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Analysis of Claims and Dispute Resolution in Construction Projects: a Case Study Approach

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Abstract. Disputes in construction projects are often inevitable due to various factors such as delays, cost overruns, and changes in scope. This study aims to identify the root causes of claims and examine the resolution strategies implemented in the Sierra Intercultural School construction project. Using a qualitative descriptive approach, data were collected through in-depth interviews with contractors, consultants, and owners, as well as analysis of supporting documents such as contracts and site reports. The study found that the most frequent claim types were time extension claims (37%), additional cost claims (28%), and design change claims (21%). These were primarily caused by design errors, late approvals, and incomplete work planning. Dispute resolution predominantly relied on negotiation and direct discussion, without involving formal legal or arbitration procedures. The findings indicate that effective contract documentation and proactive communication among stakeholders can significantly reduce claim occurrence. This research contributes to the field of construction management by offering practical insights into dispute avoidance and resolution mechanisms in medium-scale educational infrastructure projects. It also highlights the importance of early stakeholder alignment to prevent claims and delays in similar future developments.

Keywords: construction claims, dispute resolution, causal factors.

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1. Introduction

In the construction sector, design and build projects are becoming popular due to the fact that direct use of this method saves time as well as cost. The design and construction phases within this method will be integrated in a single contract, theoretically facilitating faster completion of the project. But such a

method also poses some number of possible risks that can lead to claims from either the Service User or the Service Provider [1]. Claims in design and build contracts are more complex due to the mutual dependency between the design and implementation stages. The Service Providers generally have more risks to deal with, which include handling design changes, compressed construction schedules, poorly detailed contract documents, variability in currency exchange rates, delays in approval of the Detail Engineering Design (DED), errors in early measurements (MC-0), and events outside of the project scope like civil unrest or natural disasters [2].

In the construction sector, design and build projects are becoming increasingly popular due to their potential to save time and cost by integrating the design and construction phases within a single contract [1]. However, such projects inherently carry higher risks of claims due to overlapping responsibilities and compressed schedules. Claims in construction are not merely contractual disagreements; they can significantly affect project performance, causing cost overruns, schedule delays, and quality degradation if not properly managed [2]. Empirical studies have shown that in many international projects, claims account for a substantial proportion of disputes, over 25% in large-scale infrastructure projects, highlighting their strategic importance in construction management. [3]

Internationally, dispute resolution frameworks such as those provided by the Fédération Internationale des Ingénieurs-Conseils (FIDIC) and the American Institute of Architects (AIA) offer structured processes for resolving claims, ranging from negotiation and mediation to arbitration and litigation. These frameworks emphasize early intervention, transparent documentation, and collaborative problem solving as key to minimizing the escalation of disputes [4]. In the Indonesian context, however, the application of such frameworks is still evolving, with limited integration of international best practices into local contract management.

Construction claims, as per Kikwasi [2], are those arising from or connected with the delivery of construction services between Service Providers and Service Users. These claims may occur because of a number of reasons, including alterations in the design of a project, alterations in the schedule of work acceleration or alteration, and lack of detail in the Bill of Quantity (BOQ), technical specifications, and contract drawings. Moreover, extreme fluctuations in the currency exchange rate, deferment of approval by DED, absence of MC-0 approval, and external interferences such as natural disasters, civil unrest, protests, or riots are also common causes of construction claims [3]. Claim in a construction project is a request put forward by one party against another for variations or non-compliance with agreed terms. These problems not only increase the possibility of conflict among stakeholders but also adversely impact the project budget, project schedule, and general quality of the project outcome [4].

Construction claims are a recurring issue in global infrastructure development. According to the 2022 Global Construction Disputes Report by Arcadis, the average value of disputes worldwide reached USD 52.6 million, with time extension claims being the most frequent, followed by scope change and cost escalation claims. In the Southeast Asian region, including Indonesia, nearly 68% of projects experience at least one formal claim during their lifecycle, as reported by the Construction Services Development Board (LPJK) in 2021. These statistics highlight the urgent need for effective claim identification and resolution strategies in both public and private projects.

Unless the root causes of claims are diagnosed and managed at the outset, they can result in enormous cost escalation, project delays, and lawsuits. Thereafter, effective resolution of disputes over claims in design and build contracts is essential in terms of minimizing adverse impacts on project performance. This process, not only makes it easy to protect the interests of Service Users as well as Service Providers, but also maintains project delivery continuity without drastic disruption. The purpose of this study is to analyze the reasons for claims in design and build contracts, evaluate their impact on project success, and review effective methods of conflict resolution that can be applied in construction projects [5-10].

Therefore, this study aims to analyze the causal factors behind construction claims and to examine the dispute resolution mechanisms applied in the Sierra Intercultural School project. By doing so, the research seeks to contribute practical insights that can enhance risk management and stakeholder coordination in future construction projects.

2. Methods

2.1 Research Design

This research applies a mixed-method approach, combining both quantitative analysis and descriptive insights to identify causal factors of construction claims and evaluate resolution strategies. The quantitative component is conducted using Smart PLS to measure the relationships between latent variables based on theoretical constructs. This is supported by descriptive techniques such as interviews, document analysis, and case study observations to capture contextual depth [11-14].

The study is centered on the Sierra Intercultural School Project, a design and build contract involving several stakeholders including Asya Mandira Land as the developer, PT. Acset Indonusa Tbk. as the main contractor, and PT. Tethagra CM as the construction manager. This project was selected due to its representative claim issues and the availability of comprehensive documentation and access to informants

2.2 Data Collection Techniques

Data collection followed standard research procedures, prioritizing the validity and reliability of data. Three main techniques were used:

- Questionnaires: A closed-ended questionnaire was developed using indicators derived from literature and validated by subject-matter experts. A Likert scale (1–5) was used to assess respondent perceptions regarding claim causes and dispute outcomes. A pilot test involving five respondents was conducted to ensure clarity before full-scale distribution.
- Interviews: In-depth, semi-structured interviews were held with selected experts (owners, contractors, consultants) to gain deeper insights into the most significant causes of claims and their resolution strategies. An interview protocol was prepared in advance, and responses were recorded and transcribed.
- Document analysis: The researchers examined relevant documents including contracts, variation orders, weather records, and meeting minutes to triangulate the findings and contextualize quantitative data.

All participants provided informed consent prior to data collection. Ethical approval was obtained. Identities of respondents were anonymized to protect confidentiality.

All such data collected were translated into quantitative form and analyzed with Smart PLS and Excel with the assistance of Monte Carlo simulations with thousands of iterations to generate probabilistic estimates for claim frequency and distribution.

$$E\,[x] = \frac{1}{n}\ \sum_{i=1}^{n} X_i \tag{1}$$

A sensitivity analysis using a Tornado Chart was also conducted to identify the most influential factors contributing to claim risks, allowing mitigation efforts to be effectively targeted.

2.3 Research Variables

Variables in the study were analyzed through a quantitative process with an etic orientation, wherein data were collected from preconceived concepts and translated into indicators for questionnaire development. Independent variable (X) is design and build construction project causes of construction claim, while the dependent variable (Y) is how construction claim disputes are resolved. The two variables were both measured on ordinal levels to show their effect on the Sierra School Project.

2.4 Sampling Technique

The study used purposive sampling to identify informants with direct knowledge and involvement in the claim and resolution process. This technique is suitable for case studies that seek insight rather than

generalizability. The selection criteria included individuals who had participated in decision-making, dispute documentation, or contract administration during the project.

By focusing on information-rich cases, purposive sampling ensured that data collected were directly relevant to the study objectives. Although the sample size was limited to five informants, the depth of their experience and involvement provided sufficient data for theme development. The diversity of stakeholder roles also allowed for triangulation across perspectives.

2.5 Data Analysis Technique

The analytical process included multiple statistical and modeling tools [15]:

- Validity testing using outer loadings and AVE (Average Variance Extracted),
- Reliability testing via Cronbach's Alpha (threshold > 0.6),
- Normality testing using the Kolmogorov–Smirnov test,
- Multiple regression to assess the simultaneous influence of independent variables on the dependent variable,
- Correlation analysis to determine the strength of linear relationships,
- F-test to evaluate overall model significance using the formula:

$$F = \frac{(r^2/\mathrm{k})}{((1-r^2)/(n-k-1)} \tag{2}$$

3. Results and Discussion

3.1 Result

3.1.1. Respondent Characteristic

Respondent profile revealed that most were men (58%) and of working age between 27 and 45 years, with an average age of 35 years. Work experience-wise, 24 had three years of experience, then 18 had two years, and 11 had four years. Function-wise, 79% did technical work, while 21% were engaged in administrative functions. Educational qualifications were varied, with 51% holding D3/D4 certificates, 34% S1 certificates, and 15% postgraduate or professional qualifications. In their line of work, 34 were not certified, 11 had gained certification, and 8 were in the process of being certified.

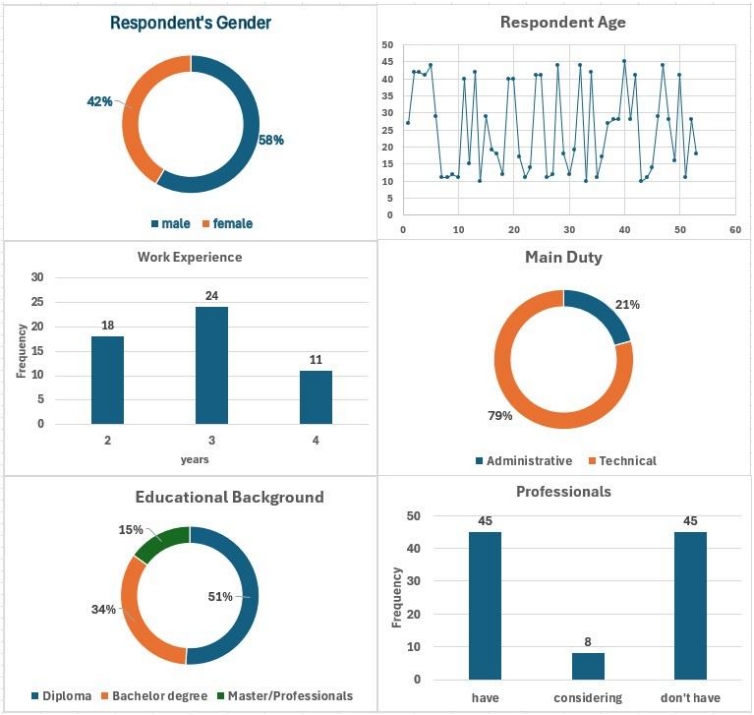

Figure 1. Respondent Characteristic Data

3.1.2. Description of Research Variables

This study adopts a quantitative approach to examine the relationship between independent and dependent variables based on developed theory and models [11]. The independent variable (X) represents the reasons for claims in construction contracts based on design and build contract systems, and the dependent variable (Y) represents the methods and types of dispute resolution in construction claims. Each of the variables is measured on an ordinal scale and assessed through a ranking method based on mean questionnaire scores that were completed by respondents, for example, Service Providers, Service Users, and Construction Management employees who were part of the Sierra Intercultural School construction project [16].

The claim-causing variable (X) consists of six major elements: (1) tender document conditions, (2) conditions of execution, (3) changes in work scope, (4) site conditions, (5) contract administration, and (6) delayed payments. Each element was further divided into several questionnaire items. From the processed data, average scores indicate that the most common causes of claims are a result of work scope changes and tender document discrepancies. The conflict resolution variable (Y) is categorized into five primary methods: (1) negotiation, (2) mediation, (3) adjudication, (4) arbitration, and (5) litigation. The analysis results show that negotiation is the most commonly used method among construction practitioners because it is seen as the most cost- and time-efficient. This is also a reflection of a trend in informal conflict resolution that is not tied to legal processes [17].

Data was collected with a standard questionnaire instrument drawn from indicators in literature on claim management and resolution of disputes in construction [18]. Outcomes were analyzed in order to identify the dominant factors in claims and most suitable methods in resolution of disputes in the case study project. The methods for resolving disputes that were used in practice comprised four major alternatives, namely, negotiation, mediation, arbitration, and litigation. Respondent data indicates that negotiation was the most frequently employed approach (n = 28), followed by mediation (n = 24), litigation (n = 23), and arbitration (n = 21).

3.1.3. Variable Correlation

Correlation was subsequently conducted by transforming data into the total score of items that comprised each variable, with six items making up X1 and X2, the item X3.2 representing X3, nine items making up X4, and four items making up Y. The results revealed predominantly positive correlations across the matrix except for X3, where it had negative and statistically nonsignificant correlations with X2 and Y. There was a strong positive relationship between X1 (Contract Documents) and Y (Claim Resolution), such that a solid understanding of contract documents can be applied to minimize claims. The negative relationship between Regulations (X3) and Design Changes (X2) and Claim Resolution (Y) suggests that inconsistencies in the regulations will worsen project circumstances. At the same time, the total correlation of all independent variables (X) and the dependent variable (Y) was 0.389 (FR-tot = 0.09), showing a moderately strong but not quite statistically significant relationship.

Table 1. Correlation Values between Variables

	Statistic	*X1*	*X2*	*X3*	*X4*	*Y*
X1	**R**	1	0.166	0.023	0.014	**.351**
	Sig.		0.234	0.868	0.923	0.01
X2	**R**	0.166	1	-0.014	0.266	0.052
	Sig.	0.234		0.923	0.055	0.714
X3	**R**	0.023	-0.014	1	-0.139	-0.101
	Sig.	0.868	0.923		0.32	0.473
X4	**R**	0.014	0.266	-0.139	1	0.139
	Sig.	0.923	0.055	0.32		0.322
Y	**R**	**.351**	0.052	-0.101	0.139	1
	Sig.	0.01	0.714	0.473	0.322	

Based on the results in Table 1, the Contract Documents variable (X1) shows a moderately strong and statistically significant positive correlation with Claim Resolution (Y) at 0.351 ($p = 0.01$), indicating that a solid understanding and proper management of contract documents can contribute to minimizing claim disputes. The Design Changes variable (X2) has a very weak positive correlation with Y (0.052) and is not statistically significant ($p = 0.714$), while the Regulations variable (X3) displays a negative correlation with Y (-0.101) and is also not significant ($p = 0.473$), suggesting that changes or inconsistencies in regulations may worsen project conditions, although their impact is not statistically proven. The Execution variable (X4) shows a weak positive correlation with Y (0.139; $p = 0.322$). Correlations among the independent variables are mostly positive, except for X3, which tends to have negative correlations with X2 and X4. Overall, the total correlation between all independent variables and the dependent variable is 0.389, indicating a moderate but not statistically significant relationship at the 95% confidence level.

3.1.4. Classical Assumption Test

A cut-off value of 0.4 was applied in this study as the minimum threshold for factor loadings, based on the assumption that the reliability value, as measured through composite reliability, had already reached the acceptable standard of 0.6. This threshold is widely adopted in social science and engineering research as it ensures that the observed variables meaningfully contribute to the measurement of their respective latent constructs. Applying this criterion helps to maintain the internal consistency of the instrument while allowing for the inclusion of indicators that, although not extremely high in loading, still provide valuable information for explaining the variance within the construct.

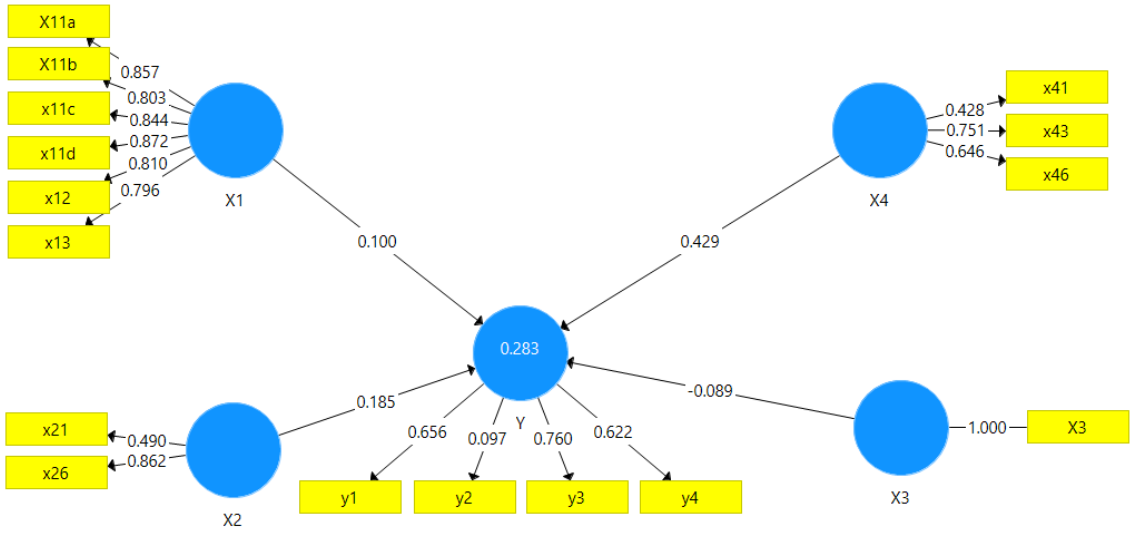

Figure 2. Loading values of each item showing the variance represented in a variable construct

Reliability test was performed using the composite reliability measure, with the criterion of > 0.6. As shown in **Table 2**, the independent variables were found to have good levels of reliability. In this study, a threshold criterion of greater than 0.6 was applied, as recommended in measurement theory for exploratory research, to indicate an acceptable level of reliability. Values exceeding this benchmark suggest that the items used in the questionnaire are sufficiently correlated to one another, thereby ensuring that the construct can be measured with a reasonable degree of stability and reproducibility. As presented in Table 2, the composite reliability scores for all independent variables in the study demonstrate generally good reliability levels, with X1 showing very high reliability, while X2 and X4 remain within an acceptable range for exploratory work, and X3 reaching a perfect value of 1.000, indicating complete internal consistency within that variable.

Table 2. Composite Reliability Values for Each Variable

Variable	Composite Reliability Value
X1	0,930
X2	0,643
X3	1
X4	0,645

Following the reliability assessment, the normality of the data was examined to ensure that the statistical tests employed in subsequent analyses met the underlying assumptions. The normality test was conducted using the Kolmogorov–Smirnov (K–S) test on the ANOVA residual distribution data, which is a robust nonparametric method for assessing whether a dataset significantly deviates from a normal distribution. The results produced a significance value of 0.200, which is well above the standard cutoff value of 0.05. This outcome indicates that the residual data were normally distributed, thereby fulfilling the normality assumption required for parametric statistical analyses such as regression and correlation tests, and providing greater confidence in the validity of the inferential results derived from the study.

3.1.5. Regression Analysis

Multiple regression analysis resulted in the fact that the variable Execution (X4) independently possessed a positive and statistically significant correlation with Claim Dispute Resolution (Y) at $\beta = 0.083$ and a level of significance = 0.019. On the other hand, variables Contract Documents (X1), Design Changes (X2), and Regulations (X3) had statistically insignificant positive or negative effects. These findings show that claim resolution performance in projects is far more influenced by the quality of

implementation rather than contractual, design, or regulatory factors. The Variance Inflation Factor (VIF) of the independent variables ranged from 1.009 to 1.257, indicating that there was no multicollinearity between the variables in the model.

Table 3. Linear Regression Test Value

Variable	β Value	s.e.	T Value	Sig.	VIF
X1	.017	.010	1.710	.094	1.257
X2	.029	.034	.861	.394	1.212
X3	-.020	.028	-.726	.471	1.009
X4	.083	.034	2.431	.019	1.049
Constant	-1.186	.560	-2.117	.039	N/A

Significance value at a 0.01 error level. VIF threshold is less than 3.

3.1.6. Hypotheses

H1, *"Contract documents (X1) play an important part in the resolution of construction claim disputes."* Based on the regression findings, the significance value is 0.094, which is greater than 0.05. Therefore, this hypothesis is rejected. This means that clear and well-understood contract documents do not have a statistically significant effect on successful claim resolution.

H2, *"Design changes (X2) play an important role in resolving construction claim disputes."* The p-value is 0.394, which also is above the 0.05 level, resulting in the rejection of this hypothesis. The implication of this finding is that design changes are not an important factor in the claim resolution process.

H3, *"Regulatory changes (X3) play an important role in the resolution of construction claim disputes."* With a significance level of 0.471, which is greater than 0.05, this hypothesis is also rejected. This shows that regulatory changes do not significantly affect claim resolution in this project environment.

H4, *"Execution constraints (X4) significantly affect the resolution of construction claim disputes."* The p-value is 0.019, which is below the 0.05 level. Therefore, this hypothesis is accepted. It indicates that problems with the project execution have a statistically significant correlation with claim resolution.

The regression model can be written as follows:

$$Y_{Dispute\ resolution} = \beta_{X1} + \beta_{X2} + \beta_{X3} + \beta_{X4} + e \quad (3)$$

$$Y_{Dispute\ resolution} = 0{,}17_{X1} + 0{,}29_{X2} - 0{,}20_{X3} + 0{,}83_{X4} - 1{,}186 \quad (4)$$

As per the regression analysis, the contributory variables X1, X2, and X4 positively affect variable Y with the degrees of influence of 1.7 percent, 2.9 percent, and 8.3 percent respectively, for each unit increase in the contributory variables. Variable X3 has a negative correlation to Y, decreasing the prospects of claim resolution by approximately 2 percent for each unit increase.

3.2 Discussion

3.2.1 Analysis of Claim Causation Factors

For projects that utilize the design and build method, service providers bear dual responsibilities for both design and execution. Having such a role exacerbates exposure to risks to which they are subjected, for instance, in design changes, lack of adequate initial information, and technical defects. Findings of this study identify four major contributors to claims, which include Contract Documents (X1), Design Changes (X2), Regulations (X3), and Execution Constraints (X4). Among them, Execution Constraints (X4) has the sole statistically significant impact on resolving disputes with a coefficient value of β = 0.083 and p-value of 0.019. The result aligns with previous literature that found execution-related issues, including logistics, weather, and field procedures, to be frequent principal sources of claims in projects with high pressure and complexity [18-19].

Conversely, Contract Documents (X1), Design Changes (X2), and Regulations (X3) had minimal influences towards solving the claims. For instance, although unclear contract documents are theoretically a prominent cause of disputes [21], this study had a p-value of 0.094 for variable X1. This outcome is likely to be a result of the quality of contract documentation in the project, as reflected in the high average scores in areas such as clarity of responsibility and wording. Similarly, the high p-values under design changes and regulations (0.394 and 0.471, respectively) suggest that adaptive mechanisms in the project worked well, thereby reducing the room for claims under these factors.

3.2.2 Dominant Factors Causing Claims

The multiple regression analysis revealed that project implementation (X4) played the most significant role in the resolution of construction claims. Delays in the supply of materials and bureaucratic hurdles were the major challenges faced by respondents, even if the contract documents were perceived generally well by respondents. These findings verify the perception that construction project claims are not usually designed to be profitable but are consequences of implementation realities, such as delays in the schedule caused by uncontrollable project factors [22]. There is a real-world example cited by the Central Java Power Plant project where IDR 19 billion value of claim is the result of third-party-caused delays not explicitly delivered by the contract [20]. At this point, the Regulations variable (X3) had a negative but not significant impact, which suggests that regulations need not trigger claims if efficient risk management techniques are followed.

3.2.3 Claim Resolution Recommendation

Negotiation (28 respondents) was most widely used as a means of settling claims from the empirical findings in this project, followed by mediation (24 respondents), litigation (23 respondents), and arbitration (21 respondents). Preference for non-formal procedures such as negotiation is a desire for faster, less expensive solutions that maintain professional relationships. It is compatible with the norms of Alternative Dispute Resolution (ADR) under FIDIC's proposals and now widely employed in international projects [23]. In the Indonesian context, a culture of deliberation in an organization also adds fuel to negotiation success, although its success also greatly depends on documentation quality and the quality of negotiators [23].

Comparing these findings with prior studies, such as [24] and [27], reinforces the idea that design-related claims are among the most frequent causes in design and build contracts, especially in developing economies. However, unlike projects in Singapore and the UAE, which incorporate Dispute Resolution Boards (DRBs) and structured early warning systems, this project relied heavily on ad hoc negotiation, which while practical, may overlook systemic root causes.

The most prominent suggestions that could be concluded based on the above are the enhancement of project digital documentation systems, particularly by the introduction of a Construction Management Information System (CMIS), and the enhancement of staff competence in negotiation abilities in terms of principled, win–win approaches. Lessons in sound can also be obtained from Phase I of the Jakarta MRT Project, where the FIDIC contract format allowed for prompt determination of claims through the utilization of a dispute board and effective negotiation. The cases outline the importance of well-designed contracts and quick claim management systems for effective and constructive resolution of disputes.

3.2.4 Recommended Claim Management Strategies

By reference to the results of this research, there must be a successful claim management process that is initiated pre-construction through the creation of solid contract documents that are inspected and concurred upon collectively. Cross-functional kick-off meetings are central to the strategy since they set responsibility, contractual content, and risk at the start of the project [19]. Service providers should also have a sound working understanding of legal contractual principles, whereby they can handle not only technical matters but also administration and legal obligations. Furthermore, an early warning system should be established to monitor potential claims, including automatic notifications set off by cost or

time fluctuations of over five percent for two consecutive weeks, in an attempt to prevent dispute escalation [25].

The use of such early warning systems has been useful in megaprojects such as the Singapore Sports Hub, where more than seventy percent of the claims were resolved by mediation and early neutral evaluation [24]. For the Sierra Intercultural School Project, which is relatively complicated, adopting a risk-based claims management procedure is recommended. This must include early contract risk detection, the creation of joint claim procedures, effective management of electronic documents, and in-house resolution team setup. These enable timely resolution of claims while upholding cooperative relationships among project stakeholders. Therefore, enforcement of documentation and inter-party communication by the project from its inception is crucial to the avoidance of conflict and the smooth resolution of claims [26].

3.2.5 Practical Guideline for Claim Management and Dispute Resolution

In construction projects such as the one under discussion in this study, claims and disputes are largely unavoidable due to the intricacy of relationship working, design changes, and contractual document uncertainties. For this purpose, there exists a need for an effective and responsive claims management guide that is easy to understand by all the stakeholders of a project and can be utilized in various conditions without compromising on legal aspects and managerial effectiveness. Such a guideline must be established on the empirical evidence derived from relevant variables and indicators, but also while being prudent, transparent, equitable, and efficient. In the absence of a standard form, settlement of claims depends on personal judgments, which can further exacerbate disputes, lead to delays in the completion of projects, and even give rise to lawsuits detrimental to the reputations of the parties.

These findings suggest several implications for construction management practice. First, there is a pressing need to implement design freeze protocols and detailed scope verification prior to construction mobilization. Second, the project would benefit from a formal pre-dispute documentation system and conflict resolution training among site staff. Lastly, institutionalizing a risk register and integrating dispute resolution clauses that require third-party facilitation could standardize the resolution process and reduce escalation costs.

4. **Conclusion**

This study highlights that execution constraints, particularly flaws in work procedures and delays in material supply, are the dominant causes of claims in design and build projects. The practical implication of these findings is that project stakeholders, especially service providers, should prioritize improving on-site execution management through enhanced scheduling, proactive procurement strategies, and rigorous monitoring to reduce the likelihood of claims. Additionally, the preference for negotiation and mediation over litigation emphasizes the need to strengthen communication and collaborative problem-solving skills within project teams, which can shorten dispute resolution times and preserve professional relationships.

The novelty of this research lies in its empirical evidence demonstrating that, contrary to much of the existing literature that emphasizes contractual clarity as the main determinant of claim resolution, it is the quality of project execution that has a statistically significant effect in design and build contexts. This finding shifts the focus of claim management strategies from merely improving contract documentation to also enhancing implementation practices.

Nevertheless, this study has certain limitations. Data were collected from a single case study, the Sierra Intercultural School Project, which may limit the generalizability of results to other project types or geographical contexts. Furthermore, the study relied on self-reported data from industry practitioners, which could be subject to response bias. Future research should therefore expand to multiple projects, include a more diverse respondent pool, and explore longitudinal data to assess whether these findings hold true across different project phases and contexts.

Declaration of AI and AI assisted technologies in the writing process
The authors declare that no artificial intelligence (AI) or AI-assisted technologies were used during the preparation, writing, analysis, or editing of this manuscript. All content presented in this publication was developed and reviewed entirely by the authors.

Declaration of Competing Interest
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Ethical Statement
This study was conducted in accordance with established ethical guidelines for research involving human participants. All respondents were informed about the objectives, scope, and procedures of the research prior to their participation. Informed consent was obtained from each participant, ensuring that their involvement was entirely voluntary and that they could withdraw at any time without consequence. To maintain confidentiality and protect privacy, no personally identifiable information was recorded or disclosed, and responses were anonymized during data processing and reporting. The data collected were used solely for academic purposes and were securely stored to prevent unauthorized access. The study design and data collection procedures adhered to the ethical principles outlined, ensuring that the rights and dignity of all participants were fully respected.

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