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PROJECT MANAGEMENT OFFICES AS ADAPTIVE PLANNING GOVERNANCE SYSTEMS: A RISK-DRIVEN CAPABILITY TRANSFORMATION MODEL

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Abstract

Project Management Offices (PMOs) are widely adopted to support coordination and governance in project-based organisations, yet their performance impact remains inconsistent, particularly within urban infrastructure and construction planning organisations, where multi-project coordination and regulatory complexity are most pronounced. Existing studies typically examine PMO capability, risk, or transformation in isolation and often assume linear relationships with performance. This study reframes PMOs as adaptive governance systems and examines how Capability (C), Risk Activation (R), Adjustment (A), and Performance (P) interact to shape organisational outcomes. Using survey data from 243 practitioners and structural equation modelling, the study shows that PMO capability conditions governance stability but does not directly suppress risk or guarantee performance. Risk does not directly impair performance; instead, it functions as an activation signal that triggers organisational adjustment. PMO transformation emerges as the primary stabilisation mechanism, mediating the effects of both capability and risk on performance. By conceptualising performance as an emergent system outcome, this study advances PMO research beyond maturity and role-based explanations and offers a mechanism-based account of governance behaviour under disturbance. The findings are particularly relevant to the governance of large-scale urban development projects, where capability transformation determines whether coordinated delivery is sustained under planning and regulatory disturbance.

Keywords: project management office; adaptive governance; risk activation; organisational capability; PMO transformation

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INTRODUCTION

Project-based organisations increasingly operate under conditions of uncertainty, fragmentation, and interdependence, where coordination and governance coherence are difficult to sustain. Decisions are often distributed across multiple projects, information flows unevenly across organisational boundaries, and responsibilities shift as priorities evolve. In such environments, instability is not an exception but a recurrent condition that challenges the translation of intent into coordinated action. Empirical studies have shown that unclear decision authority, inconsistent governance routines, and weak coordination mechanisms frequently disrupt organisational performance and lead to rework, delay, and loss of coherence (Long et al., 2004; Mohammed A. Altaefi & Altaefi, 2022; Shah & Kengatharan, 2011).

Project Management Offices (PMOs) are widely adopted to address these challenges by providing structure, standardisation, and coordination across projects. Prior research has examined PMOs from multiple perspectives, including their roles, functions, maturity levels, and capability configurations. Studies have distinguished between strategic and operational PMO roles, highlighting differences in how PMOs support alignment, governance, delivery, and value management (Andersen et al., 2007; Low & Yeow, 2004). Despite this growing body of work, empirical findings remain mixed. Some studies report positive performance effects associated with PMO capabilities, while others find limited or inconsistent impact, particularly for strategic PMO roles. This inconsistency is especially consequential in urban infrastructure and construction planning organisations, where PMOs are directly responsible for coordinating multi-project portfolios, managing regulatory approval processes, and sustaining alignment across the fragmented actors involved in large-scale urban development.

A related stream of research has examined risk in project and organisational contexts. Risk is commonly treated as a negative condition that directly undermines performance, often operationalised through project-level hazards, uncertainty, or exposure to adverse events (Ershadi et al., 2021; Lines et al., 2015; Nisrina et al., 2025). Within PMO research, risk is typically examined as something to be mitigated through stronger controls, better processes, or improved capability. However, this treatment implicitly assumes a linear relationship between risk and performance and overlooks how organisations actually respond when risk becomes visible.

Taken together, these streams reveal a persistent gap in the literature. Capability, risk, and organisational response are frequently analysed as separate phenomena. What remains underexplored is how these elements interact as part of a broader governance system, particularly under conditions where routine coordination mechanisms are no longer sufficient. From a systems perspective,

performance outcomes depend not only on structural conditions or the presence of disturbance, but on how organisations absorb, interpret, and respond once stability is disrupted (Leveson, 2011; Sterman, 2000). Yet this perspective has rarely been applied to PMOs as organisational governance mechanisms.

This study addresses this gap by reframing PMOs as adaptive governance systems and by examining the interaction among Capability (C), Risk Activation (R), Adjustment (A), and Performance (P). Capability is conceptualised as a conditioning structure that shapes organisational sensitivity to disturbance; risk as an activation signal that reveals misalignment rather than directly impairing outcomes; and adjustment, operationalised as PMO transformation, as the mechanism through which stability is restored.

By explaining PMO effectiveness as a system-level adaptive process rather than a linear capability–performance relationship, the study contributes a coherent account of how governance structures behave under pressure. The findings help clarify why organisations with similar capability profiles and risk exposure can experience divergent performance outcomes and position PMOs as adaptive infrastructures that support coordination and coherence in complex, multi-project environments.

Sector Specificity and Planning Governance Relevance

Although the respondent sample spans multiple project-based sectors, more than half are drawn from construction and infrastructure planning organisations (53.09%), the segment of the built environment most directly engaged in urban development governance. Within this sector, PMOs are rarely confined to single-project execution; instead, they operate as coordinating structures across programmes of urban infrastructure delivery, where planning approvals, land-use constraints, multi-stakeholder authority, and phased regulatory compliance introduce distinct sources of governance instability. Capability Transformation, examined in this study as organisational Adjustment, is therefore interpreted specifically as the mechanism through which PMOs in these organisations reconfigure planning governance routines, authority structures, and coordination mandates when misalignment across urban development programmes becomes visible. Framing the C–R–A–P model in this way positions PMO transformation not merely as a generic organisational response, but as a planning governance capability that determines whether large-scale urban development projects sustain coordinated delivery under conditions of institutional and regulatory disturbance.

LITERATURE REVIEW

PMOs as Governance Mechanisms in Project-Based Organisations

Project-based organisations rely on temporary structures to deliver permanent strategic outcomes, creating inherent coordination and governance challenges across multiple projects. Prior research positions governance in such contexts as a mechanism for aligning authority, decision-making, and control across organisational levels rather than merely enforcing compliance (Müller & Söderlund, 2015; Turner, 2014).

Within this context, Project Management Offices (PMOs) have been widely conceptualised as organisational governance mechanisms that connect strategy, portfolios, and projects. Early studies emphasise the role of PMOs in establishing standards, monitoring performance, and supporting coordination across projects (Hobbs & Aubry, 2010; PMI, 2025). Subsequent research highlights that PMOs evolve in response to organisational needs rather than remaining static structural units (Aubry, 2011; Joslin, 2022).

These studies suggest that PMOs operate within dynamic organisational environments where stability cannot be assumed. Governance effectiveness therefore depends not only on formal structures, but on how PMOs adapt their roles when alignment between strategy, governance, and delivery is disrupted (Pellegrinelli & Garagna, 2009).

PMO Capability as Organisational Conditioning (C)

PMO capability has been examined extensively through role typologies, functional scope, and maturity models. A recurring distinction differentiates strategic PMO capabilities, such as strategic alignment and benefits oversight, from operational capabilities, including standardisation, delivery support, and control (Andersen et al., 2007; Aubry et al., 2007).

Empirical evidence regarding the performance impact of these capabilities remains mixed. While operational capabilities are often associated with improved delivery consistency, strategic PMO roles show less consistent direct effects on organisational performance (Aubry, 2011; Müller & Lecoivre, 2014). This inconsistency suggests that capability alone does not guarantee performance outcomes.

Several studies therefore argue that PMO capability should be understood as a structural conditioning factor that shapes governance coherence and coordination readiness rather than as a direct performance driver (Aubry & Hobbs, 2011; Pellegrinelli & Garagna, 2009). Capability establishes the organisational conditions under which disturbances are either absorbed or amplified.

Risk in PMO and Project Governance Research (R)

Risk has traditionally been treated in project research as exposure to uncertainty that negatively affects cost, schedule, and quality outcomes. Within PMO studies, risk is commonly framed as something to be mitigated through stronger governance, standardisation, and control mechanisms (Andersen et al., 2007; Aubry et al., 2007).

However, empirical findings indicate that organisations with comparable governance structures and risk exposure often experience divergent performance outcomes. This observation challenges the assumption of a linear risk–performance relationship and suggests that risk does not operate as a direct performance determinant (Hobbs et al., 2010).

Emerging perspectives in project governance research conceptualise risk as a signal of misalignment that becomes visible when existing coordination mechanisms are insufficient (Aubry et al., 2011; Ershadi, 2021). From this view, risk indicates pressure on governance arrangements rather than directly causing performance degradation.

Adjustment and PMO Transformation (A)

PMO transformation has been widely documented as a recurring phenomenon rather than an exceptional event. Studies show that PMOs frequently change their mandates, structures, and governance roles in response to organisational pressures, strategic shifts, or perceived misalignment (Aubry, 2011; Joslin, 2022). Rather than representing linear maturity progression, transformation is increasingly viewed as an adaptive response through which organisations attempt to restore governance coherence. Such adjustment may involve redefining authority, reallocating responsibilities, or reconfiguring coordination mechanisms across portfolios and projects (Aubry et al., 2007; Müller & Lecoeuvre, 2014).

This perspective positions PMO transformation as a dynamic governance capability that enables organisations to respond once existing structures no longer stabilise performance.

Performance as an Emergent Governance Outcome (P)

Performance in project-based organisations is commonly assessed through indicators of efficiency, consistency, and reliability across projects. While many studies implicitly assume that stronger PMO capability leads directly to improved performance, empirical evidence remains inconclusive (Andersen et al., 2007; Aubry & Hobbs, 2011).

Recent governance-oriented research suggests that performance should be understood as an emergent outcome resulting from interactions between organisational structures, risk conditions, and adaptive response (Müller et al.,

2019; Pellegrinelli & Garagna, 2009). Performance stability therefore depends not only on baseline capability, but on how organisations adjust when misalignment becomes visible.

Research Gap and Conceptual Positioning

Although PMO capability, risk, and transformation have each been extensively studied, they are rarely integrated into a single explanatory framework. Existing research tends to examine capability–performance or risk–performance relationships in isolation, often assuming linear effects (Andersen et al., 2007; Aubry et al., 2007).

This study addresses this gap by integrating these elements through a Capability–Risk–Adjustment–Performance (C–R–A–P) framework, positioning PMOs as adaptive governance systems. The framework examines how capability conditions governance stability, how risk activates organisational response, and how adjustment restores performance coherence. The empirical testing of this framework is presented in the following section.

RESEARCH DESIGN AND METHODS

Research Design

This study adopts a quantitative, explanatory research design to examine how Project Management Offices (PMOs) function as adaptive governance systems in project-based organisations. A cross-sectional survey approach was employed to capture practitioners' assessments of governance capability, perceived risk activation, transformation responses, and performance outcomes.

The unit of analysis is the organisational PMO operating within a project-based environment. This focus is appropriate given the study's emphasis on governance behaviour beyond individual project execution.

Conceptual Model and Hypotheses

The conceptual model is derived from the literature reviewed in Section 2 and positions PMOs as adaptive governance systems. The model comprises four interrelated subsystems: Capability (C), Risk Activation (R), Adjustment (A), and Performance (P). Capability represents structural governance conditions, risk activation reflects the visibility of misalignment, adjustment captures PMO transformation as an adaptive response, and performance denotes the stability and consistency of organisational outcomes.

Based on this framework, the study formulates hypotheses that examine:

- 1) the internal structure of PMO capability,
- 2) the relationship between capability and risk activation,

- 3) the role of risk activation in triggering adjustment, and
- 4) the contribution of adjustment to performance outcomes.

The hypothesised relationships are illustrated in Figure 1 and empirically tested using structural equation modelling.

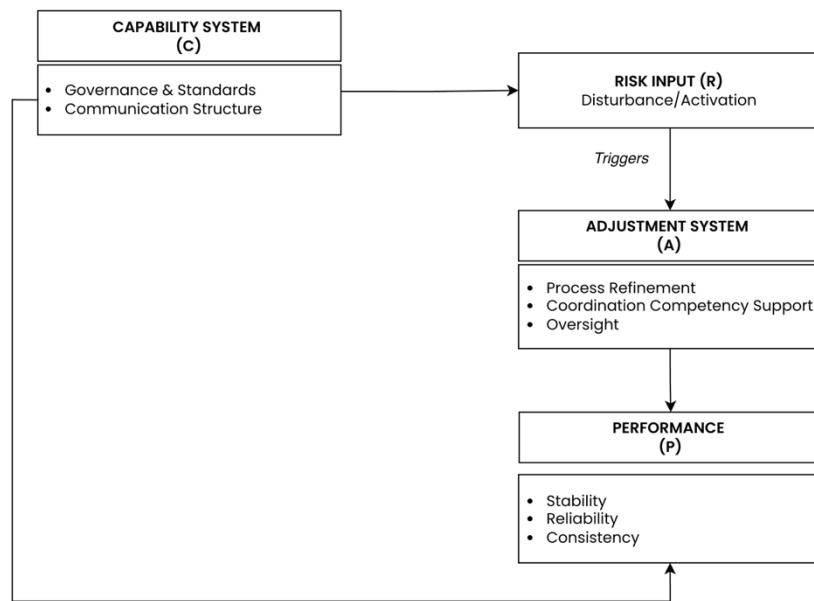


Figure 1: Conceptual Framework

Measurement of Constructs

All constructs were measured using multi-item indicators adapted from established PMO and project governance literature. PMO capability was operationalised as a higher-order construct comprising strategic alignment, governance and standardisation, performance and value management, delivery support, and capability development. Risk activation captures observable deviations and governance instability arising from weak capability structures. Adjustment reflects PMO transformation activities undertaken in response to emerging misalignment, while performance represents perceived stability, reliability, and consistency of organisational outcomes.

All items were measured using a Likert-type scale. The validity and reliability of the measurement model are assessed and reported in the Results section.

Data Collection and Sample

Data were collected through a structured questionnaire distributed to practitioners working in project-based organisations. A total of 243 valid responses were obtained, representing a range of organisational roles, professional experience levels, and educational backgrounds. This diversity supports the examination of PMO governance behaviour across different organisational contexts. Respondents were drawn from a range of project-based sectors, including construction and infrastructure planning, information and communication technology, energy, finance, and oil and gas. Construction and infrastructure planning organisations constituted the largest share of the sample (53.09%), consistent with this study's emphasis on PMO governance within the built environment, while the remaining respondents (46.91%) were drawn from other project-based sectors, providing a comparative basis for interpreting sector-specific governance patterns.

Respondents were selected based on their involvement in PMO-related activities, ensuring that assessments reflected informed perspectives on governance capability, risk, and transformation.

Data Analysis Technique

The proposed model was tested using Partial Least Squares Structural Equation Modelling (PLS-SEM), which is appropriate for analysing complex models with higher-order constructs and exploratory causal relationships. PLS-SEM enables simultaneous assessment of measurement properties and structural relationships while accommodating non-normal data distributions.

The analysis was conducted using SmartPLS software. Evaluation of the measurement model and structural model, including reliability, validity, and path relationships, is presented in the following Results section.

RESULTS

Respondent Profile

The analysis is based on 243 valid responses from practitioners involved in PMO-related activities within project-based organisations. Respondents represent a wide range of professional roles, experience levels, and educational backgrounds, ensuring that the data reflect diverse governance perspectives rather than a single functional viewpoint. A summary of respondent characteristics is presented in Table 1. Consistent with the study's emphasis on the built environment, 53.09% of respondents were affiliated with construction and infrastructure planning organisations, while the remaining 46.91% represented other project-based sectors such as ICT, energy, finance, and oil and gas.

Table 1: Respondent Characteristics (n = 243)

Category	Distribution
Education	Bachelor's (48%), Master's (49%), Doctoral (3%)
Professional Experience	<5 years (7%), 6–10 (13%), 11–15 (19%), 16–20 (22%), 21–25 (18%), >25 (20%)
Position	Executive/Director (13%), Head of PMO/Department (19%), Program Manager (7%), PMO Expert (9%), Project Management Practitioner (32%), Project Manager (15%), PMO Staff (5%)

Capability System Results (C)

This section reports the internal structure of the PMO capability system. Capability was modelled as a higher-order construct comprising five domains: Strategic Alignment, Governance & Standardisation, Performance & Value Management, Delivery Support, and Capability Development.

The structural paths among these domains show a consistent and significant hierarchical pattern. Strategic Alignment exhibits significant relationships with Governance & Standardisation, Performance & Value Management, Delivery Support, and Capability Development, indicating its role as an upstream conditioning domain. Governance & Standardisation further demonstrates significant effects on Performance & Value Management, Delivery Support, and Capability Development. Downstream capability domains also show significant internal linkages, reflecting cumulative capability development rather than independent capability silos.

Table 2: Structural Paths within the Capability System

Path	Result	p-value
Strategic Alignment → Governance & Standardization	Significant	< 0.001
Strategic Alignment → Performance & Value Management	Significant	< 0.001
Strategic Alignment → Delivery Support	Significant	0.005
Strategic Alignment → Capability Development	Significant	0.005
Governance & Standardization → Performance & Value Management	Significant	< 0.001
Governance & Standardization → Delivery Support	Significant	< 0.001
Governance & Standardization → Capability Development	Significant	0.005
Performance & Value Management → Delivery Support	Significant	0.005
Performance & Value Management → Capability Development	Significant	< 0.001
Delivery Support → Capability Development	Significant	0.005

These results confirm that PMO capability operates as an internally structured system rather than as a flat collection of functions.

Risk Activation Results (R)

Risk Activation was examined as an outcome of PMO capability conditions. The results show that capability significantly influences risk activation, indicating that observable governance instability emerges when structural capability arrangements are insufficient to absorb disturbance.

However, risk activation does not exhibit a significant direct relationship with organisational performance. This pattern indicates that risk does not function as a direct performance driver, but rather as an intermediate condition that reflects visible misalignment within governance arrangements.

Table 3: Structural Paths Involving Risk Activation

Path	Result	p-value
Capability → Risk Activation	Significant	< 0.001
Risk Activation → Performance	Not significant	> 0.05

Adjustment and PMO Transformation Results (A)

Adjustment, operationalised as PMO Transformation, was examined as the organisational response to risk activation. The results show a strong and significant relationship between risk activation and adjustment, indicating that transformation is triggered when governance instability becomes visible.

Adjustment also exhibits a strong and significant direct effect on organisational performance. This relationship represents the most substantial effect observed in the structural model, indicating that performance stability is primarily achieved through organisational adjustment rather than through capability alone.

Table 4: Structural Paths Involving Adjustment

Path	Result	p-value
Risk Activation → Adjustment (PMO Transformation)	Significant	< 0.001
Adjustment → Performance	Significant	< 0.001

Integrated System Behaviour

Taken together, the results describe a system in which capability establishes governance conditions, risk activation signals misalignment, and adjustment restores performance stability. Capability does not eliminate risk, and risk does not directly degrade performance. Instead, performance outcomes depend on whether risk activation is followed by effective organisational adjustment.

The absence of a direct risk–performance relationship, combined with the strong effect of adjustment on performance, indicates that PMO transformation functions as a stabilisation mechanism within the governance

system. Performance emerges from the interaction among capability, risk activation, and adjustment rather than from any single subsystem operating in isolation.

DISCUSSION

This study advances PMO research by examining Project Management Offices as adaptive governance systems, rather than as static organisational units or maturity-driven support functions. By integrating Capability (C), Risk Activation (R), Adjustment (A), and Performance (P) into a single explanatory framework, the findings provide a system-level explanation of how PMOs contribute to organisational performance under conditions of disturbance.

Reframing PMO Capability Beyond Linear Performance Effects

Consistent with prior studies, the results confirm that PMO capability is internally structured and hierarchically organised (Aubry et al., 2007; Aubry & Hobbs, 2011). Strategic alignment conditions governance standardisation and delivery support, which in turn shape downstream capability development. However, this study extends existing literature by demonstrating that strategic PMO capabilities do not exert direct performance effects.

Previous research has reported mixed and often contradictory findings regarding the value of strategic PMO roles (Aubry & Hobbs, 2011; Müller & Lecoivre, 2014). The present findings help resolve this inconsistency by showing that strategic capability functions as a conditioning structure rather than a performance lever. Its contribution lies in shaping governance coherence and response readiness, not in producing immediate performance gains.

This reframing moves PMO capability research away from accumulation and maturity logic toward an interaction-based interpretation of governance effectiveness.

Risk as an Activation Signal, not a Performance Determinant

A central contribution of this study is the empirical demonstration that risk activation does not directly impair organisational performance. This finding contrasts with dominant assumptions in project and PMO risk literature, where risk is typically treated as a negative factor to be minimised in order to improve outcomes (Andersen et al., 2007).

Consistent with governance-oriented perspectives (Müller et al., 2019; Pellegrinelli & Garagna, 2009), the results support an alternative interpretation in which risk functions as an activation signal. Risk becomes consequential only when it exposes misalignment that exceeds the stabilising capacity of existing governance arrangements. This distinction clarifies why organisations facing similar risk exposure often experience divergent performance outcomes.

By empirically separating risk visibility from performance impact, the study contributes a more precise conceptual role for risk within PMO governance research.

Adjustment as the Core Stabilisation Mechanism

The strongest relationship observed in the model is between adjustment—operationalised as PMO transformation—and performance. This finding reinforces prior observations that PMOs undergo recurrent reconfiguration in response to organisational pressures (Aubry, 2011; Joslin, 2022), but extends the literature by positioning transformation as the primary stabilisation mechanism. Where earlier studies describe PMO transformation as structural change or maturity evolution (Aubry & Hobbs, 2010), this study demonstrates that transformation mediates the effects of both capability and risk. Adjustment enables organisations to restore governance coherence once instability becomes visible, explaining why performance recovery depends less on baseline capability and more on adaptive response.

This insight reframes PMO value as a function of adaptive governance behaviour, rather than of role classification or functional scope.

Performance as an Emergent Governance Outcome

Taken together, the findings support a system-level interpretation of PMO effectiveness. Performance does not result from capability strength or risk avoidance in isolation, but emerges from the interaction among conditioning structures, activation signals, and adaptive response. This aligns with organisational governance research that conceptualises performance as an emergent property of systems under pressure (Müller et al., 2019; Pellegrinelli & Garagna, 2009).

By empirically validating this interaction pattern, the study moves beyond maturity-based and best-practice explanations of PMO performance and provides a governance-centric account of how PMOs sustain organisational coherence in dynamic project environments.

Implications for Urban Infrastructure and Construction Planning Governance

The system-level pattern identified in this study carries particular significance for PMOs operating within urban infrastructure and construction planning organisations, which formed the majority of the study sample. In these organisations, capability alone rarely stabilises governance outcomes, because urban development programmes are subject to overlapping planning approvals, shifting land-use regulations, and multi-agency coordination requirements that routinely expose misalignment regardless of an organisation's baseline capability.

The finding that risk activation does not directly impair performance, but instead triggers adjustment, suggests that planning-related disturbances, such as delayed permits, revised zoning requirements, or contested stakeholder mandates, function as signals that prompt PMOs to reconfigure coordination routines rather than as forces that inevitably degrade project outcomes. Correspondingly, the strong effect of adjustment on performance indicates that PMOs governing large-scale urban development projects sustain delivery coherence primarily through their capacity to transform mandates, reallocate authority, and reconfigure coordination mechanisms in response to planning governance pressures, rather than through static capability or risk avoidance alone. This positions PMO transformation as a planning governance capability in its own right, relevant to how urban infrastructure organisations sustain coordinated delivery across fragmented, multi-stakeholder development programmes.

Theoretical Implications

The study contributes to PMO and project governance literature in three ways. First, it reframes PMO capability as a conditioning structure rather than a direct performance driver, helping explain inconsistent findings in prior empirical research. Second, it positions risk as an activation signal rather than a determinant of performance outcomes. Third, it empirically establishes PMO transformation as a dynamic governance capability that stabilises organisational performance. For planning governance research specifically, these contributions suggest that PMO transformation should be treated as a distinct planning governance capability warranting further attention in studies of urban infrastructure delivery and large-scale development programme management, rather than being treated as a generic organisational process.

Together, these contributions advance understanding of PMOs as adaptive governance systems and provide a coherent explanation of how governance structures function under conditions of uncertainty and disturbance.

CONCLUSION

This study explains PMO effectiveness as an adaptive governance process rather than as a static organisational capability. Using the Capability–Risk–Adjustment–Performance (C–R–A–P) framework, the findings show that capability conditions governance stability, risk activates organisational response, and adjustment restores performance coherence. These findings are particularly relevant to PMOs operating within urban infrastructure and construction planning organisations, which constituted the majority of the study sample, underscoring the importance of adaptive planning governance capacity for sustaining coordinated delivery in large-scale urban development contexts.

The results demonstrate that risk does not directly impair performance and that strategic PMO capabilities do not yield performance effects unless enacted through organisational adjustment. Performance emerges from system interaction rather than linear cause–effect relationships. By reframing PMOs as adaptive governance systems, the study provides a coherent explanation for why organisations operating under comparable conditions may experience divergent outcomes.

Several limitations should be noted. The cross-sectional design limits observation of dynamic adjustment processes over time. Future research could adopt longitudinal approaches to examine how PMO transformation unfolds across different stages of disturbance. In addition, while the findings are theoretically transferable, empirical validation across sectors and institutional contexts would strengthen generalisability.

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