Reducing Financial Leakages through Post-Award Contract Governance: Evidence from Malaysian Public Sector Projects

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Abstract: Financial leakages continue to undermine the effectiveness of public sector projects by weakening financial accountability, reducing value for money, and compromising project outcomes despite established procurement regulations and governance frameworks. While previous studies have primarily focused on procurement governance and project implementation, governance mechanisms operating during the post-award contract management phase remain underexplored, particularly in relation to financial leakages. Addressing this gap, this study investigates how Comprehensive Contract Clauses (CCC) contribute to reducing financial leakages through the mediating role of Change and Risk Management (CRM). Guided by Open Systems Theory (OST) and supported by Transaction Cost Economics (TCE), the study conceptualises comprehensive contract clauses as governance inputs, change and risk management as the governance process, and the reduction of financial leakages as the governance outcome. A quantitative survey of 462 public officers responsible for post-award contract management across 28 Malaysian federal ministries was analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The results confirm that comprehensive contract clauses significantly strengthen change and risk management, which subsequently reduces financial leakages during project implementation. The significant mediating effect further demonstrates that contractual governance enhances financial accountability through effective organisational governance processes rather than contractual provisions alone. The study extends the application of Open Systems Theory within Financial Criminology by demonstrating how post-award contract governance safeguards public resources through integrated contractual and organisational governance mechanisms. These insights provide practical guidance for policymakers and public sector organisations seeking to strengthen governance capability, improve financial stewardship, and enhance public project delivery.

***Keywords**: Financial Leakages; Post-Award Contract Governance; Comprehensive Contract Clauses; Change and Risk Management; Financial Criminology; Public Sector Projects*

I. Introduction

Public sector projects represent one of the largest forms of government investment and serve as critical instruments for achieving sustainable economic development, enhancing public service delivery, and improving societal well-being. As governments allocate substantial public resources to infrastructure, healthcare, education, transportation, and other strategic initiatives, increasing emphasis has been placed on ensuring that these investments achieve value for money, financial accountability, and timely project delivery. While considerable attention has been devoted to strengthening procurement systems and regulatory compliance, the effectiveness of governance throughout project implementation remains equally important in determining whether public resources are managed efficiently and protected from financial leakages.

Financial leakages continue to present a significant governance challenge during the implementation of public sector projects. Although procurement regulations establish the legal and administrative framework for awarding contracts, many governance-related risks emerge after contracts have been awarded, during the execution and administration of contractual obligations. Weak contract administration, ineffective monitoring, uncontrolled contractual variations, inadequate risk management, and limited governance oversight may collectively reduce project efficiency, increase implementation costs, and weaken financial accountability. Consequently, strengthening governance during the post-award contract management phase has become increasingly important for safeguarding public resources and ensuring that projects achieve their intended objectives.

In Malaysia, public sector projects are implemented within a comprehensive governance framework supported by financial regulations, procurement policies, and institutional oversight mechanisms designed to promote transparency, accountability, and prudent public expenditure. Nevertheless, successive national audit reports have continued to identify implementation-related weaknesses, including project delays, cost variations, contract administration deficiencies, and governance issues that may increase the risk of financial leakages throughout project implementation. These recurring observations indicate that improving governance after contract award remains an important priority for strengthening financial stewardship and enhancing the effectiveness of public sector project delivery.

Existing studies have extensively examined procurement governance, tender evaluation, contract award decisions, corruption prevention, and project success factors. While these studies have significantly advanced the understanding of procurement and project governance, comparatively limited attention has been directed towards governance mechanisms operating during the post-award contract management phase, where contractual obligations are executed, monitored, and continuously managed throughout the project lifecycle. More importantly, empirical evidence explaining how governance mechanisms embedded within post-award contract management contribute to reducing financial leakages remains limited, particularly within the context of Malaysian public sector projects. This gap is especially relevant to the field of Financial Criminology, which extends beyond the investigation of financial misconduct to examine governance systems capable of reducing opportunities for financial irregularities while strengthening accountability in the management of public resources.

To address this gap, this study investigates the influence of comprehensive contract clauses on the reduction of financial leakages through the mediating role of change and risk management in Malaysian public sector projects. The study is grounded in Open Systems Theory (OST), which conceptualises governance as an integrated system in which organisational inputs are transformed into desired outcomes through effective management processes. Transaction Cost Economics (TCE) complements this perspective by explaining how contractual governance mechanisms reduce uncertainty, strengthen coordination, and minimise governance risks during project implementation. Integrating these theoretical perspectives provides a comprehensive explanation of how post-award contract governance contributes to strengthening financial accountability and reducing financial leakages.

This study makes three important contributions to the existing literature. First, it extends the application of Open Systems Theory by demonstrating how governance inputs represented by comprehensive contract clauses are transformed into governance outcomes through effective change and risk management during the post-award contract management phase. Second, it contributes to the Financial Criminology literature by providing empirical evidence that governance-based mechanisms can reduce financial leakages through proactive contract governance rather than relying solely on compliance or enforcement approaches. Finally, the findings offer practical insights for policymakers, project managers, and public sector organisations seeking to strengthen post-award contract governance, improve financial accountability, and safeguard public resources through more effective governance practices.

II. Literature Review

The literature on public sector project governance has expanded considerably over the past decade, reflecting growing concerns regarding financial accountability, project performance, and the effective stewardship of public resources. Previous studies have primarily examined governance from the perspectives of procurement practices, ethical decision-making, project success factors, integrity systems, and regulatory compliance. Collectively, these studies acknowledge that robust governance mechanisms are essential for enhancing transparency, reducing governance risks, and improving project outcomes. However, the existing body of knowledge remains largely concentrated on the procurement and contract award stages, with comparatively limited attention devoted to governance practices during the post-award contract management phase, where contractual obligations are implemented, monitored, and adapted throughout project execution.

Building upon this gap, this literature review synthesises existing knowledge on financial leakages, post-award contract governance, comprehensive contract clauses, and change and risk management to establish the theoretical and empirical foundation of the study. The review is organised to demonstrate how governance mechanisms embedded within post-award contract management contribute to reducing financial leakages in Malaysian public sector projects. It further supports the development of the proposed conceptual framework and research hypotheses grounded in Open Systems Theory (OST) and complemented by Transaction Cost Economics (TCE).

2.1 Financial Leakages in Public Sector Projects

Financial leakages refer to the inefficient, inappropriate, or avoidable loss of public resources during the implementation of government-funded projects, resulting from weaknesses in governance, contract administration, monitoring, financial controls, and risk management. Within public sector projects, financial leakages do not necessarily imply fraudulent or criminal conduct; rather, they encompass governance deficiencies that reduce value for money, increase project costs, delay project completion, or compromise the effective utilisation of public funds. From a public financial management perspective, minimising financial leakages is essential to ensuring that government investments achieve their intended economic and social outcomes while maintaining transparency, accountability, and public confidence.

Previous studies have consistently recognised governance as a critical mechanism for protecting public resources throughout the project lifecycle. Research on Malaysian public sector governance emphasises that ethical decision-making, institutional integrity, transparency, and accountability collectively strengthen governance effectiveness and reduce opportunities for financial irregularities during project implementation (Hassim, 2012; Hassim et al., 2017; Rosli et al., 2015). Similarly, studies on public financial management argue that effective governance frameworks supported by sound financial controls and systematic risk management contribute significantly to improving expenditure efficiency and reducing resource wastage (Aris, 2010; Hassan, 2018). These findings suggest that financial leakages are not solely financial issues but also reflect the quality of governance exercised throughout project implementation.

Within the construction and infrastructure sectors, governance-related challenges frequently emerge after contract award, when projects enter the implementation stage. During this phase, contractual variations, inadequate monitoring, ineffective coordination, delayed decision-making, and weak contract administration may collectively increase governance risks and create conditions that reduce project efficiency and financial accountability. Studies on Malaysian public construction projects similarly report that governance effectiveness during project execution significantly influences project performance, cost control, and the achievement of intended project outcomes, highlighting the importance of strengthening governance beyond the procurement stage (Sambasivan et al., 2016; Zakaria et al., 2018).

Despite growing interest in governance and public financial management, existing literature has predominantly examined procurement governance, ethical procurement practices, transparency, and project performance. Comparatively fewer studies have investigated how governance mechanisms embedded within post-award contract management contribute specifically to reducing financial leakages during project implementation. Consequently, empirical evidence explaining the governance pathway through which contractual provisions and management practices collectively safeguard public financial resources remains limited, particularly in the Malaysian public sector context. Addressing this gap provides an important contribution to Financial Criminology by shifting attention from the detection of financial misconduct towards governance mechanisms that proactively minimise opportunities for financial leakages throughout project implementation.

2.2 Post-Award Contract Governance and Comprehensive Contract Clauses

Post-award contract governance encompasses the governance mechanisms that regulate, coordinate, and oversee contractual obligations from contract award until project completion. Unlike procurement governance, which focuses on supplier selection and contract award decisions, post-award contract governance emphasises contract administration, performance monitoring, compliance management, stakeholder coordination, financial control, and the management of contractual changes throughout project implementation (Abu Hassim et al., 2011; Delhi & Mahalingam, 2017). Effective governance during this phase ensures that contractual obligations are executed consistently, governance risks are managed proactively, and public resources are utilised efficiently to achieve intended project outcomes. Consequently, post-award contract governance serves as a critical institutional mechanism for strengthening accountability, preserving contractual integrity, and enhancing public sector project performance.

Comprehensive contract clauses constitute the primary governance instrument within post-award contract management because they define the contractual rights, responsibilities, and obligations of the contracting parties. Well-developed contractual provisions specify the scope of work, performance standards, payment mechanisms, reporting requirements, risk allocation, variation procedures, dispute resolution mechanisms, and compliance requirements, thereby reducing contractual ambiguity and improving implementation consistency (Abu Hassim et al., 2011; Hassan & Abdul Latif, 2023). By providing explicit governance rules, comprehensive contract clauses enhance contractual certainty, support transparent decision-making, and establish a structured foundation for effective contract administration throughout the project lifecycle.

Beyond their legal function, comprehensive contract clauses operate as preventive governance mechanisms that minimise governance failures before they translate into financial losses. Clearly articulated contractual provisions strengthen accountability by defining measurable performance expectations, clarifying organisational responsibilities, and establishing formal procedures for managing contractual changes and resolving disputes. These governance arrangements reduce the likelihood of inconsistent contract interpretation, unauthorised variations, delayed decision-making, and ineffective contract administration, thereby strengthening financial accountability and protecting public resources during project execution (Williamson, 1985; Hassan & Abdul Latif, 2023). Accordingly, contractual completeness represents a strategic governance capability rather than merely a legal requirement.

The governance role of comprehensive contract clauses can be further explained through the complementary perspectives of Open Systems Theory (OST) and Transaction Cost Economics (TCE). Within the OST framework, comprehensive contract clauses represent governance inputs that provide the institutional resources required for effective organisational processes. However, governance outcomes are not determined solely by contractual design but by the extent to which contractual provisions are translated into operational practices through systematic management processes during project implementation (Katz & Kahn, 1978; Scott & Davis, 2015). Complementing this perspective, TCE explains that comprehensive contractual arrangements reduce transaction uncertainty by specifying governance structures, enforcement mechanisms, and contractual responsibilities that minimise opportunistic behaviour and information asymmetry while improving coordination between contracting parties (Williamson, 1985; Ketokivi & Mahoney, 2020). Together, these theoretical perspectives position comprehensive contract clauses as a strategic governance input that enables effective contract implementation.

Although previous studies have consistently recognised the importance of contractual governance in improving project performance and accountability, empirical research has largely concentrated on procurement governance, tender evaluation, contractual relationships, and public-private partnership performance. Comparatively limited attention has been devoted to examining how comprehensive contract clauses function as governance inputs during the post-award contract management phase to strengthen organisational processes that ultimately reduce financial leakages. This limitation is particularly evident within the Malaysian public sector, where implementation-related governance challenges continue to be highlighted despite an established procurement framework. Therefore, this study addresses an important empirical gap by positioning comprehensive contract clauses as a strategic governance input that supports effective change and risk management, thereby contributing to the reduction of financial leakages in Malaysian public sector projects.

2.3 Change and Risk Management

Change and Risk Management (CRM) represents a fundamental governance process within post-award contract management, ensuring that contractual changes, emerging risks, and implementation uncertainties are systematically identified, evaluated, and managed throughout the project lifecycle. Public sector projects frequently operate in dynamic environments where policy priorities, stakeholder expectations, technical requirements, and external conditions evolve over time. Consequently, effective governance extends beyond contractual compliance to include structured mechanisms that enable organisations to respond proactively to change while maintaining project objectives, financial accountability, and contractual integrity (PMI, 2021; Hillson, 2009).

Change management focuses on the systematic evaluation, approval, and implementation of contractual modifications to ensure that project changes remain aligned with contractual obligations and organisational objectives. Effective change management prevents unauthorised scope expansion, uncontrolled contractual variations, and inconsistent decision-making, thereby reducing governance failures that may increase implementation costs and compromise project performance (PMI, 2021; Kerzner, 2022). Within public sector projects, structured change management also promotes transparency by ensuring that contractual modifications are appropriately documented, justified, reviewed, and approved through established governance procedures.

Risk management complements change management by providing a systematic process for identifying, assessing, mitigating, and monitoring risks that may affect project implementation. Rather than responding reactively to emerging issues, effective risk management enables project organisations to anticipate uncertainties, allocate responsibilities, and implement appropriate mitigation strategies before governance failures occur. Previous studies have consistently demonstrated that proactive risk management strengthens organisational resilience, improves decision-making quality, enhances resource utilisation, and supports successful project delivery under conditions of uncertainty (Hillson, 2009; ISO 31000, 2018). Consequently, risk management functions as an essential governance mechanism for protecting public resources and reducing the likelihood of financial leakages during contract execution.

From the perspective of Open Systems Theory (OST), change and risk management constitute the governance process through which contractual inputs are transformed into organisational outcomes. While comprehensive contract clauses establish the governance framework, their effectiveness depends on the organisation's ability to implement contractual provisions through systematic management processes that respond to changing project conditions. Transaction Cost Economics (TCE) further explains that effective management of contractual changes and implementation risks reduces transaction uncertainty, limits opportunistic behaviour, and improves coordination between contracting parties (Williamson, 1985; Ketokivi & Mahoney, 2020). Accordingly, change and risk management represent the operational mechanism through which contractual governance strengthens financial accountability during project implementation.

Although change management and risk management have been widely examined as individual project management practices, relatively few studies have integrated both dimensions within the context of post-award contract governance to explain how governance mechanisms contribute to reducing financial leakages. Existing research has predominantly focused on project performance, schedule control, cost management, and organisational effectiveness, while comparatively limited attention has been given to the governance pathway linking contractual governance, change and risk management, and financial accountability in public sector projects. This limitation provides an important research opportunity to position change and risk management as the mediating governance process that connects comprehensive contract clauses with the reduction of financial leakages, thereby extending the application of Open Systems Theory within the field of Financial Criminology.

2.4 Development of Hypotheses

The preceding literature review establishes that post-award contract governance operates as an integrated governance system in which contractual provisions are translated into governance outcomes through effective organisational processes. Guided by Open Systems Theory (OST) and supported by Transaction Cost Economics (TCE), this study proposes that comprehensive contract clauses represent governance inputs, change and risk management functions as the governance process, and the reduction of financial leakages constitutes the governance outcome. Based on this theoretical foundation and the empirical literature, three hypotheses are developed to examine the proposed relationships.

2.4.1 Comprehensive Contract Clauses and Change and Risk Management

Comprehensive contract clauses provide the contractual foundation for effective governance by defining responsibilities, performance expectations, risk allocation, reporting requirements, and procedures for managing contractual variations. Clearly specified contractual provisions reduce ambiguity, strengthen coordination, and establish formal governance mechanisms that guide decision-making throughout project implementation (Abu Hassim et al., 2011; Hassan & Abdul Latif, 2023). From the perspective of Transaction Cost Economics (TCE), contractual completeness reduces transaction uncertainty by specifying governance arrangements that minimise opportunistic behaviour and facilitate coordination between contracting parties (Williamson, 1985; Ketokivi & Mahoney, 2020). Similarly, Open Systems Theory (OST) suggests that governance inputs only become effective when translated into organisational processes that support project implementation (Katz & Kahn, 1978; Scott & Davis, 2015).

Empirical studies consistently indicate that comprehensive contractual provisions improve organisational coordination, strengthen governance practices, and facilitate systematic management of contractual changes and implementation risks (Abu Hassim et al., 2011; Hassan & Abdul Latif, 2023). Accordingly, comprehensive contract clauses are expected to enhance change and risk management throughout the post-award contract management phase.

H1: Comprehensive contract clauses have a significant positive effect on change and risk management.

2.4.2 Change and Risk Management and Reduction of Financial Leakages

Change and risk management enable organisations to anticipate, evaluate, and respond systematically to contractual changes and implementation uncertainties throughout the project lifecycle. Effective management of contractual changes reduces uncontrolled variations, while proactive risk management minimises governance failures that may result in inefficient resource utilisation, project delays, and financial losses (Hillson, 2009; PMI, 2021). Within the OST framework, change and risk management represent the governance process through which contractual inputs are transformed into governance outcomes. TCE further explains that proactive governance processes reduce transaction uncertainty and improve contractual coordination, thereby strengthening financial accountability during project implementation (Williamson, 1985).

Previous research has consistently demonstrated that systematic change management and proactive risk management contribute to improved project governance, better resource utilisation, enhanced organisational resilience, and stronger financial control (Hillson, 2009; Kerzner, 2022). Consequently, organisations that effectively manage contractual changes and implementation risks are expected to experience lower levels of financial leakages.

H2: Change and risk management has a significant positive effect on the reduction of financial leakages.

2.4.3 The Mediating Role of Change and Risk Management

Open Systems Theory proposes that organisational inputs influence desired outcomes through internal transformation processes rather than through direct relationships alone (Katz & Kahn, 1978; Scott & Davis, 2015). Within the context of post-award contract governance, comprehensive contract clauses establish the governance framework, but their effectiveness depends on how contractual provisions are operationalised through systematic management of contractual changes and implementation risks. This perspective suggests that contractual governance alone is insufficient unless supported by effective organisational processes.

Although comprehensive contract clauses provide the institutional foundation for governance, financial leakages are more likely to be reduced when contractual provisions are translated into effective change and risk management practices. Therefore, change and risk management is expected to function as the governance mechanism through which comprehensive contract clauses strengthen financial accountability and reduce financial leakages during project implementation.

H3: Change and risk management mediates the relationship between comprehensive contract clauses and the reduction of financial leakages.

2.5 Conceptual Framework

The conceptual framework integrates the theoretical arguments and empirical evidence presented in the preceding sections into a unified governance model that explains the relationships among the study constructs. Guided by Open Systems Theory (OST) and supported by Transaction Cost Economics (TCE), the framework conceptualises post-award contract governance as a dynamic system in which governance inputs are transformed into governance outcomes through organisational processes. Within this system, comprehensive contract clauses represent the governance input, change and risk management functions as the governance process, and the reduction of financial leakages represents the desired governance outcome. This integrated perspective provides a systematic explanation of how governance mechanisms embedded within post-award contract management strengthen financial accountability and improve the stewardship of public resources.

The proposed framework further posits that comprehensive contract clauses enhance governance effectiveness by providing clear contractual responsibilities, performance expectations, reporting requirements, and risk allocation mechanisms that facilitate systematic project implementation. However, contractual provisions alone are insufficient to achieve governance outcomes unless they are operationalised through effective change and risk management. Accordingly, change and risk management is positioned as the mediating governance process through which contractual governance is translated into improved financial accountability and the reduction of financial leakages during project implementation. This conceptualisation is consistent with OST, which emphasises the transformation of organisational inputs into desired outcomes through internal processes, while TCE explains how contractual governance reduces uncertainty, strengthens coordination, and minimises opportunistic behaviour during contract execution.

Based on the proposed conceptual framework, this study examines three structural relationships: (i) the direct effect of comprehensive contract clauses on change and risk management, (ii) the direct effect of change and risk management on the reduction of financial leakages, and (iii) the mediating effect of change and risk management on the relationship between comprehensive contract clauses and the reduction of financial leakages. The proposed research model is illustrated in Figure 1.

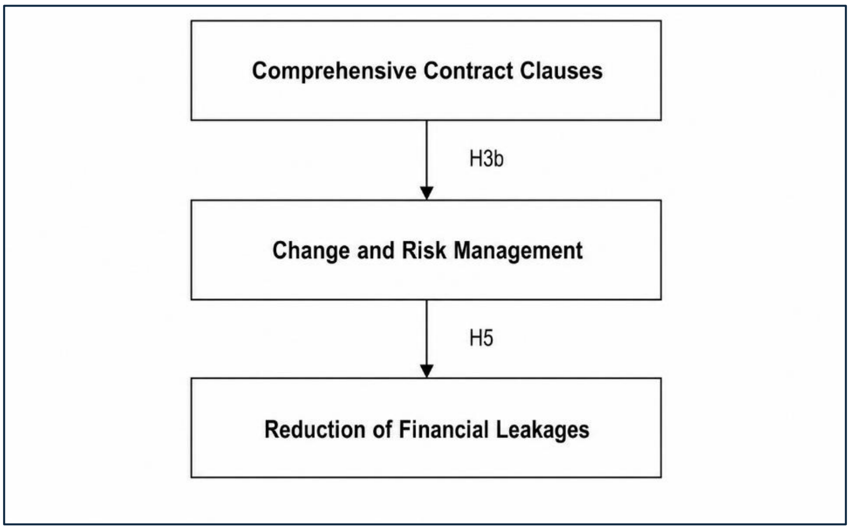

Figure 1. Proposed Conceptual Framework

Figure 1 illustrates the proposed conceptual framework of this study, which is grounded in Open Systems Theory (OST) and supported by Transaction Cost Economics (TCE). The framework conceptualises comprehensive contract clauses as the governance input, change and risk management as the governance process, and the reduction of financial leakages as the governance outcome. It further proposes that comprehensive contract clauses enhance change and risk management, which subsequently contributes to reducing financial leakages in Malaysian public sector projects. Accordingly, the proposed framework provides the basis for empirically testing the hypothesised relationships using Partial Least Squares Structural Equation Modelling (PLS-SEM).

The proposed conceptual framework represents a focused governance pathway derived from the broader Input–Process–Output (IPO) governance framework developed for this research. Rather than examining all governance relationships simultaneously, this study isolates the contractual governance pathway to provide a more in-depth understanding of how comprehensive contract clauses contribute to reducing financial leakages through effective change and risk management. This focused approach enables a rigorous examination of the proposed relationships while preserving the theoretical integrity of the overarching governance framework.

III. Methodology

This study adopted a quantitative research approach to examine the relationships between comprehensive contract clauses, change and risk management, and the reduction of financial leakages in Malaysian public sector projects. A cross-sectional survey design was employed to collect empirical data from public officials directly involved in post-award contract management activities. The quantitative approach was considered appropriate because the study aimed to test the proposed theoretical relationships and hypotheses using statistical techniques, thereby providing objective evidence of the governance mechanisms influencing financial accountability in public sector projects (Creswell & Creswell, 2018; Hair et al., 2022).

3.1 Research Design

The study employed a cross-sectional survey design to obtain quantitative data from respondents at a single point in time. Cross-sectional surveys are widely applied in governance and management research because they enable researchers to examine relationships among latent constructs across a relatively large population using standardised measurement instruments (Creswell & Creswell, 2018). In this study, the research model was developed based on Open Systems Theory (OST) and Transaction Cost Economics (TCE), where comprehensive contract clauses represented the governance input, change and risk management represented the governance process, and the reduction of financial leakages represented the governance outcome. The proposed relationships were subsequently evaluated using Partial Least Squares Structural Equation Modelling (PLS-SEM).

3.2 Population and Sampling

The target population comprised public officials responsible for post-award contract management across Malaysian federal ministries. These respondents were selected because they possess direct knowledge and practical experience in contract administration, project implementation, governance monitoring, and financial management throughout the post-award phase. A stratified random sampling technique was employed to improve the representativeness of the sample by ensuring that respondents from different ministries were proportionately represented. A total of 462 valid responses were obtained from 28 federal ministries, providing sufficient statistical power for PLS-SEM analysis and exceeding the minimum sample size recommended for structural equation modelling (Hair et al., 2022).

3.3 Instrument Development and Measurement

Data were collected using a structured questionnaire developed from established measurement scales reported in previous studies and adapted to the context of Malaysian public sector projects. The questionnaire consisted of items measuring comprehensive contract clauses, change and risk management, and the reduction of financial leakages using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Prior to the main survey, the questionnaire underwent expert review and pilot testing to assess content validity, clarity, and reliability. Minor revisions were incorporated to improve item wording and ensure consistency with the objectives of the study.

3.4 Data Collection Procedure

Primary data were collected through a self-administered questionnaire distributed to officers involved in post-award contract management within federal ministries. Participation was voluntary, and respondents were informed of the academic purpose of the study. To minimise response bias, confidentiality and anonymity were assured, and respondents were encouraged to provide honest and independent responses. The completed questionnaires were screened to identify incomplete responses, duplicate entries, and missing values before the dataset was prepared for statistical analysis.

3.5 Data Analysis

The collected data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS 4. PLS-SEM was selected because it is appropriate for analysing complex structural relationships involving latent constructs and mediation effects while imposing minimal distributional assumptions on the data (Hair et al., 2022). The analysis followed the two-stage approach recommended in the PLS-SEM literature. First, the measurement model was evaluated by examining indicator reliability, internal consistency reliability, convergent validity, and discriminant validity using factor loadings, Cronbach's alpha, composite reliability (CR), average variance extracted (AVE), and the heterotrait-monotrait ratio (HTMT). Second, the structural model was assessed using path coefficients (β), bootstrapping procedures, coefficients of determination (R^2), effect sizes (f^2), predictive relevance (Q^2), and hypothesis testing to evaluate the proposed direct and mediating relationships.

IV. RESULTS

This section presents the empirical findings obtained from the Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis. The results are organised into five subsections: respondent profile, measurement model assessment, structural model assessment, hypothesis testing, and mediation analysis. In line with the study objectives and conceptual framework, the analysis focuses on the relationships among Comprehensive Contract Clauses (CCC), Change and Risk Management (CRM), and Reduction of Financial Leakages (RFL).

4.1 Respondent Profile

A total of 462 valid questionnaires were included in the final analysis. The respondents comprised public officers responsible for post-award contract management across 28 Federal Ministries in Malaysia. They were directly involved in contract administration, project implementation, financial management, governance oversight, and project monitoring, making them appropriate informants for assessing post-award contract governance practices. The demographic characteristics of the respondents are presented in Table 1.

Variable	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**

Table 1. Demographic Profile of Respondents (N = 462)

The respondents represent a diverse range of managerial positions, educational backgrounds, and professional experience in managing public sector projects. This diversity enhances the representativeness of the sample and provides a robust empirical basis for evaluating the proposed governance relationships.

4.2 Measurement Model Assessment

The measurement model was evaluated before testing the structural relationships to establish the reliability and validity of the latent constructs. Consistent with recommended PLS-SEM procedures, the assessment included internal consistency reliability, convergent validity, and discriminant validity. Internal consistency reliability was assessed using Cronbach's alpha (CA) and composite reliability (CR), while convergent validity was evaluated using the average variance extracted (AVE). Discriminant validity was subsequently examined to confirm that each construct measured a distinct theoretical concept.

Construct	Cronbach's Alpha	Composite Reliability	AVE
Comprehensive Contract Clauses (CCC)	0.761	0.840	0.512
Change and Risk Management (CRM)	0.747	0.832	0.502
Reduction of Financial Leakages (RFL)	0.799	0.857	0.504

Table 2. Reliability and Convergent Validity

Table 2 indicates that all constructs demonstrated satisfactory internal consistency reliability. Cronbach's alpha values ranged from 0.747 to 0.799, exceeding the recommended minimum threshold of 0.70. Likewise, composite reliability values ranged from 0.832 to 0.857, indicating strong internal consistency among the measurement items. The AVE values ranged from 0.502 to 0.512, all exceeding the recommended threshold of 0.50, thereby confirming adequate convergent validity. Collectively, these results indicate that the retained indicators reliably represent their respective latent constructs and are suitable for subsequent structural model analysis.

Construct	CCC	CRM	RFL
CCC	**0.716**	0.748	0.727
CRM	0.748	**0.708**	0.695
RFL	0.727	0.695	**0.710**

Table 3. Discriminant Validity (Fornell–Larcker Criterion)

The Fornell–Larcker assessment is presented in Table 3. The diagonal elements represent the square roots of the AVE for each construct, while the off-diagonal elements represent the inter-construct correlations. These statistics were examined alongside the overall measurement model diagnostics and indicator loadings to evaluate construct distinctiveness. In addition, the retained indicators exhibited satisfactory loading patterns with statistically significant loadings, providing further evidence that the measurement model was appropriate for structural model estimation.

4.3 Structural Model Assessment

Following confirmation of the adequacy of the measurement model, the structural model was evaluated to assess the explanatory power of the proposed research model. The assessment focused on the coefficient of determination (R^2), predictive relevance (Q^2), effect size (f^2), and collinearity diagnostics. These indicators collectively evaluate the model's ability to explain and predict the endogenous constructs while ensuring that multicollinearity does not threaten the stability of the structural estimates.

Endogenous Construct	R^2	Adjusted R^2	Q^2
Change and Risk Management (CRM)	**0.598**	**0.597**	**0.585**
Reduction of Financial Leakages (RFL)	**0.504**	**0.503**	**0.498**

Table 4. Structural Model Assessment

The structural model demonstrated satisfactory explanatory power. Comprehensive Contract Clauses explained 59.8% of the variance in Change and Risk Management ($R^2 = 0.598$), while Change and Risk Management explained 50.4% of the variance in the Reduction of Financial Leakages ($R^2 = 0.504$). The adjusted R^2 values were comparable to the corresponding R^2 values, indicating model stability and limited estimation bias. Furthermore, the Q^2 values of 0.585 for Change and Risk Management and 0.498 for the Reduction of Financial Leakages were greater than zero, demonstrating that the proposed model possesses adequate predictive relevance for both endogenous constructs.

To assess potential multicollinearity, full collinearity variance inflation factor (VIF) values were examined. The VIF values for Comprehensive Contract Clauses (3.179), Change and Risk Management (2.873), and Reduction of Financial Leakages (3.202) remained below the commonly accepted threshold of 5.0, indicating that multicollinearity was not a concern in the structural model.

Structural Relationship	Effect Size (f^2)	Interpretation
Comprehensive Contract Clauses → Change and Risk Management	**0.598**	Large
Change and Risk Management → Reduction of Financial Leakages	**0.504**	Large

Table 5. Effect Size (f^2)

The effect size analysis indicates that Comprehensive Contract Clauses exert a large effect on Change and Risk Management ($f^2 = 0.598$). Likewise, Change and Risk Management demonstrated a large effect on the Reduction of Financial Leakages ($f^2 = 0.504$). These findings suggest that both structural relationships make substantial contributions to the explanatory power of the proposed governance model.

4.4 Hypothesis Testing

The proposed direct hypotheses were evaluated using the path coefficients obtained from the PLS-SEM analysis. The significance of each structural relationship was assessed based on the standardized path coefficient (β), standard error (SE), and p-value. The results are presented in Table 6.

Hypothesis	Structural Relationship	β	SE	p-value	Decision
H1	Comprehensive Contract Clauses → Change and Risk Management	**0.773**	0.042	**<0.001**	**Supported**
H2	Change and Risk Management → Reduction of Financial Leakages	**0.710**	0.043	**<0.001**	**Supported**

Table 6. Results of Direct Hypothesis Testing

The results indicate that Comprehensive Contract Clauses have a positive and statistically significant effect on Change and Risk Management ($\beta = 0.773$, $SE = 0.042$, $p < 0.001$), providing empirical support for H1. This finding suggests that clearer and more comprehensive contractual provisions are associated with more effective management of project changes and risks during the post-award implementation stage.

Similarly, Change and Risk Management exerts a positive and statistically significant influence on the Reduction of Financial Leakages ($\beta = 0.710$, $SE = 0.043$, $p < 0.001$), thereby supporting H2. The magnitude of the standardized path coefficient indicates that effective change and risk management constitutes an important organisational process associated with strengthening financial governance and reducing financial leakages in public sector projects.

Overall, the direct effects analysis demonstrates that both hypothesised relationships are statistically significant, providing empirical support for the proposed governance pathway linking contractual governance, organisational risk management, and financial integrity in post-award public sector project management.

4.5 Mediation Analysis

To further examine the underlying governance mechanism proposed in the conceptual framework, the mediating effect of Change and Risk Management (CRM) on the relationship between Comprehensive Contract Clauses (CCC) and the Reduction of Financial Leakages (RFL) was evaluated. The significance of the indirect effect was assessed using the bootstrapping procedure in SmartPLS. The results are presented in Table 7.

Hypothesis	Indirect Relationship	Indirect Effect (β)	SE	p-value	Decision
H3	Comprehensive Contract Clauses → Change and Risk Management → Reduction of Financial Leakages	**0.549**	0.031	**<0.001**	**Supported**

Table 7. Results of Mediation Analysis

The mediation analysis indicates that the indirect effect of Comprehensive Contract Clauses on the Reduction of Financial Leakages through Change and Risk Management is positive and statistically significant ($\beta = 0.549$, SE $= 0.031$, $p < 0.001$). Accordingly, H3 is supported, demonstrating that Change and Risk Management functions as a significant mediating mechanism linking contractual governance practices with improved financial governance outcomes in Malaysian public sector projects.

The significant indirect effect suggests that comprehensive contractual provisions contribute to reducing financial leakages primarily by strengthening organisational processes for managing project changes and risks during the post-award implementation stage. These findings provide empirical support for the proposed governance pathway and reinforce the importance of effective change and risk management as an intermediary organisational process within post-award contract governance.

V. Discussion

This study examined how Comprehensive Contract Clauses (CCC) contribute to the Reduction of Financial Leakages (RFL) through Change and Risk Management (CRM) in Malaysian public sector projects. The results demonstrate that contractual governance creates value not through contractual provisions alone but through organisational processes that translate contractual obligations into effective governance practices during project implementation. This finding supports the central premise of Open Systems Theory (OST) that organisational inputs generate desired outcomes only when transformed through effective internal processes (Katz & Kahn, 1978; Scott & Davis, 2015). It also reinforces Transaction Cost Economics (TCE), which argues that comprehensive contractual arrangements reduce uncertainty, minimise opportunistic behaviour, and improve governance efficiency by lowering coordination and monitoring costs (Williamson, 1985; Ketokivi & Mahoney, 2020). Collectively, the findings provide empirical evidence that integrating contractual governance with effective organisational capabilities represents an important mechanism for strengthening financial governance during the post-award phase of Malaysian public sector projects.

5.1 Comprehensive Contract Clauses and Change and Risk Management

Comprehensive contract clauses strengthen organisational capability by establishing clear governance mechanisms for managing contractual changes and implementation risks during the post-award stage. Beyond defining legal obligations, comprehensive contractual provisions clarify stakeholder responsibilities, prescribe variation procedures, allocate project risks, and facilitate coordinated decision-making. Consequently, organisations become better positioned to respond proactively to implementation uncertainties while maintaining contractual compliance and governance continuity.

This finding is consistent with Saddiqa et al. (2023), who demonstrated that contractual governance enhances project performance through project management risk, highlighting that contractual arrangements create value when translated into effective governance processes rather than functioning solely as compliance instruments. Similar evidence from infrastructure projects suggests that structured contractual provisions improve stakeholder coordination, strengthen risk identification, and enhance organisational preparedness for project changes, thereby supporting more effective implementation (Sitanggang et al., 2025; Senić et al., 2025).

However, the relationship is not universally supported. Tukamuhabwa et al. (2023) reported that contractual governance significantly improved project performance but did not significantly influence project risk management, with risk management failing to mediate the governance–performance relationship. This divergence may reflect differences in institutional environments. Malaysian public sector projects operate within a highly regulated governance framework characterised by standardised procurement procedures, formal contract administration, and strong audit oversight, which increase the likelihood that contractual provisions are systematically translated into operational governance practices.

These findings support Open Systems Theory, which conceptualises comprehensive contract clauses as governance inputs that require effective organisational processes to generate desired outcomes (Katz & Kahn, 1978; Scott & Davis, 2015). Within this study, Change and Risk Management functions as the transformation process that operationalises contractual provisions into coordinated governance actions. The findings are equally consistent with Transaction Cost Economics, whereby comprehensive contractual arrangements reduce uncertainty, contractual ambiguity, and coordination costs by clearly defining governance responsibilities before implementation begins (Williamson, 1985; Ketokivi & Mahoney, 2020).

Overall, this study extends the post-award contract governance literature by demonstrating that the effectiveness of comprehensive contract clauses lies not in contractual enforcement alone but in their ability to strengthen organisational change and risk management. This governance-based explanation broadens existing evidence beyond project performance by showing how contractual design contributes to reducing financial leakages within Malaysian public sector projects.

5.2 Change and Risk Management and Reduction of Financial Leakages

Effective change and risk management reduces financial leakages by enabling organisations to anticipate implementation uncertainties, manage contractual variations proactively, and implement timely corrective actions before governance failures escalate into financial losses. Consequently, systematic monitoring and adaptive decision-making strengthen accountability, minimise cost overruns, reduce contractual disputes, and improve financial stewardship throughout project implementation.

This finding is consistent with recent evidence demonstrating that proactive risk management improves project governance and financial performance by reducing implementation uncertainty and strengthening organisational responsiveness (Sitanggang et al., 2025; Ahmed et al., 2025). Likewise, Saddiqa et al. (2023) showed that project management risk enhances organisational performance by enabling project teams to respond effectively to changing project conditions, reinforcing the importance of governance capability beyond contractual compliance.

Nevertheless, empirical evidence remains mixed. Tukamuhabwa et al. (2023) found that project risk management did not significantly mediate the relationship between contractual governance and project performance, suggesting that governance processes may be less effective in institutional environments characterised by weaker governance capacity. In contrast, the present findings indicate that Malaysia's formal procurement regulations, contract administration procedures, and institutional oversight strengthen the effectiveness of change and risk management in safeguarding public resources.

These findings support Open Systems Theory, whereby change and risk management functions as the organisational process that transforms contractual governance into improved financial outcomes (Katz & Kahn, 1978; Scott & Davis, 2015). They are equally consistent with Transaction Cost Economics, which explains that proactive risk management reduces coordination costs, contractual uncertainty, and opportunistic behaviour, thereby improving governance efficiency during project implementation (Williamson, 1985; Ketokivi & Mahoney, 2020).

Overall, this study extends the post-award contract governance literature by demonstrating that reducing financial leakages depends not only on contractual design but also on organisational capability to implement effective change and risk management. This finding positions governance capability, rather than contractual compliance alone, as the principal mechanism through which public sector organisations strengthen financial accountability and project performance.

5.3 The Mediating Role of Change and Risk Management

The significant mediating effect of Change and Risk Management (CRM) demonstrates that comprehensive contract clauses reduce financial leakages indirectly by strengthening organisational governance during project implementation. This suggests that contractual provisions alone are insufficient to improve financial governance unless they are translated into systematic processes that anticipate risks, manage contractual changes, and support timely corrective actions.

This finding is consistent with Saddiqa et al. (2023), who reported that project management risk significantly mediates the relationship between contractual governance and project performance. The present study extends this evidence by demonstrating that the governance mechanism also enhances financial governance, indicating that effective contractual arrangements create value through organisational capability rather than contractual enforcement alone. In contrast, Tukamuhabwa et al. (2023) found no significant mediating effect of project risk management, suggesting that governance effectiveness is influenced by institutional context. Malaysia's formal procurement regulations, contract administration practices, and regulatory oversight may strengthen the operationalisation of contractual provisions into effective governance processes.

The findings reinforce Open Systems Theory, whereby organisational inputs generate desired outcomes only through effective transformation processes (Katz & Kahn, 1978; Scott & Davis, 2015), while Transaction Cost Economics explains that change and risk management operationalises contractual governance by reducing uncertainty, coordination costs, and opportunistic behaviour (Williamson, 1985; Ketokivi & Mahoney, 2020). Accordingly, this study advances post-award contract governance literature by identifying Change and Risk Management as the critical governance mechanism linking comprehensive contract clauses to reduced financial leakages in Malaysian public sector projects.

5.4 Theoretical Contributions

This study extends Open Systems Theory by demonstrating that post-award contract governance operates as an integrated governance system in which contractual inputs improve financial outcomes only when translated into effective organisational processes. While previous studies have primarily applied the theory to explain general organisational performance, the present findings show that Change and Risk Management functions as the critical transformation mechanism linking Comprehensive Contract Clauses to reduced financial leakages within public sector projects.

The study also enriches Transaction Cost Economics by illustrating that comprehensive contractual arrangements reduce transaction costs not solely through contractual safeguards but through organisational capability to manage contractual changes, implementation risks, and governance uncertainties throughout the post-award stage. This shifts the emphasis from static contractual design towards dynamic governance capability as the principal mechanism for improving financial accountability.

Collectively, these findings contribute to the post-award contract governance literature by integrating Open Systems Theory and Transaction Cost Economics into a complementary governance framework that explains how contractual governance is operationalised to reduce financial leakages in Malaysian public sector projects.

5.5 Practical Implications

The findings provide several practical implications for improving post-award contract governance in the Malaysian public sector. First, policymakers should strengthen contract drafting by incorporating comprehensive clauses that clearly define risk allocation, variation procedures, performance responsibilities, and governance mechanisms to minimise implementation ambiguities. Such contractual clarity provides a stronger foundation for effective project execution and financial accountability.

Second, public sector organisations should prioritise institutional capacity for change and risk management rather than relying solely on contractual compliance. This includes strengthening risk assessment, continuous project monitoring, structured change control procedures, and timely decision-making throughout project implementation. Enhancing these governance capabilities can improve organisational responsiveness while reducing cost overruns, contractual disputes, and financial leakages.

Finally, the findings support the adoption of an integrated post-award governance framework that combines comprehensive contractual arrangements with proactive governance processes. Such an approach enables public agencies to move beyond compliance-oriented contract administration towards adaptive governance that promotes transparency, accountability, and value for money. Collectively, these measures can strengthen financial stewardship and improve the successful delivery of Malaysian public sector projects.

VI. Conclusion

This study examined how post-award contract governance contributes to reducing financial leakages in Malaysian public sector projects by investigating the relationships among Comprehensive Contract Clauses, Change and Risk Management, and Reduction of Financial Leakages. The findings confirm that comprehensive contract clauses strengthen change and risk management, which subsequently reduces financial leakages. The significant mediating effect further demonstrates that contractual governance generates financial value only when contractual provisions are translated into effective organisational governance processes during project implementation.

The study advances the post-award contract governance literature by integrating Open Systems Theory and Transaction Cost Economics to explain how contractual governance is operationalised to improve financial accountability. Beyond its theoretical contribution, the findings provide practical guidance for policymakers and public sector organisations by emphasising that strengthening contractual design should be accompanied by systematic change and risk management to enhance governance effectiveness and safeguard public resources.

Several limitations should be acknowledged. The study employed a cross-sectional design and focused on Malaysian federal ministries, which may limit the generalisability of the findings across different institutional settings. Future research could adopt longitudinal approaches, examine other levels of government or public organisations, and incorporate additional governance dimensions to further strengthen understanding of post-award contract governance and financial performance.

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