-making. These technological advancements are particularly effective in addressing common sources of disputes, including inefficiencies in manual contract enforcement and inconsistencies in documentation. However, the findings also reveal a significant gap between technological capabilities and existing legal frameworks. Challenges related to legal enforceability, accountability, and regulatory compliance create uncertainty regarding the adoption of these technologies. The absence of standardized guidelines and legal recognition for smart contracts and AI-driven processes limits their widespread implementation. As a result, while technology-driven solutions offer substantial potential for reducing disputes, their success depends on the development of supportive legal and governance frameworks that align technological innovation with established legal principles.

The fifth cluster highlights the role of risk and contextual factors at the macro level, emphasizing that construction disputes extend beyond purely contractual or managerial issues. The findings demonstrate that external factors—such as regional legal environments, regulatory conditions, and technical uncertainties—play a critical role in shaping dispute dynamics. Variations in legal systems, enforcement mechanisms, and regulatory requirements across different regions introduce complexities that cannot be fully addressed through contractual arrangements alone. This suggests that effective dispute mitigation requires a comprehensive understanding of the legal and institutional context in which projects are executed. In addition, technical uncertainties—particularly those related to ground conditions—are identified as significant sources of disputes. Inadequate or outdated technical data, insufficient site investigations, and poor integration of technical information can lead to misinterpretations and conflicts during project execution. These findings indicate that disputes often arise not only from legal disagreements but also from information asymmetry and technical misjudgment. Collectively, these insights reinforce the understanding that construction disputes are inherently multi-dimensional, influenced by a combination of environmental, technical, and jurisdictional factors.

To further enhance the interpretation of the findings, the identified strategies were grouped into thematic clusters, illustrating the dominant approaches used across the literature. Figure 2 presents the frequency and distribution of strategy categories, highlighting the prominence of preventive, contractual, and negotiation-based approaches compared to emerging technology-enabled strategies.

Figure 2

Distribution of Construction Dispute Management Strategies across Identified Thematic Clusters



In addition, the temporal and procedural application of dispute management strategies across the project lifecycle is illustrated in Table 2, which demonstrates how different strategies are applied at various phases, ranging from pre-contract and construction stages to dispute resolution phases.

Table 2

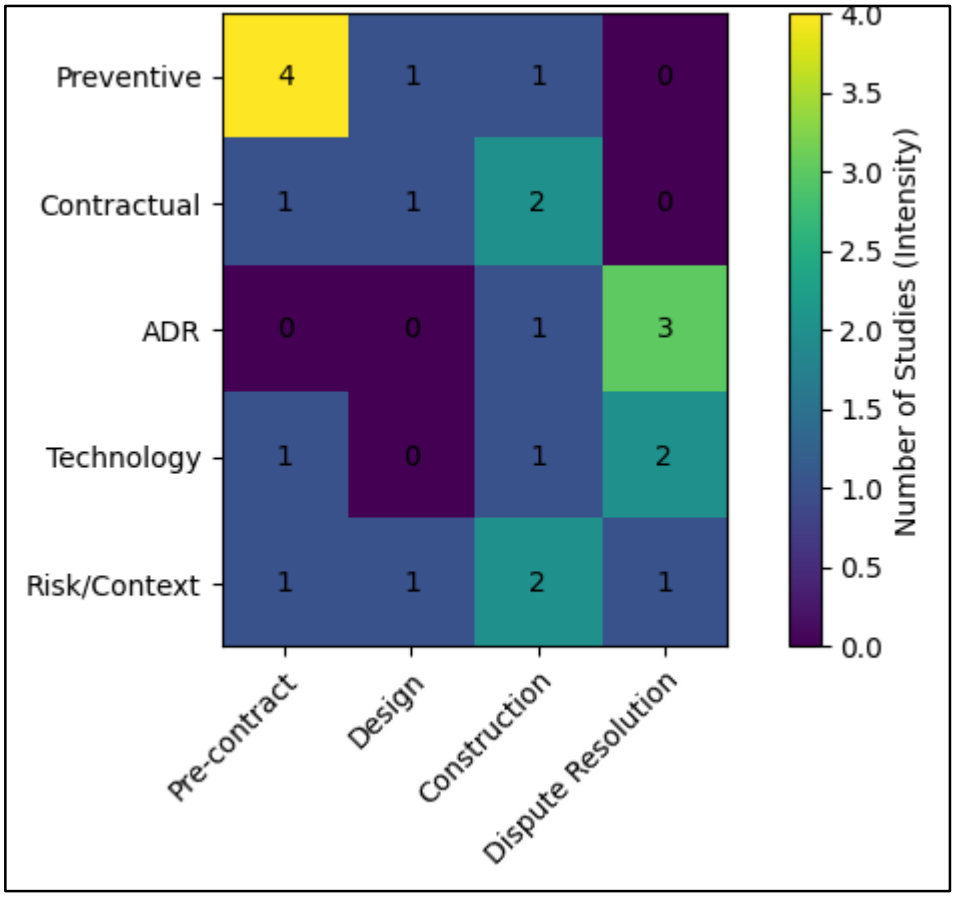
Lifecycle of Construction Dispute Management from Prevention to Resolution Stages

Step No.	Stage	Description
1	Pre-contract Stage	Preventive strategies (scope definition, planning, documentation)
2	Design & Planning Stage	Technical & contractual clarity
3	Construction Stage	Contract management + risk control
4	Dispute Occurrence Stage	Conflict emergence due to ambiguity or delays
5	ADR Stage	Negotiation, adjudication, arbitration
6	Technology Support Layer	Smart contracts, AI-assisted systems

Furthermore, a cross-stage comparison of strategy implementation is visualized in Figure 3, providing a clear representation of how preventive, contractual, and resolution strategies are distributed throughout the project lifecycle. This visualization highlights that preventive strategies are predominantly concentrated in the early phases, while negotiation and ADR mechanisms are more prevalent during the dispute resolution stage, and technology-enabled strategies are increasingly distributed across multiple phases.

Figure 3

Heatmap of Strategy Types across Different Stages of Construction Projects



4. Discussion and Conclusion

The findings of this study provide a comprehensive synthesis of the key causes of construction disputes and the effectiveness of various preventive and resolution strategies, highlighting a clear transition in the construction industry from reactive dispute resolution toward proactive dispute prevention. The results indicate that disputes are primarily rooted in contractual ambiguities, communication failures, inadequate documentation, and poor risk allocation practices. These findings align with prior studies emphasizing that contractual and managerial deficiencies remain the dominant drivers of disputes across construction projects (Cakmak, 2022; Francis et al., 2022; Gurumayum, 2025). In particular, the prominence of communication and documentation as critical factors reinforces the argument that many disputes are not solely technical or legal in nature but stem from process inefficiencies and misaligned stakeholder expectations.

A central finding of this study is the strong emphasis on preventive strategies, particularly during the pre-contract and early project phases. The results demonstrate that early-stage interventions, such as clear scope definition, comprehensive documentation, and proactive stakeholder engagement, significantly reduce the likelihood of disputes. This finding is consistent with the frameworks proposed by (Silva et al., 2025) and (Liyanawatta et al., 2024), who identified a wide range of pre-contract measures aimed at minimizing conflict potential. Furthermore, the application of lean construction principles, as highlighted in the findings, supports the notion that early identification of risks and continuous communication can prevent disputes from escalating into formal conflicts (Jagannathan et al., 2025). This convergence of evidence suggests that the most effective approach to dispute management lies in prevention rather than post-dispute resolution, marking a paradigm shift in construction management practices.

The study also confirms that contractual issues remain a core source of disputes, particularly those related to unclear terms, risk allocation, and change management procedures. The findings underscore the importance of robust contract design and management in mitigating dispute risks. This is supported by previous research emphasizing the role of standardized contracts and proactive contract design in reducing uncertainties and aligning stakeholder expectations (Hietanen-Kunwald & Haapio, 2021; Senaratne & Farhan, 2023). Additionally, the integration of clear clauses for handling variations, payment mechanisms, and dispute-prone scenarios is shown to significantly reduce the occurrence of contractual conflicts. These results reinforce the argument that effective contract management serves as a foundational element for both dispute prevention and resolution.

Another important finding relates to the increasing adoption of alternative dispute resolution (ADR) mechanisms, particularly negotiation and adjudication, as preferred methods for resolving construction disputes. The results indicate that stakeholders are moving away from traditional litigation due to its time-consuming and adversarial nature, favoring more flexible and efficient approaches. This trend is consistent with the findings of (Singh, 2023) and (Loke et al., 2025), who highlight the growing importance of ADR in addressing complex construction disputes. The study further reveals that negotiation, when supported by structured approaches and behavioral insights, can effectively resolve disputes while preserving stakeholder relationships (Sabri, 2025; Sebastian et al., 2024). However, the findings also highlight challenges associated with negotiation, particularly power imbalances and cognitive biases, which can hinder its effectiveness. This suggests that while ADR mechanisms offer significant advantages, their success depends on the ability to manage interpersonal and organizational dynamics.

A notable contribution of this study is the identification of technology-driven strategies as an emerging and transformative dimension of construction dispute management. The findings demonstrate that digital technologies, including smart contracts and artificial intelligence, have the potential to significantly reduce disputes by enhancing transparency, automating contractual processes, and improving decision-making. These results are aligned with recent studies emphasizing the role of digital technologies in transforming dispute management practices (Nada & Othman, 2025; Ru, 2026). Smart contracts, in particular, are shown to reduce disputes related to payment delays and contractual ambiguities by enabling automated execution of predefined contractual terms. Similarly, AI-based tools facilitate efficient analysis of project data, enabling early detection of potential conflicts and supporting proactive decision-making.

Despite the promising potential of digital technologies, the findings highlight several challenges that limit their widespread adoption. These include issues related to legal enforceability, regulatory uncertainty, and integration with existing contractual frameworks. These challenges are

consistent with the barriers identified in previous studies, which emphasize the need for alignment between technological innovations and legal systems (Regona et al., 2022; Zeberga et al., 2024). The findings suggest that while technology-driven solutions can significantly enhance dispute management, their effectiveness depends on the development of appropriate regulatory frameworks and industry standards.

The study also emphasizes the role of macro-level and contextual factors in shaping construction disputes. The findings indicate that regional legal risks, regulatory environments, and technical uncertainties, particularly those related to ground conditions, play a significant role in dispute occurrence. This is consistent with the work of (Bell, 2023) and (Davis, 2025), who highlight the importance of contextual factors in influencing dispute dynamics. The results suggest that effective dispute management requires a holistic approach that considers not only project-specific factors but also broader environmental and institutional contexts. This perspective is further supported by risk management frameworks that emphasize the integration of contextual and lifecycle-based risk assessment in construction projects (Almashhour et al., 2025; Koc & Gurgun, 2021).

Furthermore, the findings highlight the importance of stakeholder collaboration and communication in minimizing disputes. The results demonstrate that projects characterized by effective communication, transparency, and collaborative decision-making are less likely to experience conflicts. This aligns with previous research emphasizing the role of stakeholder engagement and integrated project delivery methods in enhancing project outcomes (Fobiri et al., 2022; Zhang et al., 2024). The findings suggest that fostering a collaborative project environment not only reduces the likelihood of disputes but also enhances overall project performance and stakeholder satisfaction.

In addition, the study reveals that construction disputes are inherently multi-dimensional, involving the interaction of contractual, managerial, technological, and contextual factors. This complexity underscores the need for integrated frameworks that combine preventive, contractual, and technological strategies to address the root causes of disputes. The findings support the argument that isolated approaches to dispute management are insufficient, and that a comprehensive, system-level perspective is required to effectively manage conflicts in construction projects (Stepanova et al., 2020; Wang & Wu, 2020). Such an approach enables the identification of interdependencies among different factors and facilitates the development of more effective and sustainable dispute management strategies.

Overall, the results of this study contribute to the existing literature by providing a holistic synthesis of construction dispute management strategies and highlighting the interplay between traditional and emerging approaches. The findings confirm that while traditional methods such as contract management and ADR remain essential, the integration of preventive strategies and digital technologies offers new opportunities for improving dispute management. This integrated perspective provides valuable insights for both researchers and practitioners, emphasizing the need for a balanced and adaptive approach to managing construction disputes.

The limitations of this study should be acknowledged to provide context for interpreting the findings. First, the study is based on a systematic review of selected literature, which may be subject to publication bias and limitations in the availability of relevant studies. Second, the focus on recent publications may exclude earlier foundational studies that could provide additional insights into dispute management. Third, the diversity of methodologies and contexts in the reviewed studies may limit the generalizability of the findings. Finally, the rapid evolution of digital technologies means that some findings related to technological strategies may become outdated as new innovations emerge.

Future research should focus on developing empirical models that validate the effectiveness of integrated dispute management frameworks in different project contexts. There is also a need for longitudinal studies that examine the impact of preventive strategies and digital technologies on dispute outcomes over time. Additionally, future studies should explore the role of organizational culture and behavioral factors in influencing dispute dynamics, particularly in relation to negotiation and collaboration. Further research is also required to address the legal and regulatory challenges associated with the adoption of smart contracts and AI-based tools in construction projects.

From a practical perspective, construction stakeholders should prioritize the adoption of preventive strategies, particularly during the early stages of project development. This includes investing in comprehensive planning, clear documentation, and effective communication systems. Practitioners should also focus on improving contract design and management practices to reduce ambiguities and align stakeholder expectations. The adoption of ADR mechanisms, supported by structured negotiation

approaches, can enhance the efficiency and effectiveness of dispute resolution. Furthermore, organizations should explore the integration of digital technologies, such as smart contracts and AI tools, to improve transparency and automate contractual processes. Finally, stakeholders should adopt a holistic approach to dispute management that considers both project-specific and contextual factors, enabling more effective and sustainable management of construction disputes.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

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Ethics Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were considered.

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