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Why Contracts Fail: Financial Risk Factors In Urban Pedestrian Bridge Construction in Indonesia

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ABSTRACT: Contract termination in public infrastructure projects reflects a failure not only in performance but also in early risk management. This study investigates the dominant risk factors that led to the contract termination of two pedestrian bridge (JPO) construction projects in Jakarta, Indonesia: the North-East Jakarta bridges. Adopting a qualitative case study approach, the research applies the risk management framework of ISO 31000:2018, integrating Ishikawa diagrams and the Probability Impact Matrix (PIM) to identify, validate, and analyze critical risks. Data were collected through literature review, field interviews, and structured questionnaires with key stakeholders, including project owners, contractors, and consultants. A total of 60 risk variables were initially identified, of which 24 were validated by experts. The PIM analysis revealed that three risk factors—irregular payment for materials, poor financial management, and insufficient execution funds—fell within the high-risk zone. All three were categorized under financial risk, highlighting the central role of financial preparedness in project continuity. These findings are consistent with prior studies emphasizing finance as a recurrent cause of project underperformance. Response strategies were formulated through expert consultation and include strengthening contract clauses related to payment, improving contractors' financial evaluation during tendering, and deploying financial management systems on-site. The study offers practical recommendations for public agencies and contractors to mitigate financial risks and reduce the likelihood of contract termination in future projects. It also contributes to the growing body of knowledge on risk management in public construction projects in emerging economies.

KEYWORDS: contract termination, pedestrian bridge, construction risk, ISO 31000:2018, Probability Impact Matrix, Jakarta.

I. INTRODUCTION

The increasing complexity of urban infrastructure projects, particularly in densely populated cities such as Jakarta, has led to an amplified risk of project failures and contract terminations. Pedestrian bridges or *Jembatan Penyeberangan Orang* (JPO) play a crucial role in ensuring pedestrian safety and urban connectivity in congested metropolitan areas. However, several JPO construction projects in DKI Jakarta have faced serious challenges, including project delays and premature contract termination. The case of the JPO projects in the North-East Jakarta exemplifies these issues, where underperformance and financial mismanagement led to termination despite advanced project stages.

Contract termination in public construction projects is not merely a legal issue but often signifies deeper structural deficiencies in project risk management. According to Fatayer et al. (2022), failure to meet contract requirements in construction is often rooted in financial instability, technical incompetence, and weak coordination mechanisms among stakeholders. Furthermore, improper risk identification and mitigation planning exacerbate the effects of unexpected events during the project life cycle (Jayady & Moerdianto, 2022). Risk management is thus a pivotal element in project governance and performance. ISO 31000:2018 offers a comprehensive framework that emphasizes risk identification, analysis, evaluation, and response (ISO, 2018). For infrastructure projects, tools such as the Probability Impact Matrix (PIM) and Ishikawa Diagram (Fishbone) are commonly employed to systematically identify risk sources and prioritize them based on severity and likelihood (Kassem et al., 2019; Greenwood & Howarth, 2018). These methods not only help visualize complex cause-effect relationships but also assist decision-makers in planning targeted responses.

While the extant literature has covered various risk factors in building and road projects, limited studies focus specifically on pedestrian bridge construction, particularly in the Southeast Asian context. Previous research by Muhammad et al. (2022) emphasized that funding inconsistencies, delayed disbursements, and poor financial governance are among the primary causes of project disruptions in developing regions. In Jakarta's JPO projects, these issues were further compounded by contractor capacity problems, adverse working environments, and misaligned project planning, leading to severe execution failures and eventual termination.

This study aims to address this research gap by investigating the dominant risk factors contributing to contract termination in pedestrian bridge construction projects. Using a qualitative approach based on expert interviews, literature synthesis, and validation through PIM analysis, the research focuses on two terminated JPO projects in Jakarta. The study also proposes practical risk response strategies to prevent recurrence in future projects.

By offering a structured and empirically validated risk assessment of contract termination, this study contributes to enhancing the body of knowledge in construction project risk management. It further informs public infrastructure planners and contractors on the importance of proactive financial planning, stakeholder communication, and adaptive mitigation frameworks. In doing so, it aims to

support more resilient and accountable public construction governance.

II. METHODOLOGY

This research adopts a descriptive, qualitative case study approach to investigate the dominant risk factors contributing to contract termination in pedestrian bridge construction projects in Jakarta. The methodological framework is grounded in ISO 31000:2018 and ISO 31010:2019 standards for risk management, and integrates established risk analysis tools such as the Ishikawa Diagram and the Probability Impact Matrix (PIM), following procedures used in prior research on infrastructure project risk (Kassem et al., 2019; ISO, 2018). The objective is to develop a structured, context-specific strategy for identifying, analyzing, and responding to risks in public pedestrian bridge (JPO) projects.

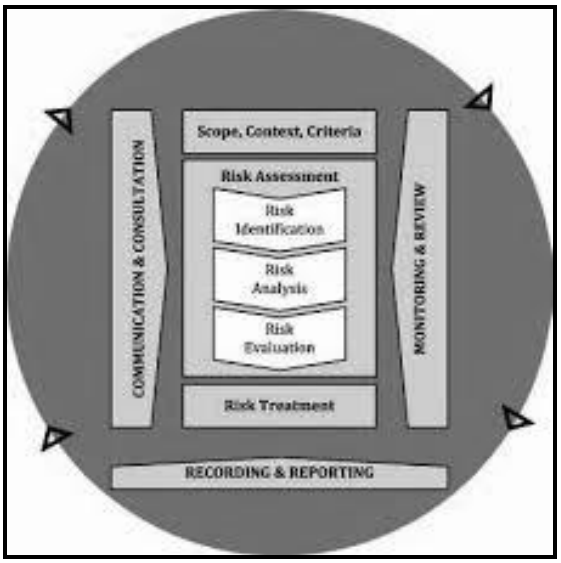

Figure 1. Process of risk management (ISO, 2018)

2.1 Case Selection

The study focuses on two specific cases: the North-Jakarta JPO and East-Jakarta JPO construction projects, both initiated by the Dinas Bina Marga of the DKI Jakarta Provincial Government. These projects were selected due to their comparable scope, funding source, and, notably, their eventual termination before completion. The cases represent critical examples where contractual breakdowns occurred despite regulatory compliance and formal project planning. This makes them ideal for exploring the root causes of failure from a risk management perspective.

2.2 Data Collection

Data collection was conducted through both primary and secondary sources:

Secondary Data were collected from literature reviews of scientific journals, technical reports, regulations, and prior theses relevant to contract termination, risk identification, and construction project governance. A total of 60 risk variables were initially compiled from this review, categorized under finance, human resources (HR), methods, materials, equipment, and environment.

Primary Data were obtained using three types of questionnaires:

Questionnaire 1 (Open-ended Interviews): Distributed to six stakeholders (project managers, government engineers, consultants) directly involved in the two JPO projects. Respondents identified potential causes of contract termination based on their experience.

Questionnaire 2 (Expert Validation): Administered to five senior construction experts with more than 15 years of professional experience and at least three JPO projects completed. Each risk factor was rated on a five-point Likert scale to evaluate its relevance. Only items with a mean score >3.0 were retained.

Questionnaire 3 (Risk Scoring): Used to determine the likelihood and impact of each validated risk factor, based on responses from ten practitioners representing contractors and consultants experienced in JPO construction.

2.3 Tools and Techniques

The study employed two well-established tools:

Ishikawa (Fishbone) Diagram: This tool enabled the classification and visualization of risk causes into six categories—finance, human resources, methods, materials, equipment, and environment. Each branch of the diagram illustrated root causes linked to contract termination.

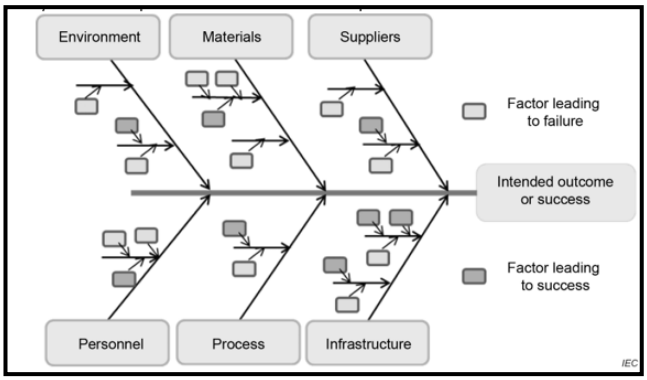

Figure 2. Ishikawa diagram (ISO, 2019)

Following the guidelines outlined in ISO 31010:2019 and the methodological application demonstrated by Kassem, Khoiry, and Hamzah (2019), this study employed the Probability Impact Matrix (PIM) to systematically assess and prioritize identified risk variables. The matrix plots each risk based on two dimensions: the probability of occurrence (likelihood) and the impact severity if the risk is realized. A 5×5 grid was utilized, dividing risk scores into three severity zones: low (green), moderate (yellow), and high (red). Only risks that fell within the red zone—characterized by high probability and high impact—were classified as dominant and prioritized for further response planning. This visual and quantitative mapping enables efficient decision-making by highlighting which risks require immediate mitigation strategies (Kassem et al., 2019).

2.4 Validation Procedure

Expert validation served as a critical step in ensuring that the list of risk variables was not only comprehensive but also relevant and specific to the context of JPO construction. The five experts provided ratings which were then averaged, and any variable scoring ≤3.0 was excluded from further analysis. This step reduced the number of risk variables from 60 to 24 significant items, allowing focused analysis in the following stages.

Subsequently, the PIM results identified three dominant risk variables that were plotted in the red zone: (1) irregular payment for materials, (2) poor financial management, and (3) insufficient funds during execution. These risks were deemed critical contributors to contract termination in the selected cases.

2.5 Response Strategy Formulation

To propose practical mitigation strategies, the final phase of the methodology involved open-ended interviews with three experienced professionals in public construction project execution. These interviews aimed to gather recommendations on how to address each dominant risk. Responses were synthesized and evaluated for feasibility, consistency, and alignment with public procurement frameworks in Indonesia.

The final output of this methodological process includes a tailored set of risk response recommendations, providing actionable strategies for project owners, contractors, and regulatory bodies to prevent similar contract terminations in future projects.

III. RESULTS AND DISCUSSION

This section presents the findings from the case studies of JPO North-Jakarta and JPO East-Jakarta, focusing on the dominant risk factors that led to contract termination. The analysis is structured in three stages: identification and categorization of risk factors, prioritization using the Probability Impact Matrix (PIM), and expert-based formulation of response strategies.

3.1 Identification of Risk Factors

Based on literature review and field data collection through interviews and questionnaire responses, a total of 60 risk variables were identified and categorized into six groups: finance, human resources, methods, materials, equipment, and environment. These categories reflect the multifaceted nature of construction risk, consistent with prior studies (Jayady & Moerdianto, 2022; Fatayer et al., 2022).

The finance category accounted for the largest number of risks, including irregular payment for materials, poor financial management, and insufficient working capital. Other risks pertained to delayed material delivery, inadequate labor skills, inappropriate construction methods, and socio-political interference. These findings support the assertion by Cross et al. (2019) that financial and managerial factors are primary contributors to construction failures in the public sector.

3.2 Expert Validation of Risk Variables

To narrow down the variables for further analysis, an expert panel of five senior professionals evaluated the significance of each risk on a five-point Likert scale. Risk factors with an average score of 3.0 or below were excluded. This process reduced the list to 24 validated risk items, ensuring focus on the most impactful and contextually relevant factors.

Experts highlighted the recurring issue of poor project cash flow planning as a root cause of downstream risks such as delayed material delivery and unpaid labor. These insights are consistent with Greenwood and Howarth (2018), who emphasized the need for robust financial controls in infrastructure projects.

3.3 Probability and Impact Analysis

The validated 24 risk variables were then subjected to Probability Impact Matrix (PIM) analysis. Ten experienced respondents rated each risk's probability of occurrence and potential impact using a 5-point scale. The mean values were plotted into a 5x5 matrix following ISO 31010:2019 guidelines.

From this analysis, three risks were identified in the high-risk (red) zone:

1. Irregular payment for materials (Finance)
2. Poor financial management (Finance)
3. Lack of sufficient operational funds (Finance)

These results indicate that financial instability was the most dominant risk group, corroborating previous findings in similar infrastructure failures (Cross & Abbas, 2019). Each of these risks showed high scores in both dimensions: probability scores ≥4.0 and impact scores ≥3.8.

3.4 Discussion of Dominant Risks

1. Irregular Payment for Materials

This issue often originates from delayed disbursement of project funds or misaligned cash flow projections. Contractors tend to rely on progress payments to finance material procurement. Delays in payment from the owner can paralyze procurement cycles, leading to cascading schedule delays. This aligns with findings by Kassem et al. (2019), who emphasized that contract cash flow structures must be adaptive to avoid liquidity traps.

2. Poor Financial Management

The absence of financial control mechanisms—such as separate project accounts, financial audits, and monitoring tools—leads to budget misallocations and untracked expenditures. Respondents noted that many contractors lacked dedicated finance staff or tools such as ERP systems to manage multi-stream transactions. This finding echoes the concerns raised by Moerdianto et al. (2022) on the importance of training site teams in basic project finance management.

3. Insufficient Funds for Execution

This refers to the contractor's lack of access to working capital during project execution, often caused by unrealistic budgeting, underbidding, or misused advance payments. Without sufficient reserves, even small deviations in cost or schedule can render the contractor unable to continue, leading to premature termination.

3.5 Risk Response Strategies

To address these high-priority risks, three senior experts were consulted using open-ended interviews. Their responses were synthesized into practical recommendations:

1. For irregular payment for materials, respondents proposed including clear payment clauses tied to physical progress in contracts and securing bank guarantees or standby financing for critical materials procurement.

2. For financial mismanagement, it was recommended to provide financial management training for site managers and use integrated accounting software. Regular audits by third-party financial consultants were also advised.

3. To mitigate insufficient execution funds, experts recommended the use of milestone-based disbursement schemes, collaboration with financial partners, and adoption of value engineering practices to lower costs without reducing quality.

These strategies are grounded in project risk literature (ISO, 2018) and tailored to Indonesia's regulatory and financial environment in public infrastructure projects.

3.6 Summary of Findings

The findings underscore the centrality of financial preparedness and transparency in preventing contract termination. While technical and environmental risks were present, they did not reach critical levels compared to the financial risks. Thus, ensuring financial resilience should be a top priority in planning, contractor selection, and contract structuring for future pedestrian bridge projects.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study analyzed the dominant risk factors leading to contract termination in the construction of pedestrian bridges (JPO) in DKI Jakarta through two case studies: the the North-East Jakarta JPO projects. Using a qualitative approach supported by ISO 31000:2018 risk management principles, Ishikawa cause-effect diagrams, and the Probability Impact Matrix (PIM), the research identified and prioritized critical risk variables.

The results revealed that financial-related risks were the most dominant contributors to contract termination. Among the 60 initially identified variables, 24 were validated by experts, and 3 were classified in the high-risk zone based on their likelihood and impact. These include: (1) irregular payment for materials, (2) poor financial management, and (3) insufficient funds during project execution. These findings confirm previous literature (e.g., Fatayer et al., 2022; Cross & Abbas, 2019), which highlights the centrality of financial capacity and controls in construction project success.

The consequences of financial instability in public infrastructure projects are severe, often triggering a chain reaction of delays, underperformance, and contractual breaches. In the cases studied, these financial issues ultimately led to project abandonment, contractor blacklisting, and the need for re-budgeting from public funds. Such outcomes significantly impact urban development goals, disrupt public services, and increase fiscal burdens.

Recommendations

Based on the analysis, this study proposes the following practical recommendations for government agencies, contractors, and future researchers:

1. Contract Structuring and Payment Terms

Government agencies should ensure that contracts include clear milestone-based payment clauses tied to measurable progress, reducing ambiguity and promoting accountability in disbursements.

Where feasible, implementing advance bank guarantees or performance bonds should be considered to strengthen financial commitment from both parties.

2. Financial Capacity Evaluation

Contractor selection criteria should give higher weight to verified financial health indicators, such as cash flow history, debt ratios, and access to short-term credit. Prequalification stages must assess a contractor's capacity to sustain cash-intensive phases of construction.

3. Project Financial Management

Contractors should deploy dedicated financial management personnel and tools—such as enterprise resource planning (ERP) software or integrated accounting systems—to monitor project-specific cash flow in real time.

Routine internal or third-party audits should be mandated during the project to prevent misallocation and detect early signs of financial distress.

4. Capacity Building

Both public sector project managers and contractors' site teams should be trained in financial literacy and construction finance planning, especially for small-to-medium contractors who often lack formal systems.

5. Collaborative Risk Allocation

Future projects should adopt a risk-sharing model where financial risks—especially in early project phases—are mitigated jointly through contingency planning, transparent forecasting, and structured communication between owner and contractor.

Implication for Future Research

This study focused on a qualitative analysis of two terminated projects in one urban area. Future research should expand to quantitative, multi-project analysis across various regions and contract types. Moreover, a comparative study between successful and failed projects could enrich understanding of risk mitigation effectiveness. Investigating legal and regulatory enforcement gaps may also offer insights into systemic prevention of contract failures in public infrastructure development.

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