INTEGRATED POST-AWARD GOVERNANCE FOR REDUCING FINANCIAL LEAKAGES: A FINANCIAL CRIMINOLOGY PERSPECTIVE

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Abstract. Financial leakages in public sector projects continue to undermine fiscal sustainability, public trust, and the effective utilisation of debt-financed public investments. Despite extensive research on procurement and project management, limited attention has been given to post-award governance as a preventive mechanism for reducing financial leakages from a Financial Criminology perspective. This study examines the influence of Comprehensive Accountability Structure (CAS) on the Reduction of Financial Leakages (RFL) through the mediating role of Change and Risk Management (CRM) within Malaysian public sector projects. Drawing upon Open Systems Theory as the primary theoretical framework and Transaction Cost Economics as a complementary perspective, the study proposes an integrated post-award governance model. Data were collected from 462 officers across 28 Federal Ministries in Malaysia and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The findings reveal that Comprehensive Accountability Structure has a significant positive effect on Change and Risk Management ($\beta = 0.697$, $p < 0.001$), while Change and Risk Management significantly reduces Financial Leakages ($\beta = 0.700$, $p < 0.001$). Furthermore, Change and Risk Management significantly mediates the relationship between Comprehensive Accountability Structure and the Reduction of Financial Leakages ($\beta = 0.488$, $p < 0.001$). These findings demonstrate that effective post-award governance strengthens accountability, enhances organisational resilience, and reduces governance vulnerabilities that may create opportunities for financial misconduct and inefficient public resource utilisation. This study contributes to both the public governance and Financial Criminology literature by extending the application of Open Systems Theory to post-award public project governance while illustrating how governance mechanisms can function as preventive safeguards against financial leakages. The proposed integrated governance framework offers practical guidance for policymakers seeking to strengthen public financial management, improve value for money, and reinforce fiscal sustainability in debt-financed public investment programmes.
Keywords: *financial criminology, post-award governance, financial leakages, public sector projects, accountability, change and risk management*

Introduction

Public sector investment constitutes a fundamental driver of national economic development by facilitating infrastructure expansion, improving public service delivery, and enhancing societal well-being. Governments allocate substantial public resources to finance strategic development programmes that stimulate economic growth, improve institutional capacity, and achieve long-term national development objectives. In developing economies such as Malaysia, these investments are increasingly supported by sovereign borrowing and public expenditure, thereby placing greater emphasis on governance mechanisms that ensure accountability, transparency, fiscal discipline, and efficient utilisation of public resources (OECD, 2024). Effective governance is therefore indispensable not only for improving project performance but also for safeguarding fiscal sustainability and maintaining public confidence in government institutions.

Despite continuous reforms in public procurement and financial management, the implementation of public sector projects remains vulnerable to governance deficiencies that compromise project performance and financial integrity. Numerous public projects continue to experience cost overruns, schedule delays, ineffective contract administration, inadequate monitoring, payment irregularities, and weak inter-agency coordination, ultimately reducing value for money and limiting the achievement of intended project outcomes (OECD, 2024; Flyvbjerg and Gardner, 2023). These implementation failures frequently emerge after contract award, where governance responsibilities shift from procurement activities towards project execution, contractual compliance, performance monitoring, financial control, and risk management. Consequently, governance effectiveness during the post-award phase has become increasingly important in ensuring that public investments generate sustainable economic and social benefits.

Within the broader context of public financial management, financial leakages have emerged as one of the most significant governance challenges affecting government expenditure worldwide. Financial leakages extend beyond direct fraud or corruption and encompass broader governance weaknesses such as inefficient utilisation of public resources, contractual non-compliance, weak financial controls, excessive project costs, resource wastage, payment irregularities, and ineffective monitoring mechanisms. These governance failures reduce organisational effectiveness, increase fiscal pressure, and undermine public trust in government institutions. Research has consistently demonstrated that strengthening accountability and transparency mechanisms significantly contributes to reducing financial leakages and improving governance performance, particularly within public financial management systems (Adekunle et al., 2018). Likewise, governance mechanisms such as effective boards, audit committees, and accountability structures have been shown to substantially reduce financial fraud risks by strengthening institutional oversight and governance effectiveness (Al-Sharabi et al., 2025). The importance of governance becomes even more pronounced when viewed from the perspective of Financial Criminology, which examines the institutional conditions that facilitate financial misconduct and the preventive mechanisms capable of reducing opportunities for financial crime. Rather than viewing financial leakages solely as consequences of fraudulent behaviour, Financial Criminology recognises that organisational weaknesses, including ineffective accountability, inadequate monitoring, poor governance coordination, and weak internal controls; create an environment conducive to opportunistic behaviour and financial misconduct. In public sector project management, governance failures during contract implementation may not always constitute criminal offences; however, they frequently generate institutional vulnerabilities that expose governments to unnecessary financial losses and reduce the effectiveness of public expenditure. Consequently, strengthening governance mechanisms represents an important preventive strategy that complements traditional anti-fraud and anti-corruption initiatives.

Existing literature has extensively examined public procurement governance, corruption prevention, supplier selection, tender evaluation, and public financial management. Nevertheless, comparatively limited empirical attention has been devoted to governance during the post-award contract management phase, despite this stage representing the longest and most resource-intensive component of the project lifecycle. Most implementation challenges, including contract variations, performance deficiencies, payment certification disputes, project delays, ineffective monitoring, and

emerging project risks; materialise after contracts have been awarded. Recent studies on financial crime in public procurement further demonstrate that governance vulnerabilities often arise during project implementation through weak oversight, fragmented institutional responsibilities, and insufficient accountability mechanisms, thereby increasing opportunities for financial misconduct and resource wastage. Similarly, La Cascia et al. (2023) identify procurement governance vulnerabilities, inadequate transparency, and weak institutional controls as major factors increasing fraud and corruption risks within public procurement systems. These findings collectively indicate that improving governance after contract award represents a critical yet underexplored research area.

The present study addresses this gap by integrating Open Systems Theory (OST) and Transaction Cost Economics (TCE) to explain governance effectiveness in reducing financial leakages during post-award contract management. Open Systems Theory conceptualises organisations as dynamic systems that transform organisational inputs into desired organisational outcomes through interconnected organisational processes while continuously interacting with internal and external environments (Scott and Davis, 2015; Katz and Kahn, 1978). Within this framework, the Comprehensive Accountability Structure (CAS) represents the organisational input, Change and Risk Management (CRM) functions as the transformation process, and the Reduction of Financial Leakages (RFL) constitutes the organisational outcome. Complementing this perspective, Transaction Cost Economics explains how effective governance arrangements reduce contractual uncertainty, mitigate opportunistic behaviour, improve coordination, and minimise transaction costs arising from incomplete contracts and information asymmetry (Williamson, 1985). The integration of these theoretical perspectives provides a more comprehensive explanation of governance effectiveness by simultaneously considering organisational adaptation and contractual governance mechanisms. Accordingly, this study develops an integrated post-award governance framework to examine the influence of Comprehensive Accountability Structure (CAS) on the Reduction of Financial Leakages (RFL) through the mediating role of Change and Risk Management (CRM) within Malaysian public sector projects. Unlike previous studies that predominantly focus on procurement governance before contract award, this research investigates governance throughout project implementation, where financial risks, governance failures, and contractual uncertainties are most likely to occur. The study contributes to the literature in three significant ways. First, it extends the application of Open Systems Theory by demonstrating how governance inputs are transformed into financial governance outcomes through organisational processes. Second, it complements Transaction Cost Economics by explaining how governance mechanisms reduce contractual risks and opportunistic behaviour during project implementation. Third, it advances the Financial Criminology literature by positioning financial leakages as preventable governance vulnerabilities rather than merely outcomes of fraud or corruption. Collectively, these contributions provide a stronger theoretical foundation for strengthening governance effectiveness, enhancing project delivery, and safeguarding public financial resources within Malaysia's public sector.

Literature review and hypothesis development

Theoretical foundation: Open systems theory and transaction cost economics

This study is grounded in Open Systems Theory (OST) and Transaction Cost Economics (TCE) to explain how governance mechanisms influence financial governance performance during the post-award phase of public sector projects. The integration of these complementary theories provides a robust conceptual foundation for understanding how organisational governance structures, management processes, and contractual arrangements collectively contribute to reducing financial leakages. Open Systems Theory (OST) conceptualises organisations as adaptive systems that continuously interact with their internal and external environments through the transformation of organisational inputs into desired outputs (Scott and Davis, 2015; Katz and Kahn, 1978). Organisational effectiveness is achieved when governance structures, institutional resources, and accountability mechanisms are effectively transformed through internal organisational processes to produce sustainable organisational outcomes. Within the context of this study, Comprehensive Accountability Structure (CAS) represents the organisational input by establishing governance arrangements, accountability mechanisms, and institutional oversight. Change and Risk Management (CRM) functions as the transformation process through which organisations coordinate project implementation, manage contractual changes, and mitigate emerging risks. The Reduction of Financial Leakages (RFL) represents the organisational outcome, reflecting stronger financial governance, improved accountability, and more efficient utilisation of public resources. Accordingly, OST provides the primary theoretical explanation for how governance capabilities influence organisational performance during post-award contract management.

While OST explains organisational transformation, it provides limited insight into contractual behaviour and governance decisions under conditions of uncertainty. To address this limitation, the study incorporates Transaction Cost Economics (TCE) as a complementary theoretical perspective. Williamson (1985) argues that governance structures exist to minimise transaction costs arising from bounded rationality, information asymmetry, contractual incompleteness, environmental uncertainty, and opportunistic behaviour. Public sector projects typically involve multiple stakeholders, long implementation periods, contractual complexities, and evolving project requirements, all of which increase governance risks and coordination costs. Effective governance mechanisms therefore play a critical role in reducing contractual uncertainty, strengthening accountability, improving monitoring effectiveness, and discouraging opportunistic behaviour throughout project implementation (Williamson, 1985). The integration of OST and TCE provides a comprehensive explanation of post-award governance. OST explains governance from an organisational systems perspective by illustrating how accountability structures are transformed through organisational processes into improved governance outcomes. TCE complements this perspective by explaining why governance mechanisms are necessary to reduce contractual risks and transaction costs throughout project implementation. Together, these theories support the proposition that strengthening accountability structures and organisational management processes enhances governance effectiveness and contributes to reducing financial leakages in public sector projects. Consequently, OST serves as the primary theoretical foundation, while TCE provides complementary support for explaining governance behaviour within complex contractual environments.

Comprehensive accountability structure and change and risk management

Comprehensive Accountability Structure (CAS) refers to the formal governance arrangements that define roles, responsibilities, reporting relationships, decision-making authority, and oversight mechanisms throughout the post-award contract management process. In public sector projects, accountability extends beyond compliance with statutory and contractual requirements to encompass institutional practices that promote transparency, answerability, and responsible stewardship of public resources. Effective accountability structures facilitate coordination among project stakeholders, strengthen managerial oversight, and ensure that contractual obligations are implemented in accordance with established governance standards. Consequently, accountability is widely recognised as a critical governance mechanism for enhancing organisational effectiveness and improving public financial management (OECD, 2024; Bovens, 2007). From the perspective of Open Systems Theory (OST), Comprehensive Accountability Structure represents a key organisational input that shapes the effectiveness of internal governance processes. Organisations function as adaptive systems in which governance inputs are transformed into organisational outcomes through coordinated managerial activities (Scott and Davis, 2015; Katz and Kahn, 1978). Within the post-award contract management context, clearly defined accountability arrangements strengthen communication, coordination, and decision-making, enabling project teams to respond more effectively to contractual changes and implementation risks. As a result, organisations with stronger accountability structures are better positioned to implement systematic Change and Risk Management practices throughout the project lifecycle.

The relationship between accountability and Change and Risk Management is further supported by Transaction Cost Economics (TCE). TCE posits that governance mechanisms are designed to minimise transaction costs arising from bounded rationality, information asymmetry, contractual incompleteness, environmental uncertainty, and opportunistic behaviour (Williamson, 1985). Contemporary interpretations further emphasise that governance structures serve as strategic mechanisms for coordinating organisational relationships, reducing contractual hazards, and improving governance efficiency in complex institutional environments (Ketokivi and Mahoney, 2017). Public sector projects typically involve multiple stakeholders, evolving project requirements, and lengthy implementation periods, all of which increase governance complexity and coordination costs. Comprehensive accountability structures therefore mitigate these governance challenges by clarifying responsibilities, strengthening oversight, improving information flows, and reinforcing contractual compliance. Consequently, organisations are better positioned to identify, assess, and manage project risks throughout the post-award contract implementation phase. Empirical evidence generally supports the positive relationship between accountability and governance effectiveness. Previous studies have shown that strong accountability mechanisms improve monitoring quality, managerial control, and organisational coordination, thereby enhancing the capability of public organisations to manage implementation risks and project uncertainties (Flyvbjerg and Gardner, 2023; Amirkhanyan, 2010). Similarly, effective governance arrangements are essential for coordinating complex public projects, particularly where multiple stakeholders and contractual interdependencies increase implementation risks. These findings suggest that accountability structures not only strengthen governance performance but also provide the institutional foundation for effective Change and Risk Management.

Despite these contributions, existing studies have primarily examined accountability in relation to procurement compliance, organisational performance, and financial reporting. Comparatively limited empirical attention has been devoted to understanding how Comprehensive Accountability Structure strengthens Change and Risk Management during the post-award contract implementation phase, where governance complexity and contractual uncertainty are greatest. Addressing this gap is important because effective accountability structures may enhance organisational capability to anticipate, monitor, and mitigate implementation risks before they develop into governance failures and financial leakages. Based on the theoretical arguments and empirical evidence presented above, this study proposes the following hypothesis:

H1: Comprehensive accountability structure has a positive and significant effect on Change and Risk Management.

Change and risk management and the reduction of financial leakages

Change and Risk Management (CRM) refers to the systematic processes through which organisations identify, assess, monitor, and respond to contractual changes, operational uncertainties, and emerging risks throughout the project implementation lifecycle. In post-award public sector projects, contractual variations, unforeseen events, resource constraints, and implementation complexities frequently arise after contract award, requiring timely managerial intervention to maintain project performance and financial integrity. Effective Change and Risk Management enables public organisations to minimise disruptions, strengthen contractual compliance, improve decision-making, and ensure that public resources are utilised efficiently. Consequently, CRM has become a critical governance mechanism for enhancing project performance and protecting public financial resources. From the perspective of Open Systems Theory (OST), Change and Risk Management represents the transformation process through which governance inputs are converted into desirable organisational outcomes (Scott and Davis, 2015; Katz and Kahn, 1978). Organisations continuously adapt to changing internal and external conditions by modifying managerial practices, reallocating resources, and coordinating organisational responses to implementation challenges. Within the post-award governance context, effective Change and Risk Management enhances organisational resilience by enabling project teams to anticipate risks, respond to contractual changes, and maintain effective project control. These adaptive capabilities improve governance performance and contribute to more efficient utilisation of public funds, ultimately reducing financial leakages.

The importance of Change and Risk Management is further explained by Transaction Cost Economics (TCE), which suggests that governance mechanisms reduce transaction costs associated with uncertainty, contractual incompleteness, information asymmetry, and opportunistic behaviour (Ketokivi and Mahoney, 2017; Williamson, 1985). During project implementation, ineffective management of contractual changes and project risks often results in cost overruns, delayed project completion, contractual disputes, unnecessary variations, and weak financial controls. These governance failures increase coordination costs and create opportunities for inefficient resource utilisation and financial leakages. Conversely, organisations that implement effective Change and Risk Management are better able to coordinate stakeholders, strengthen contractual compliance, minimise governance risks, and improve financial accountability throughout project implementation. Empirical evidence consistently highlights the

importance of Change and Risk Management in improving project governance and organisational performance. Previous studies have demonstrated that proactive risk management enhances project success by reducing implementation uncertainty, improving project control, and strengthening governance effectiveness in complex projects (Flyvbjerg and Gardner, 2023). Similarly, effective governance and monitoring mechanisms have been shown to improve financial accountability, reduce governance failures, and promote more efficient utilisation of public resources (OECD, 2024; La Cascia et al., 2023). Collectively, these findings suggest that organisations with stronger Change and Risk Management capabilities are more likely to minimise financial leakages during post-award contract implementation.

Despite increasing recognition of the importance of project risk management, existing studies have primarily examined its influence on project performance, cost control, and schedule achievement. Comparatively less attention has been devoted to understanding how Change and Risk Management contributes to the reduction of financial leakages, particularly within the post-award governance of public sector projects. From a Financial Criminology perspective, ineffective management of contractual changes and project risks creates governance vulnerabilities that may facilitate resource wastage, payment irregularities, and other forms of financial misconduct. Strengthening Change and Risk Management is therefore expected to reduce these vulnerabilities and improve financial governance outcomes. Based on the theoretical arguments and empirical evidence presented above, the following hypothesis is proposed:

> H2: Change and Risk Management has a positive and significant effect on the reduction of financial leakages.

The mediating role of change and risk management

The effectiveness of governance structures in improving organisational outcomes often depends not only on the existence of formal accountability mechanisms but also on how these mechanisms are translated into effective governance practices during project implementation. In the context of post-award public sector projects, accountability structures provide the institutional foundation for governance; however, their effectiveness in reducing financial leakages is likely to be realised through the implementation of systematic Change and Risk Management (CRM) practices. Accordingly, CRM is expected to function as an important mediating mechanism that transforms governance inputs into improved financial governance outcomes. From the perspective of Open Systems Theory (OST), organisational inputs do not directly generate organisational outcomes but are transformed through internal organisational processes (Scott and Davis, 2015; Katz and Kahn, 1978). Within the proposed research framework, Comprehensive Accountability Structure (CAS) represents the governance input, while Change and Risk Management (CRM) constitutes the transformation process through which governance capabilities are operationalised during project implementation. Effective accountability structures establish governance expectations, whereas Change and Risk Management enables organisations to identify implementation challenges, coordinate corrective actions, and respond adaptively to contractual uncertainties. Consequently, financial leakages are reduced because governance principles are translated into effective operational practices rather than remaining as formal administrative requirements.

The mediating role of CRM is further supported by Transaction Cost Economics (TCE). Williamson (1985) argues that governance structures alone cannot eliminate contractual inefficiencies unless they are supported by governance mechanisms capable of managing uncertainty and reducing opportunistic behaviour. Contemporary TCE literature similarly emphasises that governance effectiveness depends on the alignment between institutional arrangements and operational governance practices that minimise transaction hazards and coordination costs (Ketokivi and Mahoney, 2017). During post-award contract implementation, Change and Risk Management performs this operational governance role by facilitating continuous monitoring, timely management of contractual changes, effective risk mitigation, and coordinated decision-making. These practices reduce information asymmetry, strengthen contractual compliance, and minimise governance failures that may contribute to financial leakages. Empirical studies further indicate that governance structures are more effective when supported by robust organisational processes. Previous research has shown that accountability mechanisms improve organisational performance indirectly through enhanced monitoring, coordination, and risk management capabilities rather than through formal governance arrangements alone (Flyvbjerg and Gardner, 2023; Amirkhanyan, 2010). These findings suggest that Change and Risk Management serves as the operational mechanism through which accountability structures influence governance effectiveness and financial performance.

Despite growing interest in governance and project management, limited empirical research has examined the mediating role of Change and Risk Management in explaining how accountability structures contribute to the reduction of financial leakages during the post-award contract implementation phase. From a Financial Criminology perspective, ineffective governance processes create institutional vulnerabilities that increase opportunities for resource wastage, payment irregularities, and other forms of financial misconduct. Understanding the mediating role of CRM therefore provides a more comprehensive explanation of how governance mechanisms operate to prevent financial leakages and strengthen public financial integrity. Based on the theoretical arguments and empirical evidence presented above, the following hypothesis is proposed:

H3: Change and Risk Management positively mediates the relationship between comprehensive accountability structure and the reduction of financial leakages.

Integrated post-award governance framework

Drawing upon Open Systems Theory (OST) and Transaction Cost Economics (TCE), this study proposes an integrated post-award governance framework to explain how governance mechanisms contribute to reducing financial leakages in Malaysian public sector projects. Consistent with the principles of OST, the framework conceptualises Comprehensive Accountability Structure (CAS) as the organisational input, Change and Risk Management (CRM) as the transformation process, and the Reduction of Financial Leakages (RFL) as the organisational outcome. This input–process–output configuration explains how governance capabilities are transformed into improved financial governance performance during post-award contract implementation. Complementing this perspective, Transaction Cost Economics (TCE) explains that effective governance mechanisms minimise contractual uncertainty, information asymmetry, opportunistic behaviour, and coordination costs throughout project

implementation (Ketokivi and Mahoney, 2017; Williamson, 1985). Accordingly, Comprehensive Accountability Structure establishes the institutional governance arrangements that strengthen Change and Risk Management, while effective Change and Risk Management enhances financial governance by reducing governance vulnerabilities that may contribute to financial leakages.

Based on the theoretical arguments and empirical evidence presented in the preceding sections, the conceptual framework proposes three hypotheses: H1, Comprehensive Accountability Structure positively influences Change and Risk Management; H2, Change and Risk Management positively influences the Reduction of Financial Leakages; and H3, Change and Risk Management positively mediates the relationship between Comprehensive Accountability Structure and the Reduction of Financial Leakages. The proposed conceptual framework is illustrated in *Figure 1*. Figure 1 illustrates the proposed Integrated Post-Award Governance Framework developed for this study. Guided by Open Systems Theory and complemented by Transaction Cost Economics, the framework conceptualises Comprehensive Accountability Structure as the organisational input, Change and Risk Management as the governance process, and the Reduction of Financial Leakages as the organisational outcome. The framework further proposes that Change and Risk Management mediates the relationship between Comprehensive Accountability Structure and the Reduction of Financial Leakages, providing an integrated theoretical explanation of how governance mechanisms strengthen financial integrity during post-award public sector project implementation.

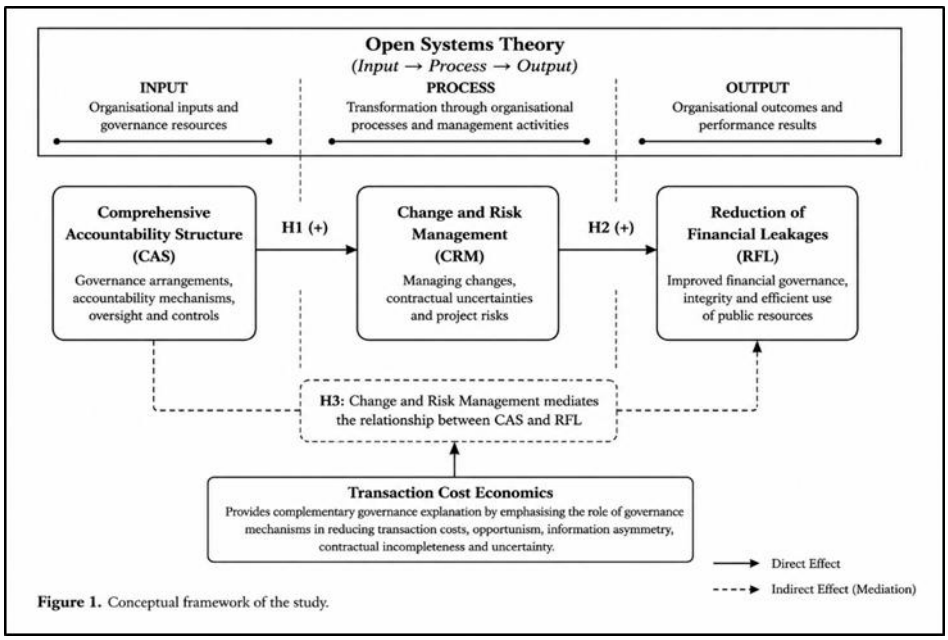

Figure 1. *Proposed research framework.*

Materials and Methods

This study employed a quantitative cross-sectional research design to examine the relationships among Comprehensive Accountability Structure (CAS), Change and Risk Management (CRM), and the Reduction of Financial Leakages (RFL) in Malaysian public sector projects. A quantitative approach was considered appropriate because it

enables the empirical testing of hypothesised relationships and provides objective evidence for theory validation. Data were collected using a structured questionnaire and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). PLS-SEM was selected because it is suitable for predictive research, mediation analysis, and complex models involving latent constructs while imposing minimal distributional assumptions.

Population and sampling

The target population comprised officers directly involved in post-award contract management across 28 Federal Ministries in Malaysia. These officers were responsible for contract administration, project implementation, financial management, project monitoring, and governance-related functions. A stratified random sampling technique was employed to ensure adequate representation across ministries. Data collection yielded 462 valid responses, which exceeded the minimum sample size recommended for PLS-SEM analysis, thereby providing sufficient statistical power for hypothesis testing.

Data collection

Primary data were collected using a structured self-administered questionnaire. The instrument consisted of two sections: the first captured respondents' demographic information, while the second measured the study constructs using previously validated measurement items adapted to the context of post-award public sector project governance. All items were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Participation was voluntary, and respondents were assured that all responses would remain confidential and be used solely for academic research purposes.

Measurement of variables

The study examined three latent constructs: Comprehensive Accountability Structure (CAS), Change and Risk Management (CRM), and Reduction of Financial Leakages (RFL). Measurement items for each construct were adapted from established literature on public governance, accountability, project management, and financial governance to ensure content validity. Comprehensive Accountability Structure assessed formal governance arrangements, organisational accountability, and oversight mechanisms. Change and Risk Management measured practices related to managing contractual changes, identifying and mitigating project risks, and coordinating implementation activities. Reduction of Financial Leakages evaluated the effectiveness of governance practices in minimising financial losses, payment irregularities, resource wastage, and other governance weaknesses. All constructs were operationalised using reflective indicators measured on a five-point Likert scale.

Data analysis

The collected data were analysed using IBM SPSS Statistics Version 29 and SmartPLS Version 4. SPSS was used to perform descriptive statistical analyses of the respondents' demographic characteristics, whereas SmartPLS was employed to evaluate the measurement and structural models. The measurement model assessment included

indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Subsequently, the structural model was evaluated by examining the significance of the hypothesised relationships, the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and the mediating effect of Change and Risk Management using the bootstrapping procedure with 5,000 resamples.

Results and Discussion

This study obtained 462 valid responses from officers involved in post-award public sector project management across 28 Federal Ministries in Malaysia. The respondents comprised officers responsible for contract administration, project implementation, financial governance, project monitoring, and related management functions. *Table 1* summarises the demographic characteristics of the respondents. Overall, the sample comprised officers from 28 Federal Ministries in Malaysia with diverse educational backgrounds, years of service, and professional positions. The diversity of the respondents indicates that the data were obtained from individuals directly involved in post-award public sector project management, thereby providing an appropriate basis for assessing the proposed research model.

Table 1. *Demographic profile of respondents.*

Category	Frequency (N)	Percentage (%)
Gender		
Male	245	53.0
Female	217	47.0
Age		
Below 30 years	182	39.4
31–40 years	20	4.3
41–50 years	80	17.3
51–60 years	180	39.0
Highest Educational Qualification		
SPM / Diploma	110	23.8
Bachelor's Degree	135	29.2
Master's Degree	123	26.6
Doctorate	94	20.3
Position		
Top Management	82	17.7
Senior Management	110	23.8
Middle Management	160	34.6
Executive / Officer	110	23.8
Ministry Coverage		
28 Federal Ministries	462	100.0

Measurement model evaluation

Indicator reliability

The measurement model was evaluated by examining indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Before assessing the structural relationships, the adequacy of the measurement model was confirmed to ensure that the latent constructs were measured reliably and validly. Indicator reliability was assessed using the outer loadings of the measurement items. Indicators with

loadings above 0.70 are generally recommended, while indicators with loadings between 0.40 and 0.70 may be retained when supported by theoretical justification and when construct reliability remains satisfactory. During model refinement, CRM2 was removed because of its inadequate loading, while CAS4 was excluded due to conceptual overlap with the Change and Risk Management construct. The final measurement model comprised five indicators for Comprehensive Accountability Structure (CAS), five indicators for Change and Risk Management (CRM), and six indicators for Reduction of Financial Leakages (RFL). As shown in *Table 2*, the retained indicators exhibited acceptable outer loadings, ranging from 0.510 to 0.793. Although several indicators recorded loadings below the recommended threshold of 0.70, they were retained because they exceeded the minimum acceptable value of 0.50 and contributed to maintaining the theoretical coverage of the constructs. The adequacy of the measurement model was subsequently confirmed through the assessment of internal consistency reliability and convergent validity.

Table 2. *Indicator reliability.*

Construct / indicator	Outer loadings
CAS	
CAS1	0.684
CAS2	0.697
CAS3	0.705
CAS5	0.646
CAS6	0.677
CRM	
CRM1	0.510
CRM3	0.793
CRM4	0.750
CRM5	0.732
CRM6	0.720
RFL	
RFL1	0.750
RFL2	0.651
RFL3	0.766
RFL4	0.764
RFL5	0.546
RFL6	0.754

Internal consistency reliability and convergent validity

Internal consistency reliability and convergent validity were assessed using Cronbach's alpha, rho_A, Composite Reliability (CR), and the Average Variance Extracted (AVE). Cronbach's alpha and Composite Reliability values should exceed 0.70, while AVE values should be greater than 0.50 to establish adequate convergent validity. As presented in *Table 3*, All latent constructs demonstrated satisfactory internal consistency reliability, with Cronbach’s alpha, rho_A and Composite Reliability exceeding the recommended thresholds. Cronbach's alpha values ranged from 0.712 to 0.799, while Composite Reliability values ranged from 0.813 to 0.857, exceeding the recommended threshold of 0.70. Similarly, rho_A values were above 0.70, further confirming the reliability of the measurement model. With respect to convergent validity, the CRM and RFL constructs achieved AVE values above the recommended

threshold of 0.50, indicating adequate convergent validity. Although the AVE value for CAS (0.465) was slightly below the recommended threshold, the construct was retained because its Composite Reliability exceeded 0.80 and all retained indicators were supported by strong theoretical justification. Therefore, the overall measurement model was considered sufficiently reliable and appropriate for further discriminant validity assessment.

***Table 3**. Internal consistency reliability and convergent validity.*

Construct	Cronbach's Alpha	rho_A	Composite Reliability	AVE
CAS	0.712	0.716	0.813	0.465
CRM	0.747	0.760	0.831	0.501
RFL	0.799	0.805	0.857	0.504

Discriminant validity

Discriminant validity was assessed using the Fornell–Larcker criterion and the Heterotrait–Monotrait Ratio (HTMT) to determine whether the latent constructs were empirically distinct from one another. *Table 4* presents the discriminant validity assessment using the Fornell–Larcker criterion. The square root of the AVE for each construct is presented on the diagonal, whereas the off-diagonal values represent the correlations among the latent constructs. The CRM and RFL constructs satisfied the Fornell–Larcker criterion, as the square root of the AVE exceeded their respective inter-construct correlations. However, the CAS construct exhibited a marginal overlap with CRM, where the correlation between CAS and CRM (0.697) slightly exceeded the square root of the AVE for CAS (0.682). Nevertheless, considering the satisfactory internal consistency reliability, acceptable cross-loadings, and the theoretical distinction between the constructs, the measurement model was considered adequate for subsequent structural model evaluation. *Table 4* presents the HTMT assessment of discriminant validity. The HTMT values ranged from 0.857 to 0.936. The HTMT values for CAS–RFL (0.857) and CRM–RFL (0.891) were below the recommended threshold of 0.90, indicating acceptable discriminant validity. However, the HTMT value for CAS–CRM (0.936) slightly exceeded the recommended threshold, reflecting the close conceptual relationship between accountability structures and change and risk management within post-award public project governance. Considering the satisfactory reliability measures, acceptable cross-loadings, and the theoretical distinction between the constructs, the discriminant validity of the measurement model was deemed acceptable for structural model evaluation.

***Table 4**. The discriminant validity.*

Category	CAS	CRM	RFL
The Fornell–Larcker Criterion			
CAS	0.682		
CRM	0.697	0.708	
RFL	0.690	0.700	0.710
The Heterotrait–Monotrait Ratio (HTMT)			
CAS	-		
CRM	0.936	-	
RFL	0.857	0.891	-

Structural model evaluation

Direct effects

Following confirmation of the adequacy of the measurement model, the structural model was evaluated using the bootstrapping procedure with 5,000 bootstrap resamples. The evaluation focused on the significance of the hypothesised relationships, the coefficient of determination (R^2), effect size (f^2), and the mediating effect of Change and Risk Management (CRM). As presented in *Table 5*, Comprehensive Accountability Structure (CAS) exerted a significant positive effect on Change and Risk Management (CRM) ($\beta = 0.697$, $t = 20.447$, $p < 0.001$), supporting H1. Similarly, Change and Risk Management (CRM) had a significant positive effect on the Reduction of Financial Leakages (RFL) ($\beta = 0.700$, $t = 16.883$, $p < 0.001$), supporting H2.

***Table 5**. Structural model results.*

Hypothesis	Structural Relationship	β	t-value	p-value	Decision
H1	CAS → CRM	0.697	20.447	<0.001	Supported
H2	CRM → RFL	0.700	16.883	<0.001	Supported

Assessment of the indirect effect

The mediating effect of Change and Risk Management (CRM) on the relationship between Comprehensive Accountability Structure (CAS) and the Reduction of Financial Leakages (RFL) was examined using the bootstrapping procedure. As presented in Table 7, the indirect effect was positive and statistically significant ($\beta = 0.488$, $t = 11.319$, $p < 0.001$). Furthermore, the 95% bias-corrected and accelerated (BCa) confidence interval did not include zero ([0.401, 0.569]), confirming the significance of the mediation effect. Therefore, H3 was supported (*Table 6*).

***Table 6**. Assessment of the indirect effect (Mediation analysis).*

Hypothesis	Indirect Relationship	β	t	p	95% BCa CI	Decision
H3	CAS → CRM → RFL	0.488	11.319	<0.001	[0.401, 0.569]	Supported

Coefficient of determination (R^2)

The explanatory power of the structural model was assessed using the coefficient of determination (R^2), which indicates the proportion of variance in each endogenous construct explained by its predictor(s). R^2 values of approximately 0.75, 0.50, and 0.25 may be interpreted as substantial, moderate, and weak explanatory power, respectively. As shown in *Table 8*, the model explained 48.5% of the variance in Change and Risk Management (CRM) ($R^2 = 0.485$) and 49.0% of the variance in the Reduction of Financial Leakages (RFL) ($R^2 = 0.490$). Both values indicate moderate explanatory power, suggesting that the proposed structural model provides a satisfactory explanation of the endogenous constructs (*Table 7*).

***Table 7**. Coefficient of determination (R^2).*

Endogenous construct	R^2	Adjusted R^2
Change and Risk Management (CRM)	0.485	0.484
Reduction of Financial Leakages (RFL)	0.490	0.489

Effect Size (f^2)

The contribution of each exogenous construct to the endogenous constructs was further evaluated using the effect size (f^2). The f^2 values of 0.02, 0.15, and 0.35 indicate small, medium, and large effect sizes, respectively. As shown in *Table 8*, Comprehensive Accountability Structure (CAS) exerted a large effect on Change and Risk Management (CRM) ($f^2 = 1.066$). Likewise, Change and Risk Management (CRM) demonstrated a large effect on the Reduction of Financial Leakages (RFL) ($f^2 = 0.966$). Both relationships exhibit substantial effect sizes, indicating that the predictor constructs make strong contributions to explaining the variance in their respective endogenous constructs.

Table 8. *Effect size (f^2).*

Structural Relationship	f^2	Effect Size
CAS → CRM	1.066	Large
CRM → RFL	0.966	Large

Predictive relevance (Q^2 Predict)

The predictive capability of the proposed structural model was assessed using the PLSpredict procedure. Predictive relevance is supported when the Q^2 predict values are greater than zero. Positive Q^2 predict values indicate that the PLS-SEM model possesses out-of-sample predictive capability for the endogenous constructs. As presented in *Table 9*, both endogenous constructs recorded positive Q^2 predict values, with 0.478 for Change and Risk Management (CRM) and 0.387 for the Reduction of Financial Leakages (RFL). Since both values exceed zero, the results confirm that the proposed structural model possesses predictive relevance. These findings indicate that the model can generate accurate predictions for the endogenous constructs beyond the estimation sample, thereby providing additional support for its predictive performance.

Table 9. *Predictive relevance assessment (Q^2 predict).*

Endogenous Construct	Q^2 Predict	Predictive Relevance
Change and Risk Management (CRM)	0.478	Yes
Reduction of Financial Leakages (RFL)	0.387	Yes

The purpose of this study was to examine the influence of Comprehensive Accountability Structure (CAS) on the Reduction of Financial Leakages (RFL) through the mediating role of Change and Risk Management (CRM) within post-award public project governance in Malaysia. The findings demonstrate that all proposed hypotheses were supported. Specifically, Comprehensive Accountability Structure significantly influenced Change and Risk Management, while Change and Risk Management significantly enhanced the Reduction of Financial Leakages. Furthermore, the mediation analysis confirmed that Change and Risk Management serves as an important mechanism through which accountability structures improve financial governance outcomes. These findings indicate that effective post-contract governance extends beyond compliance with contractual procedures and requires integrated governance processes that strengthen organisational capability to minimise financial leakages (Al-Sharabi et al., 2025; OECD, 2024; Adekunle et al., 2018).

Discussion of H1: Comprehensive Accountability Structure → Change and Risk Management

The findings indicate that Comprehensive Accountability Structure exerts a strong positive influence on Change and Risk Management. This suggests that clearly defined governance responsibilities, transparent reporting mechanisms, and structured accountability arrangements enable public organisations to respond more effectively to project risks, contractual changes, and implementation challenges. These findings support the principles of Open Systems Theory, which emphasises that organisational inputs, including governance structures and institutional arrangements, shape organisational processes and adaptive capabilities (Scott and Davis, 2015; Katz and Kahn, 1978). From a Transaction Cost Economics perspective, accountability structures also reduce behavioural uncertainty, minimise opportunistic behaviour, and lower coordination costs throughout project implementation (Ketokivi and Mahoney, 2017; Williamson, 1985). Consequently, stronger accountability systems facilitate more effective governance during the post-contract stage.

Discussion of H2: Change and Risk Management → Reduction of Financial Leakages

The results further demonstrate that Change and Risk Management significantly contributes to reducing financial leakages. Effective monitoring of contractual variations, proactive risk mitigation, and timely corrective actions improve project control and reduce the likelihood of cost overruns, delays, contract disputes, and inefficient resource utilisation. This finding is consistent with previous studies highlighting the importance of governance mechanisms in protecting public financial resources during project implementation (OECD, 2024; Flyvbjerg and Gardner, 2023; La Cascia et al., 2023; Adekunle et al., 2018). Within the Open Systems Theory framework, Change and Risk Management represents a critical organisational process that transforms governance inputs into desirable public sector outcomes (Scott and Davis, 2015; Katz and Kahn, 1978). Simultaneously, Transaction Cost Economics explains that effective governance mechanisms reduce transaction risks associated with contractual uncertainty and incomplete contracts, thereby improving project efficiency and safeguarding public expenditure (Ketokivi and Mahoney, 2017; Williamson, 1985).

Discussion of H3: Mediating Effect of Change and Risk Management

The mediation analysis confirms that Change and Risk Management significantly mediates the relationship between Comprehensive Accountability Structure and the Reduction of Financial Leakages. This finding suggests that accountability structures alone are insufficient to improve financial governance unless they are translated into effective governance practices during project implementation. In other words, governance policies become meaningful only when supported by continuous performance monitoring, coordinated risk management, and responsive decision-making throughout the project lifecycle. This finding further strengthens Open Systems Theory by demonstrating that organisational processes serve as the mechanism through which governance inputs generate organisational outcomes (Scott and Davis, 2015; Katz and Kahn, 1978). From the perspective of Transaction Cost Economics, effective governance processes minimise contractual inefficiencies and coordination costs, thereby improving public sector project performance (Ketokivi and Mahoney, 2017; Williamson, 1985).

Theoretical Implications

The present study extends the application of Open Systems Theory within the field of public financial governance by demonstrating that governance inputs influence organisational outcomes primarily through governance processes during post-contract management (Scott and Davis, 2015; Katz and Kahn, 1978). Unlike previous studies that largely focus on procurement procedures or financial controls independently, this study integrates governance structures, organisational processes, and financial outcomes into a comprehensive governance framework. Furthermore, the incorporation of Transaction Cost Economics complements Open Systems Theory by explaining how governance mechanisms reduce contractual uncertainty, minimise opportunistic behaviour, and improve the efficiency of public expenditure management (Ketokivi and Mahoney, 2017; Williamson, 1985).

Practical Implications

The findings provide important implications for policymakers and public sector organisations responsible for managing debt-financed public investment projects. Strengthening accountability structures should be accompanied by systematic performance monitoring, integrated risk management, and continuous governance oversight throughout project implementation. Public agencies should also invest in organisational capability, governance training, and digital monitoring systems to enhance post-award contract governance. Such initiatives are expected to reduce financial leakages, improve value for money, strengthen fiscal sustainability, and support more resilient sovereign debt management (Al-Sharabi et al., 2025; OECD, 2024; Adekunle et al., 2018).

Conclusion

This study examined the influence of Comprehensive Accountability Structure (CAS) on the Reduction of Financial Leakages (RFL) through the mediating role of Change and Risk Management (CRM) within the context of post-award public project governance in Malaysia. Using Partial Least Squares Structural Equation Modelling (PLS-SEM) based on data collected from officers across 28 Federal Ministries, the findings confirmed that all proposed hypotheses were supported. Specifically, Comprehensive Accountability Structure significantly enhanced Change and Risk Management, while effective Change and Risk Management contributed significantly to reducing financial leakages. Furthermore, the mediation analysis demonstrated that Change and Risk Management serves as the critical governance mechanism through which accountability structures improve financial governance outcomes. These findings reinforce the importance of integrated post-award governance in strengthening the integrity and effectiveness of public project implementation (Al-Sharabi et al., 2025; OECD, 2024; La Cascia et al., 2023; Adekunle et al., 2018). This study contributes to both the public governance and Financial Criminology literature by extending the application of Open Systems Theory to post-award public project governance while complementing its explanatory power through Transaction Cost Economics. The findings demonstrate that governance inputs, particularly accountability structures, generate meaningful organisational outcomes only when translated into effective governance processes (Scott and Davis, 2015; Katz and Kahn, 1978). From a Financial

Criminology perspective, the study further demonstrates that financial leakages should be viewed not merely as administrative inefficiencies but as governance vulnerabilities that may create opportunities for financial misconduct, resource wastage, fraud, and the inefficient utilisation of public funds (Al-Sharabi et al., 2025; La Cascia et al., 2023; Adekunle et al., 2018). Accordingly, strengthening governance mechanisms represents an important preventive strategy for protecting public financial resources (Al-Sharabi et al., 2025; OECD, 2024; La Cascia et al., 2023).

From a practical perspective, the findings suggest that strengthening accountability structures alone is insufficient to achieve effective financial governance. Public sector organisations should simultaneously reinforce change and risk management capabilities through systematic performance monitoring, coordinated governance practices, and continuous organisational learning. Such initiatives are expected to enhance value for money, improve project delivery, reduce financial leakages, and strengthen fiscal sustainability in debt-financed public investment programmes (Al-Sharabi et al., 2025; OECD, 2024; Adekunle et al., 2018). Despite these contributions, this study has several limitations. First, the study employed a cross-sectional research design, which limits the ability to infer causal relationships over time. Second, the empirical evidence was obtained from Federal Ministries in Malaysia, which may limit the generalisability of the findings to other public sector contexts. Third, the study focused on three principal governance constructs and did not incorporate other organisational or institutional factors that may also influence financial governance outcomes. Future research should adopt longitudinal research designs to examine governance performance throughout the project lifecycle and validate the stability of the proposed relationships over time. Comparative studies involving state governments, government-linked companies, statutory bodies, and public agencies in other countries would further enhance the generalisability of the proposed governance framework. Future studies may also extend the present model by incorporating digital governance, artificial intelligence, organisational culture, institutional resilience, and anti-fraud governance mechanisms. Such efforts would further advance the field of Financial Criminology by expanding its focus beyond the investigation of financial crime towards preventive governance approaches that strengthen accountability, minimise financial leakages, and safeguard public financial resources.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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