The Effect of Payment Delay in Interim Payment Certificate (IPC) and Payment Delay in Invoice, Financial Reporting Transparency; The Mediation Role of Accountability in Infrastructure Project In Timor-Leste

Merlinda Amaral da Cruz [1] ; Baldric Siregar[2] ;
Miswanto[3] ; Frasto Biyanto[4]

[1,2,3,4] STIE YKPN School of Business Yogyakarta, Indonesia
[1]merlinda.amaral@gmail.com,[2]baldricsiregar@gmail.com,[3]miswanto.ykpn@gmail.com,[4]frastobiyanto@gmail.com.

Abstract. The timely disbursement of payment through Interim Payment Certificates (IPC) and Invoice is critical to keep liquidity consistent stability and supporting smooth successful execution of construction projects. This study assesses how delays in IPC and invoice settlements affect accountability and financial reporting transparency in public infrastructure projects in Timor-Leste and further investigates the indirect role of accountability connection on Agency theory and stakeholder theory. A quantitative causal survey design was employed, with primary data collected from 108 respondents comprising financial personnel from contractors, monitoring consultants, and PMU representatives at the Ministry of Public works of Timor-Leste. Data was evaluated using PLS-SEM statistical approach. The results showed that both IPC and Invoice payment delays have significantly negative effects on accountability, while accountability itself exerts a favorable effect on financial reporting transparency. These findings emphasize the necessity of improving the payment administration system and accountability mechanisms. The mediation analysis indicates that the effect of X1 through M toward Y showsβ -v0.108 p 0.004. and the mediated relationship of X2 through M toward Y demonstrates β - 0.125 (p 0.002).

Keywords: Accountability, Financial reporting transparency, Invoice payment delay, IPC payment delay.

1 Introduction

Timely disbursement of payment based on Interim Payment Certificated (IPC) and Invoice is essential to support construction project activities. Nevertheless, payment delays remain a persistent and widespread problem in both development and development countries [1],[2]. Empirical studies indicated that such delays commonly range from one to three months and are often accompanied by underpayments amounting to 10% to 30% of the contractual greed value [3]. These conditions create

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significant financial uncertainty across the project supply chain, restrict contractor's liquidity, disrupt operational activities and ultimately project performance and long-term sustainability. Payment delays reduce operational efficiency and affect project performance [4]. Furthermore, bureaucratic inefficiencies and adequate information systems can hinder verification and compromise financial reporting transparency [5].

On the site of public financial management, accountability serves as a fundamental governance principle, requiring organizations to demonstrate clear, measurable, and transparent responsibility towards stakeholders. High-quality accountability is inherently linked to the integrity and accuracy of accounting records, just as financial reporting transparency is considered an essential element reflecting the quality of project governance practices [6]. Conversely, a weak financial management system can result in budget misallocation, fiscal imbalance, and diminished public accountability. These shortcomings not only reduce governance effectiveness but also erode stakeholder trust, weaken institutional credibility, and hinder the achievement of project outcomes and broader development goals [7].

Official records from the project management unit (PMU) under Timor-Leste's ministry of public works show that several IPC claims submitted between 2017 to 2019 were only settled in 2023, reflecting delays of up to six years. Such prolonged payment period highlights substantial inefficiencies in the public financial management and project payment administration. Additionally, an evaluation report by the Asian Development Bank identified deficiencies in the completeness and comprehensiveness of expenditures reporting, as well as inconsistencies in the application of accounting policies [8]. Collectively, these findings point to weaknesses in accountability mechanisms and financial governance that may adversely affect the quality and transparency of financial governance, as well as stakeholder confidence in public infrastructures management.

This research aims to provide a deeper analysis of the correlation between IPC and invoice payment mechanisms, accountability, and financial reporting transparency remains limited, particularly within the institutional context of Timor-Leste. This gap motivates this study by investigating the influence of IPC and invoice delays on accountability and financial reporting transparency in infrastructure projects, while exploring how accountability reserves as a mediating mechanism in explaining how payment delay influences transparency. By integrating perspectives on payment management and Governance, this research contributes to the literature on public financial management and accountability in infrastructure projects in developing.

2 Literature Review and Hypothesis Development.

2.1 Agency Theory

The present research draws on two complementary theoretical frameworks are Agency Theory and Stakeholder Theory to explain the governance implication of payment delays in public infrastructure projects. According to Agency Theory an agency relationship exists when the government as the principal delegates decision making authority and operational responsibility to project implementers, including contractors and consultants who act as agents [9]. Differences in objectives, information asymmetry, and fiscal constraints may generate agency conflicts that hinder timely

fulfilment of contractual obligations, including IPC and invoice payments. In this context, payment delays represent governance issues affecting accountability within public sector project management [10].

2.2 Stakeholder Theory

Stakeholder Theory emphasizes that achievement of organizational objectives and project effectiveness is influenced by the capability to address the interest and expectations of all parties affected by project activities [11]. In public infrastructure projects, key stakeholders include government agencies, contractors, consultants, funding institutions, and public financial reporting transparency constitutes a critical governance mechanism that enables governments to demonstrate accountability, sustain institutional legitimacy, and strengthen stakeholder trust. Conversely payment delays may be interpreted as indicators of weak fiscal governance and inadequate financial management, potentially damaging stakeholder relationships and reducing confidence in project administration. Such conditions may also increase the likelihood of opportunistic behavior, procurement irregularities and governance failures, thereby compromising the efficiency, accountability, and sustainability of public infrastructure development [12].

2.3 IPC and Invoice Payment Delays

IPC payment delays occur when government or project owners fail to settle certified claims for completed and verified work within the contractual payment period. Invoice payment delays, by bidding contracts, refer to the failure to process and settle non-IPC payment claims within the timeframe agreed in the contract. Both types of delay present major challenges in financial management, as they restrict cash flow and create significant liquidity constraints for contractors and other project participants. Beyond their financial impact, persistent delays can undermine administrative efficiency, weaken internal control systems, and reduce the quality of accounting and reporting practices. Consequently, delayed payments may negatively affect accountability, transparency and overall governance performance in public infrastructure projects [13][7].

2.4 Accountability

Accountability is a fundamental pillar of governance in public infrastructure projects, encompassing clearly defined roles, responsibilities, and compliance with regulatory and financial management requirements throughout the project lifecycle. Robust accountability mechanisms ensure that public resources are used efficiently and transparently through compliance with procedures, effective controls mechanisms and reliable auditing practices [14] & [10].

2.5 Financial Reporting Transparency.

Financial reporting transparency is a key governance mechanism for strengthening public accountability and maintaining the confidence of donors' investors, and other

stakeholders in infrastructure project management. High levels of transparency facilitate effective monitoring, minimize information gaps among stakeholders and strengthen the trustworthiness of reported financial information. Nevertheless, bureaucratic inefficiencies that result in payment delays may create incentives for implementing agencies to restrict access to critical financial records and supporting documentation, thereby reducing the informational quality and reliability of financial reports [15] & [16]. Such conditions can hinder stakeholder oversight and weaken governance effectiveness. Transparent financial reporting therefore requires information to be presented in an open, understandable, relevant, reliable, and timely manner, so that stakeholders can make informed decisions and accurately assess organizational and project performance [17].

2.6 Previous Studies

Previous research findings have revealed payment delays, accountability, and transparency in public sector and infrastructure project management. Based on [10], [14] they found that payment delays reduce accountability and transparency by weakening monitoring mechanisms and lowering compliance with administrative procedures. Thesis finding suggests that financial constraints resulting from delayed payments may undermine governance effectiveness and increase the risk of managerial inefficiency. In contracts, [18] demonstrated that transparency can be maintained despite bureaucratic inefficiencies when strong stakeholder pressure and external oversight mechanisms are in place. Furthermore, [19] reported that the implementations of the e-government system can mitigate the adverse effects of bureaucratic processes on transparency by improving information accessibility, administrative efficiency, and public oversight.

2.7 Hypothesis Development

Describe Agency theory and Stakeholder theory, together with the empirical evidence discussed above, this study shows that payment delays may undermine governance quality by weakening accountability mechanisms, which in turn affects the transparency of financial reporting. Accordingly, the following hypotheses are formulated. Based on [15], [20], [21] it is understood that delays in settling Interim Payment Certificates (IPCs) and invoices adversely affect the reliability and transparency of financial processes. Within it show a decline in the degree of accountability as well as transparency in the resulting financial statements. Describe from the theoretical framework and conceptual model outlined previously the proposed hypotheses are developed as presented below:

H_1: Delays in Interim Payment Certificated payments have a negative effect on accountability in infrastructure project financial reporting.

Postponement of financial obligations creates disruptions in administrative processes required for proper accountability. Previous evidence indicates that contractual issues and late payment reduce accountability practices in managing public sector resources [21].

H_2: Invoice payment delays negatively affect accountability in infrastructure project financial reporting

When payment and billing documents are not completed on schedule, delayed obligations create information gaps and affect financial reporting reliability. This is supported by [22], who explain that bottlenecks in payment workflows may reduce information openness and transparency.

H_3: Accountability has a positive influence on financial reporting transparency.

Strong accountability mechanisms through clear responsibility and effective oversight encourage organizations to present financial information openly and reliably. Previous studies confirm that improvements in accountability increase openness and clarity of reporter information [15].

H_4: Accountability mediates the relationship between IPC payment delays and financial reporting transparency,

Accountability serves as a mediating mechanism explaining how payment issues influence financial reporting transparency through accountability practices [23], [24]

H_5: Accountability mediates the relationship between invoice payment delays and financial reporting transparency

Delays in construction project payments disrupt financial stability and reduce reporting quality [1], [25]. Accountability represents a key mechanism for establishing transparency practices in public organizations [10], [26]. Therefore, accountability is expected to mediate the relationship between invoice payment delays and financial reporting transparency [27], [28].

3 Methodology

3.1 Research Design and Sample

The present research applies a quantitative approach using a causal survey method to analyze the relationship among payment delays, accountability, and financial reporting transparency in public infrastructure projects. Data was collected through structured online questionnaires from 108 participants consisting of finance staff and Quantities Engineering from contractors, supervising consultants, and PMU representatives of the ministry of public works Timor-Leste. Participants were selected through purposive sampling based on their involvement payment verification, contract administration, and financial reporting.

3.2 Research Variable

This study includes four constructs: Payment delay in IPC (X_1), Payment delay in Invoice (X_2), Accountability (M), and Financial Reporting Transparency (Y). Payment delay in IPC and payment delay in invoice represent delay settling project payment obligation beyond contractual periods. Accountability reflects compliance with Standard Operation Procedures (SOPs) responsibility clarity, internal control effectiveness, and reporting timeliness. Financial reporting on transparency represents an accessible, accurate, complete, and timely financial disclosure.

3.3 Model Specification and Hypothesis Evaluation

The research framework was evaluated using Partial Least Square Structural Equation Modelling (PLS-SEM). The analysis was conducted with two main phases, measurements model (outer model) and evaluation structural model (inner model).

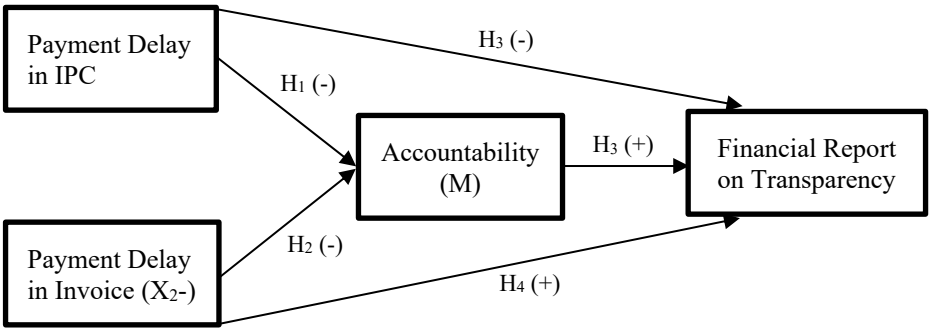


Fig. 1. Conceptual Framework of the Study

The measurement model assessment included convergent validity, discriminant validity and construct reliability evaluation. Convergent Validity was examined using outer loading (> 0.70) and Average Variance Extracted (AVE > 0.50). Discriminant validity was assessed through the Fornell-Larcker criterion, and Heterotrait-Mootrait Ratio (HTMT < 0.90). Construct reliability was evaluated using Cronbach's Alpha and Composite Reliability (> 0.70) Furthermore the structural model was assessed through path coefficients, coefficient of determination (R^2), effect size (f^2), and bootstrapping procedures with 5.0 subsamples to examine the significance of direct and mediation effects.

4 Data analysis Results

4.1 Respondent Profile

Demographic characteristics indicated that most respondents were male participants (72%), with the largest age group ranging from 20 to 25 years (43%). Regarding education qualification, most respondents held undergraduates' degree (67%), while 88.8% were employed on a contractual basis. Respondents consisted of key stakeholders involved in infrastructure projects, including representatives from ministry of public works (46.7%), contracting firms (31%) and consulting organizations (24.4%). Their professional background reflects direct involvement in payment administration, accounting processes, and financial reporting practices [29].

Table 1. Respondents Demographic Profile

Characteristics	Classification	Frequency	Percentage (%)
Age	20–25 years	46	43.0%
	26–30 years	27	25.2%
	31–35 years	23	21.5%

	> 35 years	12	11.2%
Gender	Male	72	72.0%
	Female	28	28.0%
Employment Status	Contract Employee	95	88.8%
	Permanent Employees	13	12.1%
	High School	14	13.1%
	Diploma (D3)	13	12.1%
Education Level	Undergraduate Degree (S1)	72	67.0%
	Master's Degree (S2)	9	8.4%

4.2 Descriptive Statistics

The descriptive analysis results indicate that among the four measured constructs, financial reporting transparency and accountability recorded the highest mean scores at 24.95 and 17.80 respectively. Conversely payment delay in IPC (mean 13.55) and payment delay in invoice mean 13.42 show the mediation to high values, indicating that payment delay remains a persistent challenge in public infrastructure management in Timor-Leste.

Table 2. Descriptive analysis results of the research constructs.

Construct	Nu. Items	Mean	Std. Dev.
IPC Payment Delay (X1)	5	13.55	3.93
Invoice Payment Delay (X2)	5	13.42	4.16
Accountability (M)	6	17.80	4.53
Financial Reporting Transparency (Y)	6	24.95	6.63

4.3 Evaluation of the Measurement Model

The present research applies a reflective measurement framework to evaluate construct validity and reliability. Following established guidelines [30], [31], the measurement framework was Assessed based on outer loading values (> 0.70) Cronbach's Alpha and Composite Reliability (> 0.70) AVE (> 0.50) and discriminant validity through the Fornell-Larcker approach along with and HTMT ratio (< 0.90).

Table 3. Outer loading, Cronbach's Alpha, Composite Reliability, and AVE.

Construct/Indicator	Outer Loading	Cronbach's α	CR (rho_a)	AVE
Delay Payment in IPC		**0.929**	**0.948**	**0.778**
IPC payment delayed compared to the payment schedule specified in the project contract	0.857			
The IPC document verification process takes an excessively long time before payments are actually made.	0.883			

IPC payment approval experiences significant delays due to administrative issues.	0.861			
Delays in IPC payment occur repeatedly throughout the project implementation.	0.892			
Delays of IPC payment disrupt and hinder the normal progress and activities of the project.	0.915			
Delay Payment in Invoice		**0.937**	**0.942**	**0.800**
Invoice payments are made late, exceeding the established deadline.	0.895			
The administrative process for invoice payments proceeds slowly, resulting in payment delays.	0.915			
Fund transfers for invoices from the financial institution to the contractor and consultant experience significant delays.	0.896			
Delays in invoice payments affect the continuity of operations and normal activities of the project.	0.859			
Delays in invoice payments cause cash flow problems during project implementation.	0.905			
Accountability		**0.948**	**0.951**	**0.792**
The project payment process is carried out in accordance with established procedures and regulations.	0.901			
Every project payment is always supported by complete, clear and verifiable documentation.	0.891			
The responsibilities of each party involved in the payment process have been clearly defined and explained.	0.898			
Each payment transaction is accountable, and its justification is explained in detail.	0.853			
Mechanisms for controlling and monitoring project payments have been implemented effectively.	0.897			
Findings from inspections or audits related to project payments are always followed and up corrected if errors are identified.	0.899			
Financial Reporting Transparency		**0.954**	**0.955**	**0.813**
Information regarding project payment is disclosed transparently to all relevant stakeholders.	0.933			
Interim payment certificates (IPC) and invoices are easily accessible and available to authorized parties.	0.902			
Project financial reports are prepared in clear, straightforward language that is easy to understand and unambiguous.	0.912			
Information regarding payment delay is always communicated openly and honestly.	0.906			

The recording of every payment transaction reflects actual conditions and is entered at the time the transaction reflects actual conditions and is entered at the time the transaction occurs.	0.889
Project financial reports are submitted within the established deadlines.	0.869

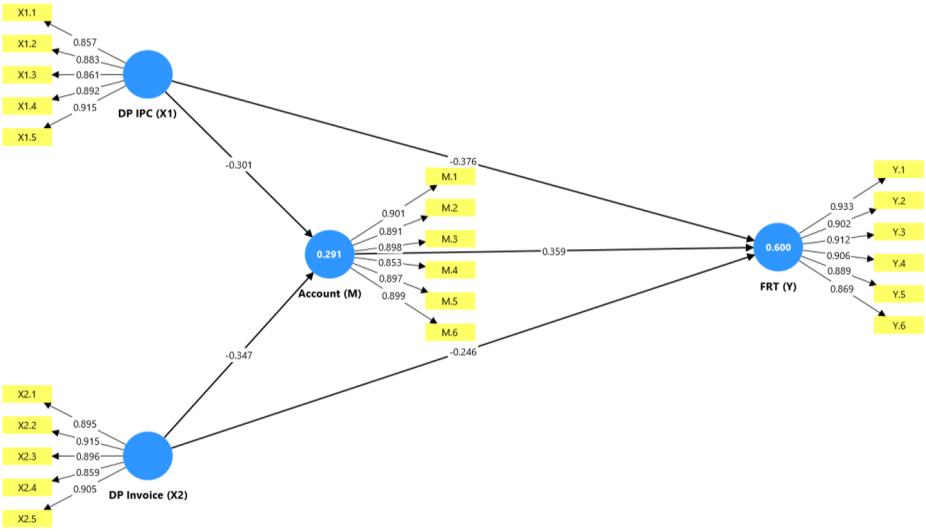


Fig. 2. PLS-SEM Measurement and Structural Model Results

4.4 Discriminant Validity

Discriminant validity assessment was conducted based on the Fornell-Larcker criterion together with the HTMT ratio, as presented in the following table.

Table 4. Fornell-Larcker criterion and HTMT ratio.

Variable	Account. (M)	Delay Payment in IPC (X_1)	Delay Payment in Invoice (X_2)	FRT (Y)
Panel A: Fornell–Larcker Criterion				
Accountability (M)	-			
Delay Payment in IPC (X1)	0.445	-		
Delay Payment in Invoice (X2)	0.481	0.400	-	
Fin. Reporting Transparency (Y)	0.665	0.650	0.584	-
Panel B: Heterotrait–Monotrait (HTMT) Ratio				
Accountability (M)	0.890			
Delay Payment in IPC (X1)	0.433	0.882		
Delay Payment in Invoice (X2)	0.462	0.381	0.894	
Fin. Reporting Transparency (Y)	0.635	0.626	0.555	0.902

Note. Value in panel B is reported as absolute value. All of diagonal HTMT values remain lower than the recommended cut-of value 0.90 [32].

The Fornell-Larcker result indicated that all diagonal values exceeded the correlations among latent constructs. Furthermore, HTMT analysis provided additional support for discriminant validity, with all values ranging from 0.381 and 0.635. and remaining below the recommended threshold of 0.90 [33].

4.5 Structural Model Evaluation

The structural model results indicated that all hypothesized relationships are statistically supported. The strongest relationship is observed between IPC payment delay and financial reporting transparency H1: β - 0.376, p 0.000, f^2 0.273, indicating a medium to large negative effect [34], [35]. Invoice payment delay also negatively affects financial reporting transparency H2: β - 0.246, p 0.002, f^2 0.113. Furthermore, IPC payment delay H3: β - 0.301, p 0.001, and invoice delays further undermine it H4: β -0 .347, p 0.000. The significant positive influence of accountability toward financial reporting transparency H5: β - 0.359, p 0.000 underscores the critical role of organizational accountability as a driver of reporting quality.

The indirect effects confirm partial mediation by accountability in both pathways. The mediation analysis indicates that the effect of X1 through M toward Y showsβ -v0.108 p 0.004. and the mediated relationship of X2 through M toward Y demonstrates β - 0.125 (p 0.002). because the bootstrapped confidence interval of both indirect effects excludes zero, the mediation is statistically significant [31]. The presence of both significant direct and indirect effects provides evidence that Accountability partially acts as intervening mechanism linking payment delays with financial reporting transparency, rather than fully mediating it.

Table 5. Hypothesis testing direct and indirect path coefficients.

Hypothesis	β	p-value	CI Lower	CI Upper	f^2	Decision
Direct Effects						
H1: X1 to Y	- 0.376	0.000	- 0.509	- 0.237	0.273	Supported
H2: X2 to Y	- 0.246	0.002	- 0.391	- 0.088	0.113	Supported
H3: X1 to M	- 0.301	0.001	-0.469	- 0.120	0.109	Supported
H4: X2 to M	- 0.347	0.000	- 0.505	- 0.183	0.145	Supported
H5: M to Y	0.359	0.000	0.220	0.493	0.228	Supported
Indirect Effects (Mediation via Accountability)						
X1 to M to Y	- 0.108	0.004	- 0.188	- 0.041	-	Supported
X2 to M to Y	- 0.125	0.002	- 0.216	- 0.057	-	Supported

Note. B: standardized pat coefficient. CI: 95% bootstrapping confidence interval 5.000 sub samples, f^2 effect size [36].

4.6 Model Fit Evaluation

The obtained R^2 result of Accountability (M) is 0.291, suggesting that IPC and invoice payment delay explain 29.1% of accountability variance. Furthermore, financial reporting transparency (Y) achieved an R^2 value of 0.600, demonstrating substantial

explanatory power [32]. Indicating that 60% of transparency variation is accounted for collectively by the two-payment delay constructs together with the mediator. The predictive relevance assessment showed Q^2 0.257 for Accountability and Q^2 0.486 for Financial Reporting Transparency both exceeding zero. Additionally, the SRMR value of 0.06 indicated an acceptable model fit while the Gof value of 0.96 reflects strong compatibility between the proposed structural framework and observed research data [9], [10], [14], [37].

Table 6. R^2, Q^2, SRMR, and GoF index.

Evaluation Measure	Value	Interpretation
R^2 Accountability (M)	0.291	Moderate
R^2 Financial Reporting Transparency (Y)	0.600	Substantial
Q^2 Accountability (M)	0.257	Medium predictive relevance
Q^2 Financial Reporting Transparency (Y)	0.486	Strong predictive relevance
SRMR	0.06	Good model fit (< 0.08)
GoF Index	0.796	Large / good fit

5 Discussion and Findings

The empirical results of this research demonstrated that payment delays constitute a substantial governance challenge in public infrastructure projects. The results show that both IPC payment delays and invoice payment delays negatively affect accountability, supporting Agency theory, which argues that contractual inefficiencies and information asymmetries weaken monitoring mechanisms and reduce managerial responsibility [9], [10], [14].

The negative relationship between IPC payment delays and accountability suggests that prolonged settlement periods disrupt administrative discipline and weaken compliance with established financial procedures. When payments are delayed, project managers and implementing agencies face increasing pressure to manage limited financial resources, which may reduce the effectiveness of internal controls and reporting practices. This result aligns with previous empirical evidence demonstrating which indicates that delayed payments undermine governance quality and accountability in public sector projects [5], [7], [10].

Similarly, invoice payment delays were found to negatively influence accountability. This result indicates that inefficiencies in processing non-IPC claims contribute to administrative bottlenecks and reduce compliance with financial management procedures, supporting previous research suggesting that bureaucratic constraints and payment delays can weaken organizational accountability and increase governance risk [13], [25]

The study further demonstrates that accountability positively affects financial reporting transparency, confirming that organizations with stronger accountability mechanisms tend to provide more accurate, timely, and comprehensive financial information. From a stakeholder perspective, accountability serves as a critical governance mechanism that enhances transparency and strengthens stakeholder trust. This result aligns with the findings of [14], [17], [22], [36] who emphasized the importance of accountability in improving financial disclosure quality and governance effectiveness.

The mediation assessment demonstrates that accountability serves as a partially mediating mechanism linking payment delays with financial reporting transparency. The statistically significant indirect relationship indicated that payment delays not only directly affected indicate that payment delays not only directly reduce transparency but also indirectly weaken transparency by undermining accountability mechanisms. This finding provides empirical support the combination of Agency Theory and Stakeholder Theory perspectives, indicating that governance quality serves as an important explanatory mechanism linking payment management practices to transparency outcomes, in line with earlier empirical research emphasizing the intermediary function of accountability with public financial governance [10], [26], [38].

Overall, the findings suggest that improving payment administration systems, reducing bureaucratic delays, and strengthening accountability mechanisms are essential for enhancing financial reporting transparency in public infrastructure projects. For developing countries such as Timor-Leste, effective payment management is not merely an operational issue but also a governance requirement that directly influences accountability, transparency, and stakeholder confidence.

6 Conclusion

This research investigated the influence of IPC and invoice payment delays on accountability and financial reporting transparency in public infrastructure projects in Timor-Leste. The findings demonstrated that payment delays negatively affect accountability mechanisms, while stronger accountability practices contributed to improving financial reporting transparency. Furthermore, mediation analysis with transparency outcomes, highlighting its important role in strengthening governance quality within infrastructure project management.

Theoretically, this research extends the application of Agency Theory and Stakeholder theory by explaining how payment management practices influence governance performance through accountability mechanisms. Practically, the findings emphasize the importance of improving payment administrations systems, strengthening internal control caused by delayed payments. Although this research provides empirical evidence from Timor-Leste infrastructure projects, several limitations should be considered. The use of cross-sectional survey data. Limits the ability to examine long-term causal relationships, and the sample focuses only on respondents involved in infrastructure project management. Future research is encouraged to include broader organizational context, additional governance variables, and longitudinal approaches to provide deeper understanding of the relationship between payment management, accountability, and financial reporting transparency.

This study possesses several strengths: it addresses a relatively underexplored research context by focusing on infrastructure projects in Timor-Leste. It integrates payment management and governance perspectives within a single analytical framework; the use of PLS enables the simultaneous examination of direct and indirect relationships among constructs and the study provides empirical evidence regarding the mediating role of accountability. Nevertheless, studying has several limitations. First the analysis is based on cross sectional survey data which restricts the ability to establish a causal relationship over time. Second, the sample is limited to respondents

involved in infrastructure projects under the Ministry of Public Works of Timor-Leste, which may limit the generalizability of the findings. Third, the model explains 60% of the variance in financial reporting transparency, indicating that other factors not included in the model may also influence transparency outcomes. Future studies may expand this research by incorporating additional governance variables such as organizational culture, digital governance, leadership effectiveness, audit quality or institutional culture digital governance leadership effectiveness, audit quality or institutional capacity and may adopt longitudinal or cross-country comparative designs to provide deeper insights into the dynamics of payment management accountability and financial reporting transparency.

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