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The Effect of Project Management Office Effectiveness on Project Performance in Saudi Arabia's Giga-Project Sector

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Table of Contents

Table of Contents.....	2
Chapter 1: Introduction	3
1.1 Research Background.....	3
1.2 Research Problem	6
1.2.1 Theoretical Gaps	7
1.2.2 Practical Gaps	7
1.3 Research Significance	7
1.3.1 At the Theoretical Level.....	8
1.3.2 At the Practical/Empirical Level	8
1.4 Research Questions	9
Main Research Question.....	9
Research Sub-questions	9
1.5 Research Objectives.....	10
1.6 Research Hypotheses	10
1.7 Research Model.....	11
1.8 Research Methodology.....	12
1.9 Scope of the Study.....	15
1.10 The Suggested Project Structure.....	15
Chapter 2: Literature Review	17
2.1 Introduction	17
2.2 The Independent Variable: Project Management Office Effectiveness	17
2.3 The Dependent Variable: Project Performance	20
2.4 The Relationship Between the Independent and Dependent Variables	22
2.5 Conclusion	24
References	26

Chapter 1: Introduction

1.1 Research Background

Saudi Arabia's Vision 2030 program has put a massive set of demands on the country's project management infrastructure. Giga-projects such as NEOM, Red Sea Global, Qiddiya, and Diriyah Gate combine city-scale physical scope with compressed delivery timelines. Each has built a large, fast-growing network of contractors, subcontractors, and specialist consultants to run overlapping streams of design and construction at once, rather than in the sequential phases typical of conventional developments (Calabrese, 2026). Several of the highest-profile components have already needed rescoping, deferral, or a budget revision as delivery realities collided with the original ambitions (Calabrese, 2026). Calabrese's article is a policy commentary rather than an empirical study, so it is cited here as background on the delivery climate. The coordination structures wrapped around these projects remain unproven in practice. Recent modelling of project control systems across 222 completed Saudi construction projects found that 64% exceeded their planned schedule and 53% exceeded their planned budget (Alotaibi et al., 2025). Those figures describe the broader delivery environment giga-projects sit within, even though the study itself was not limited to giga-project sites.

Governments and private developers rely on one specific organizational structure to manage this kind of complexity, namely the Project Management Office, or PMO. A PMO is generally defined as a centralized or federated unit tasked with standardizing project governance, consolidating reporting, coordinating resources across a portfolio, and spreading project management practice through an organization (Hobbs & Aubry, 2010). In the giga-project case, that role stretches well beyond a single organization to a wider network of delivery partners. On a conventional development, a single project management team can absorb that role. Giga-project owners in Saudi Arabia have had to build PMO structures capable of governing dozens of concurrent contracts, a scale of coordination with few precedents in the regional construction sector. That scale raises a direct practical

question about whether these PMOs are improving delivery outcomes or are adding another administrative layer to an already strained system.

The relationship between PMO presence and project outcomes has been studied for roughly two decades, and most of that work reaches broadly similar conclusions. Hobbs and Aubry (2008) drew on a large, empirically grounded study of PMOs across multiple industries and found that PMOs vary enormously in structure and mandate. Even so, the more mature and better-resourced offices were consistently the ones associated with improved standardization, reporting discipline, and portfolio-level resource allocation. Hill (2004) took a different approach, proposing a five-stage competency continuum that describes how a PMO's function set expands as it matures, from basic project oversight and control at the lower stages toward strategic business alignment at the higher ones. On this view, a PMO's effectiveness depends on how far it has progressed along that continuum. Bae et al. (2008) tested the link directly, and their structural model showed project success factors shaping PMO capability, which in turn affected several dimensions of project performance. Their sample was limited to 132 valid responses, however, and the performance data was self-reported by the respondents themselves, so the strength of the reported association should be treated with some caution. Sandhu et al. (2024) surveyed staff across nineteen project-based organizations and reached a similar conclusion, rating methodology development and performance monitoring among a PMO's most valuable contributions. That study asked respondents how valuable each PMO role was rather than measuring delivery outcomes directly, which is a different kind of evidence. The literature therefore supports a general expectation that better-developed PMOs are associated with better project outcomes, although a large part of the supporting evidence rests on practitioner perception.

Whether that general expectation holds under the operating conditions of a giga-project, including in Saudi Arabia, remains an open question. Two recent Saudi-based studies address related issues without answering it directly. Alghaseb and Alali (2024) compared three PMO structural models (enterprise, program, and centre-of-excellence) against public

construction projects in Hail, and found the Enterprise PMO model to be the dominant fit. This identifies which model owners tend to adopt, but it does not establish whether that choice improves schedule, cost, or quality outcomes. The sample is also restricted to public construction projects in a single administrative region, which limits how far the finding can be generalized to giga-project delivery. Alotaibi et al. (2025) approach the problem differently, modelling project control system effectiveness across Saudi construction delivery more broadly, and report that organizational, human, and technological inputs all shape control outcomes. Their unit of analysis is the project rather than the PMO, and control-system effectiveness is measured as a composite, so the model does not identify which individual governance or monitoring function accounts for the effect. For the purposes of this research, both studies share the same limitation: neither breaks its outcome measures down into the specific PMO functions examined here, and neither restricts its sample to giga-project-scale developments.

The evidence base is thinner still at megaproject scale. Zani et al. (2024) conducted the largest systematic literature review of megaproject organization design to date, screening more than ten thousand articles, and organizational capability emerged repeatedly as a theme. They conclude that the field still lacks a settled understanding of which design choices, PMO structure among them, drive performance at megaproject scale, and their review calls explicitly for more empirical work connecting those design choices to measurable outcomes.

Most PMO effectiveness research, though, has been done in conventional single-project or single-organization settings. A giga-project PMO works differently. It coordinates an unusually large and rapidly scaling network of contractors and subcontractors, often from different countries and regulatory backgrounds, all delivering interdependent packages of work under compressed timelines. Governance, resource oversight, knowledge management, monitoring: these are the functions that make a PMO “effective” in a conventional corporate setting. Whether they translate cleanly to a coordination problem

this size is a different question, one that particularly matters within Saudi Arabia's giga-project sector.

Giga-project owners, boards, and program-management consultancies operating in Saudi Arabia are currently deciding how much to invest in PMO structures, what functions to prioritize, and how to justify that investment to stakeholders and financiers. Mostly, they are doing this without local empirical evidence linking specific PMO functions to delivery outcomes. Project management professionals working inside these PMOs face the same difficulty. They lack a clear, evidence-based picture of which of their functions have a measurable effect on schedule, cost, and quality performance, and which do not. These programs are already absorbing the schedule and budget pressure documented by Calabrese (2026) and Alotaibi et al. (2025), and getting the allocation of PMO effort right affects whether these giga-projects stay within the budgets now being renegotiated.

The present study examines the relationship between Project Management Office effectiveness and project performance within Saudi Arabia's giga-project sector. It breaks PMO effectiveness down into its separate functional dimensions, so that the relationship can be tested with more precision than a single composite PMO variable would allow, or a single composite control-systems variable of the kind used by Alotaibi et al. (2025). It applies organizational capability theory and Resource-Based View reasoning to a context in which that framework has rarely been tested at this level of functional detail. The study is preparatory in nature, and lays the empirical and methodological groundwork for a survey-based investigation of that relationship among project management professionals working within or alongside giga-project PMO structures.

1.2 Research Problem

The evidence connecting PMO effectiveness to project performance is reasonably consistent, but it was gathered somewhere else. Almost all of it comes from conventional single-project or corporate program environments. Saudi-based work does exist, although it sits to one side of the question: Alghaseb and Alali (2024) examine which PMO structural

model owners prefer, and Alotaibi et al. (2025) model control-system effectiveness across construction delivery in general. Neither measures the functional effectiveness of a PMO against delivery outcomes at giga-project scale.

1.2.1 Theoretical Gaps

Bae et al. (2008) and Sandhu et al. (2024) established a general link between Project Management Office effectiveness and project performance, but both worked in conventional corporate and program-level settings. The individual functional dimensions are the part that has not been separated out. Governance and standardization, resource and portfolio oversight, knowledge management, and monitoring and reporting are normally folded into a single composite measure, so how each of them drives performance once the setting shifts to megaproject and giga-project delivery has not been established (Zani et al., 2024).

1.2.2 Practical Gaps

The Saudi giga-project sector has barely been examined on this question at all. Its PMO structures were assembled quickly, under schedule pressure, to coordinate contractor networks that were themselves still growing. Whether those structures protect the schedule, cost, and quality outcomes they were set up to protect is not documented in the published literature.

The study therefore asks:

How does Project Management Office Effectiveness influence Project Performance in Saudi Arabia's giga-project sector?

1.3 Research Significance

Two audiences have a stake in the answer. One is the research literature on project organizations. The other is the giga-project leadership in Saudi Arabia currently deciding how much PMO capacity to fund.

1.3.1 At the Theoretical Level

Organizational capability theory and the Resource-Based View provide the theoretical grounding (Barney, 1991; Teece et al., 1997). Under both, a PMO is a capability rather than a department: a bundle of governance routines, coordination knowledge, and monitoring processes. Where that bundle is well developed it is valuable and hard for other project organizations to copy quickly, which is what makes it a plausible source of better project outcomes. The dynamic-capabilities extension in Teece et al. (1997) matters more here than it would in a conventional setting. It deals with a firm's capacity to reconfigure its capabilities as conditions change, and giga-project PMOs depend on precisely that, since their governance and coordination routines have to scale as the contractor network around them grows.

Applying the framework at giga-project scale is a test of its reach. The capability explanation of PMO effectiveness was developed and validated mainly in single-project and conventional program contexts, and whether it extends to an unusually large, rapidly scaling contractor base has not been shown. Zani et al. (2024) called for exactly this kind of empirical work linking organizational design choices to measurable performance outcomes in megaproject research. There is a second contribution as well. Testing the relationship at the level of individual functional dimensions, rather than through one composite variable, takes capability theory further than most PMO research has taken it, and the findings may help refine how these frameworks are applied to megaproject-scale organizations.

1.3.2 At the Practical/Empirical Level

Decisions about PMO investment are being made now, against the budget renegotiations Calabrese (2026) describes and the delivery variance Alotaibi et al. (2025) reports. Owners have to choose how much PMO capacity to fund and which functions to prioritize, and at present they are choosing without local evidence. Findings from the empirical study would feed directly into that. Suppose monitoring and reporting turns out to carry more weight

for schedule and cost performance than knowledge management does. That would give an owner a concrete basis for directing limited PMO resources. The findings would also sit alongside Alghaseb and Alali (2024), who identified which structural model Saudi construction projects adopt, by adding evidence on which functions inside that model matter most.

There is a practitioner audience as well. Project management professionals inside these PMOs coordinate a large, multi-national supplier base, and conventional PMO guidance was written for single-organization projects. It does not address that problem well. NEOM, Red Sea Global, Qiddiya, and Diriyah Gate are all in delivery simultaneously, which puts an unusual number of active giga-project PMOs inside one country. Evidence drawn from them would be useful to owners, to policymakers, and to the program-management consultancies working across the wider Gulf giga-project pipeline.

1.4 Research Questions

Main Research Question

How does Project Management Office Effectiveness influence Project Performance in Saudi Arabia's giga-project sector?

Both variables are measured through a structured survey of professionals working in and around these PMOs.

Research Sub-questions

1. How does the governance and standardization function of Project Management Offices relate to project performance in Saudi Arabia's giga-project sector?
2. To what extent does resource and portfolio oversight affect project performance in these giga-projects?
3. What is the impact of knowledge management and best-practice dissemination on project outcomes in the Saudi giga-project context?

4. How does the PMO's monitoring and reporting function influence overall project performance?

1.5 Research Objectives

1. To examine the current effectiveness of Project Management Offices in Saudi Arabia's giga-project sector.
2. To identify the key challenges faced by Project Management Offices in supporting project performance in this sector.
3. To evaluate the strength and direction of the relationship between Project Management Office effectiveness and project performance.
4. To propose recommendations for improving Project Management Office effectiveness in giga-project contexts.
5. To generate insights for future research on Project Management Offices in megaproject settings.

1.6 Research Hypotheses

The null hypothesis (H0) states that there is no statistically significant relationship between Project Management Office Effectiveness and Project Performance in Saudi Arabia's giga-project sector. The alternative hypothesis (H1) states that there is a statistically significant positive relationship between the two variables.

Four sub-hypotheses are proposed, one for each of the PMO functional dimensions:

- H1a: The governance and standardization function of the PMO has a statistically significant positive relationship with project performance in Saudi Arabia's giga-project sector.

- H1b: Effective resource and portfolio oversight positively impacts project performance in these giga-projects.
- H1c: There is a statistically significant positive relationship between PMO knowledge management practices and overall project outcomes.
- H1d: The monitoring and reporting function of the PMO relates positively and significantly to project performance in the Saudi giga-project context.

1.7 Research Model

The research model treats Project Management Office Effectiveness as four functional dimensions, consistent with the PMO typology and competency literature (Hill, 2004; Hobbs & Aubry, 2008, 2010): (1) Governance and Standardization, (2) Resource and Portfolio Oversight, (3) Knowledge Management and Best-Practice Dissemination, and (4) Monitoring and Reporting. Project Performance is measured using the iron-triangle tradition (Atkinson, 1999): Schedule/Time Performance, Cost Performance, and Quality/Technical Performance. Each dimension is hypothesized to relate to Project Performance separately (see Figure 1).

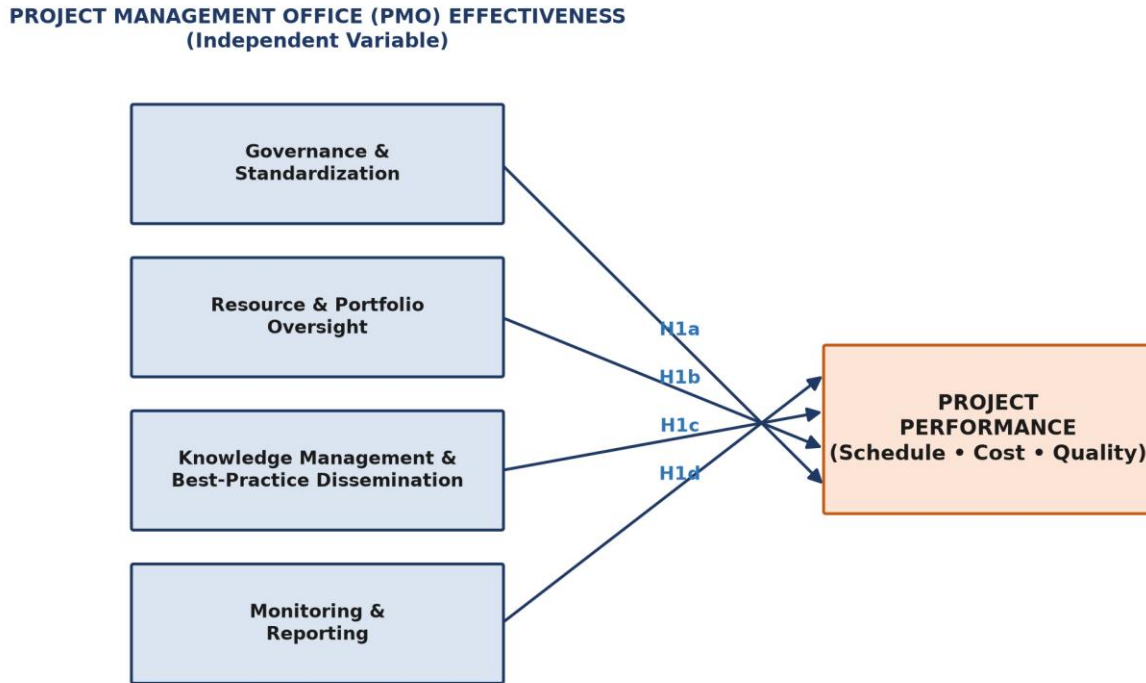


Figure 1: The Proposed Research Model

1.8 Research Methodology

The methodological choices made in this study follow from the nature of the research question, and are set out below with reference to Saunders et al.'s (2019) Research Onion. The question asks whether one measurable property of an organization relates to another. This requires treating Project Management Office effectiveness and project performance as constructs that exist independently of the researcher and can be captured through observable, quantifiable data, which is a positivist position (Saunders et al., 2019). An interpretivist stance would suit a different study, one concerned with how individual PMO staff experience and make sense of their roles, but it would not answer the question set out in Section 1.2. A deductive approach follows for the same reason. The study begins from an established theoretical position, organizational capability theory and the Resource-Based View (Barney, 1991; Teece et al., 1997), derives testable hypotheses from it (Section 1.6), and then collects data to test them, rather than building theory upward from raw observation.

A quantitative method follows from these commitments. Constructs defined as measurable, and hypotheses stated in advance, require numerical scale scores, which a structured questionnaire can produce. The planned analysis is correlation and regression, following the modelling approach used by Alotaibi et al. (2025) in a related Saudi construction context. The design is described as both a survey and a correlational study, since these two terms refer to different things. The survey is the data-collection method, a structured questionnaire administered to a sample of respondents, while “correlational” is the analytical classification, since the study tests the strength and direction of a relationship between two variables without manipulating either one experimentally. A limitation of this design is that it cannot establish that PMO effectiveness causes better project performance, only that the two variables are associated. Data will be collected at a single point in time from respondents across the giga-project sector, rather than tracking the same respondents or projects longitudinally, which makes the design cross-sectional. This suits the time available and the relationship-testing purpose of the study, although it means that any association observed reflects a single point in time, in organizations that Aubry et al. (2010) show continue to change (see Figure 2).

The planned instrument will adapt items from established PMO and project-performance measurement traditions rather than developing an unvalidated scale from scratch. On the PMO Effectiveness side, item development will draw on Hill's (2004) competency-continuum functions and on the functional dimensions validated in Hobbs and Aubry's (2008, 2010) empirically grounded typology research, with Pemsel and Wiewiora's (2013) knowledge-broker items supplementing the knowledge-management dimension specifically. On the Project Performance side, item development will draw on Atkinson's (1999) time, cost, and quality criteria as applied in subsequent construction and megaproject performance-measurement research. Several named “PMO maturity model” instruments circulate in the practitioner literature, but their structural details, such as the number of focus areas or capability dimensions claimed, vary inconsistently from one source to the next. This proposal therefore bases its instrument description on sources

whose functional content can be independently confirmed. Final instrument selection, and any permissions needed to use a validated scale, will be settled before data collection begins.

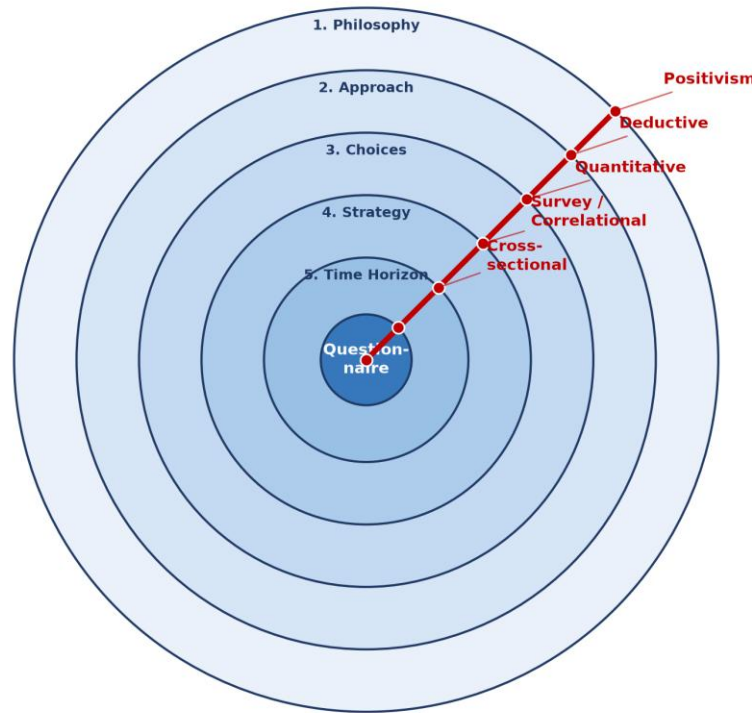


Figure 2: The Research Onion, Adapted From Saunders et al. (2019), With This Study's Methodological Path Marked

Target Population: Project management professionals working within or alongside Project Management Office structures in Saudi Arabia's giga-project sector (e.g., PMO analysts, project controls staff, project managers, and program management consultancy staff assigned to giga-project developments such as NEOM, Red Sea Global, Qiddiya, and Diriyah Gate).

Target Sample Size: Approximately 150–200 respondents. This range is consistent with the sample sizes used in comparable PMO- and project-control-performance survey research (e.g., Bae et al., 2008, analyzed 132 valid responses; Sandhu et al., 2024, analyzed 268 valid responses out of 450 distributed; Alotaibi et al., 2025,

analyzed data from 222 completed projects). It should give sufficient statistical power for the correlational and regression analysis, while staying realistic given how hard this specialized population is to reach. No formal power calculation has been run at this stage, so the range rests on precedent rather than on a computed effect size, and it will be revisited once the instrument is finalized.

Sampling, data collection, and statistical analysis belong to the next phase of the research.

1.9 Scope of the Study

The study is bounded to Saudi Arabia's giga-project sector: NEOM, Red Sea Global, Qiddiya, and Diriyah Gate. These developments were selected because they depend on PMOs to coordinate large contractor networks, which is the condition the research question is about. Respondents will be PMO staff, project controls specialists, and program managers working inside them. This population is reachable through professional networks and project management associations in the Kingdom.

Respondents will be reporting on the performance of projects run by their own employers, so data collection follows standard workplace ethical guidelines. Participation is voluntary, responses stay confidential, and the instrument does not ask for commercially sensitive financial data. The boundary on what the findings can claim is a similar one. Four developments in a single country can describe how giga-project PMOs operate in that country. They cannot describe smaller, single-organization construction projects, and no such transfer is claimed here.

1.10 The Suggested Project Structure

This research is organized into five chapters. Chapter 1 introduces the research background, problem, significance, questions, objectives, hypotheses, model, methodology, and scope. Chapter 2 reviews the literature on the independent variable, the dependent variable, and the relationship between them. Chapter 3 sets out the instrument

design, sampling procedure, and data collection protocol. Chapter 4 reports the descriptive statistics, reliability testing, and the correlation and regression analysis of the collected survey data. Chapter 5 discusses the findings and draws out the theoretical and practical implications, the limitations, and the recommendations for future research.

Chapter 2: Literature Review

2.1 Introduction

Research on Project Management Offices has grown steadily since the early 2000s, and most of it reaches a similar conclusion. The more developed a PMO's functions are, the better its projects tend to perform. Very little of that evidence comes from megaproject or giga-project settings, and none of it from Saudi Arabia's giga-projects specifically.

2.2 The Independent Variable: Project Management Office Effectiveness

A Project Management Office is most usefully understood not as a single standardized structure but as an organizational unit whose form and mandate vary considerably across contexts. Hobbs and Aubry's (2010) multi-year, empirically grounded research program established this, and it remains one of the most widely cited efforts to define what PMOs actually do in practice, rather than what they are assumed to do. A cluster of follow-up studies backs this up from a different angle, that of change over time: Aubry et al. (2008) traced four organizations' PMO history and found that PMOs evolve, get reconfigured, and sometimes disappear entirely as priorities shift; Hobbs et al. (2008) found much the same across eleven organizational transformations; and Aubry et al. (2010) confirmed it again across seventeen case-study organizations. Treating the presence or absence of a PMO as a simple binary variable therefore fails to capture this variation. This study follows that logic. Through the lens of organizational capability theory and the Resource-Based View (Barney, 1991; Teece et al., 1997), it treats PMO effectiveness as a variable property of an organizational capability: a bundle of governance routines, coordination knowledge, and monitoring processes. Where those routines are well developed, they are valuable and hard for other project organizations to replicate quickly, and so capable of generating superior outcomes. A PMO is effective, under this framing, to the extent that its governance, resourcing, knowledge, and monitoring routines are developed, embedded, and used.

Hobbs and Aubry's (2008) empirically grounded typology research, based on data collected across a large multi-industry sample of PMOs, found that the functions PMOs perform cluster into recognizable groups rather than varying randomly, which supports treating PMO effectiveness as a multi-dimensional construct instead of a single composite score. Hill (2004) builds on this idea with a five-stage competency continuum, in which PMO functions expand from basic project-level oversight and control toward broader resource integration, technical support, and ultimately strategic business alignment as the PMO matures. Hill's continuum groups the twenty functions of a mature PMO under headings that map closely onto the four functional dimensions used in this study. Monteiro et al.'s (2025) more recent systematic analysis of the PMO typology literature confirms that the field still lacks full consensus on a single PMO functional taxonomy, despite two decades of research since Hill (2004) and Hobbs and Aubry (2008). A further limitation of this literature is the age of its core frameworks. The functional vocabulary most PMO research still relies on was established by Hill (2004) and Hobbs and Aubry (2008), before the current generation of program-scale delivery organizations existed, and it has largely been extended since rather than retested at that scale. Partly for that reason, this study anchors its own four dimensions in specific, independently verifiable functions identified across multiple typology studies, instead of adopting any single author's complete framework wholesale. Pemsel and Wiewiora (2013) contribute a further refinement specific to one of the four dimensions used here, finding that PMOs are widely expected to act as knowledge brokers between individual projects and between projects and top management. Their study also cautions that the literature at the time had not produced strong evidence that PMOs fulfill this brokering role as consistently as the expectation assumes. This study's knowledge-management dimension is designed with that caveat in mind: it tests the brokering claim rather than assuming it holds.

Building on this literature, the present study breaks PMO effectiveness down into four functional dimensions, summarized in Table 1: (1) the governance and standardization function, covering the PMO's role in setting and enforcing consistent project management

methodology and reporting standards across the giga-project's contractor base; (2) the resource and portfolio oversight function, covering the PMO's role in allocating and monitoring shared resources across the giga-project's concurrent work packages; (3) the knowledge management and best-practice dissemination function, covering the PMO's role in capturing lessons learned and circulating best practice among the giga-project's many delivery partners; and (4) the monitoring and reporting function, covering the PMO's role in tracking and escalating schedule, cost, and quality performance data across the portfolio.

Table 1: Functional Dimensions of Project Management Office Effectiveness Used in This Study

Dimension	Definition	Key Source(s)
Governance & Standardization	Setting and enforcing consistent project management methodology, processes, and reporting standards across the PMO's sponsored projects and contractors.	Hill (2004); Hobbs & Aubry (2008)
Resource & Portfolio Oversight	Allocating, tracking, and rebalancing shared resources (staff, budget, equipment) across concurrent projects within the portfolio.	Hobbs & Aubry (2010); Aubry et al. (2010)
Knowledge Management & Best-Practice Dissemination	Capturing lessons learned and circulating best practice among project teams and delivery partners.	Pemsel & Wiewiora (2013); Hill (2004)
Monitoring & Reporting	Tracking schedule, cost, and quality performance data and escalating issues to project sponsors and leadership.	Sandhu et al. (2024); Bae et al. (2008)

Source: Author's synthesis, based on Hill (2004), Hobbs & Aubry (2008, 2010), Aubry et al. (2010), Pemsel & Wiewiora (2013), Sandhu et al. (2024), and Bae et al. (2008).

A smaller body of work tests PMO capability directly against outcomes instead of just describing PMO structures, and it generally finds a positive association. Bae et al. (2008), using a structural model tested via partial least squares on 132 valid responses, found that PMO capability, a composite of knowledge management, resource management, and problem-solving competency, was shaped by earlier project success factors and in turn

affected multiple dimensions of project performance, one of the more direct empirical links between PMO functional capability and project outcomes anywhere in this literature. Sandhu et al. (2024) report a similar result from survey data. Across 268 respondents in nineteen project-based organizations, PMO roles tied to methodology development and to monitoring and controlling project performance were rated among the most valuable of the PMO's contributions to strategic execution, which corresponds to two of the dimensions used in this study's model, monitoring and reporting, and governance and standardization. Within Saudi Arabia specifically, Alghaseb and Alali (2024) found that public construction projects in Hail favored an Enterprise PMO structure over program-office or centre-of-excellence alternatives, evidence that Saudi project owners are making deliberate PMO design choices, even if that particular study measured model preference rather than functional effectiveness against performance outcomes. Nearly all of these samples come from conventional corporate, IT, or single-organization program contexts. Megaproject and giga-project settings are almost absent from the evidence base.

2.3 The Dependent Variable: Project Performance

This study measures Project Performance using the efficiency-focused “iron triangle” tradition established by Atkinson (1999): schedule/time performance, cost performance, and quality/technical performance, that is, whether a project is delivered on time, on budget, and to its specified technical and quality standards. Defined this way, Project Performance is deliberately narrower than “Project Success,” a related but distinct construct. Project Success typically pulls in a wider set of criteria, including stakeholder satisfaction, strategic benefit realization, and broader organizational impact beyond the immediate delivery constraints. Atkinson (1999) himself argues that the iron triangle, while historically dominant, is an incomplete measure of overall project success, and proposes a broader alternative he calls the Square Route. This study sticks with the narrower iron-triangle measure instead, which keeps Project Performance and Project Success separate rather than conflating them.

Time and cost performance are typically measured through variance-based indicators: actual schedule duration or actual cost, compared against the originally baselined plan. Quality and technical performance, by contrast, tend to be measured through defect or non-conformance rates, rework levels, or compliance with specified technical requirements. Construction and megaproject research adds its own sector-specific indicators, but this study uses a narrower measure of project efficiency only, covering time, cost, and quality/safety combined. Broader dimensions such as stakeholder satisfaction fall outside that measure and are deliberately excluded, to preserve the distinction from Project Success noted above. Within the Saudi construction sector specifically, Alotaibi et al.'s (2025) modelling of 222 completed projects found that 64% exceeded planned schedule and 53% exceeded planned budget (see Figure 3). Time and cost variance remain the operational performance indicators most readily available, and most consistently tracked, by project organizations in this market.

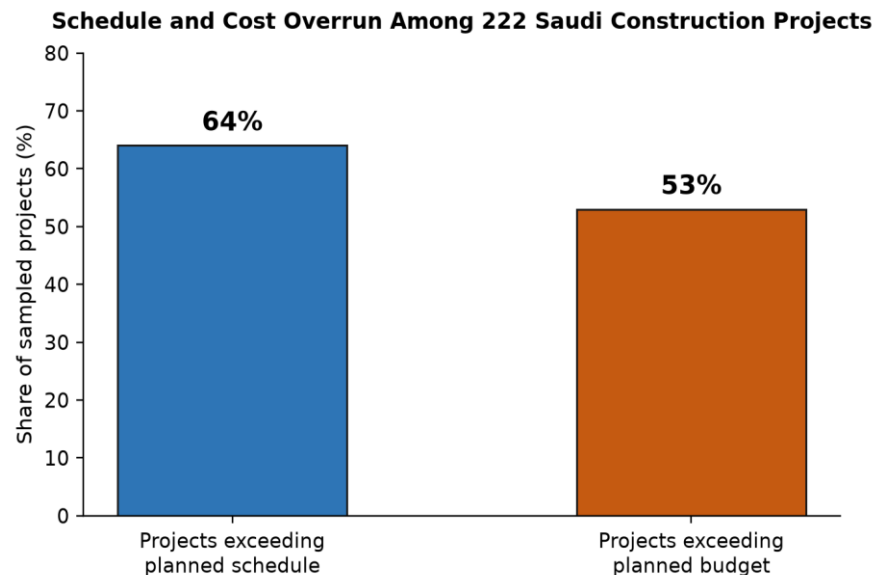


Figure 3: Schedule and Cost Overrun Among 222 Saudi Construction Projects, Based on Data Reported by Alotaibi et al. (2025)

The iron-triangle tradition remains the most widely used operational definition of project performance in both conventional and megaproject research. Part of the reason is practical: its three dimensions (time, cost, quality) can be measured using data that most project

organizations already track for internal reporting purposes. That is an advantage for survey-based research that relies on respondent self-report of performance outcomes, as this study's own data collection will.

2.4 The Relationship Between the Independent and Dependent Variables

A positive relationship between PMO effectiveness and project performance is plausible on theoretical grounds, and several studies have demonstrated it empirically. The theoretical mechanism comes from organizational capability theory, the Resource-Based View, and its dynamic-capabilities extension (Barney, 1991; Teece et al., 1997): a well-developed PMO is an organizational capability that reduces variance in project execution by standardizing governance, coordinating resource allocation, disseminating knowledge, and tightening monitoring and escalation. Each of those actions plausibly lowers the risk of schedule slippage, cost overrun, or quality failure. Empirically, Bae et al. (2008) and Sandhu et al. (2024) each back this up directly or closely, and Hobbs and Aubry's (2008, 2010) foundational typology work supplies much of the vocabulary this study borrows, alongside the studies on how PMOs evolve over time (Aubry, Hobbs, & Thuillier, 2008; Hobbs, Aubry, & Thuillier, 2008; Aubry, Müller, Hobbs, & Blomquist, 2010). This study borrows that vocabulary of governance, resourcing, knowledge, and monitoring to break the relationship into testable sub-hypotheses. One caution should be carried forward, however. Pemsel and Wiewiora (2013) found that the PMO's knowledge-broker role is expected but not always empirically confirmed. Not every PMO function should be assumed, in advance, to relate equally strongly to performance, which is exactly why the four functional dimensions are tested as separate sub-hypotheses (Section 1.6) rather than folded into one composite predictor.

Table 2 below summarizes the empirical studies most directly relevant to this relationship, including the two Saudi-specific studies identified during the literature search for this proposal.

Table 2: Prior Empirical Studies Relevant to the Relationship Between PMO Effectiveness and Project Performance

Author(s) & Year	Context / Sample	Key Finding Relevant to This Study
Bae, Kim, & Kim (2008)	132 valid responses; PLS structural model	PMO capability (knowledge, resource, problem-solving) is shaped by project success factors and, in turn, affects project performance.
Sandhu, Al Ameri, Shahzad, & Naseem (2024)	268 respondents across 19 project-based organizations	Methodology development and monitoring/controlling performance rated among the most valuable PMO roles in strategic execution.
Alghaseb & Alali (2024)	Public construction projects, Hail, Saudi Arabia	Enterprise PMO model is the dominant fit; addresses PMO model choice, not the functional-effectiveness-to-performance link.
Alotaibi, Sohail, & Soetanto (2025)	222 completed Saudi construction projects	64% of projects exceeded planned schedule and 53% exceeded planned budget; organisational, human, and technological inputs shape control effectiveness.
Zani, Denicol, & Broyd (2024)	Systematic review; 141 articles from 10,078 screened	Organisational capability is a recurring theme in megaproject research, but the PMO-performance link at megaproject scale remains empirically unsettled.
Pemsel & Wiewiora (2013)	Literature-based review of the PMO knowledge-broker role	PMO knowledge-brokering is widely expected but not consistently evidenced empirically.

Source: Author's synthesis of the studies cited in Sections 1.1, 2.2, 2.3, and 2.4.

No study, however, has tested whether that relationship holds with the same strength, or along the same functional dimensions, once the setting shifts to a megaproject or gigaproject. Zani et al.'s (2024) systematic review, the largest of its kind conducted to date, reaches the same conclusion for megaproject organization design more generally: the field

still lacks a settled empirical understanding of which design choices, PMO structure among them, drive performance outcomes at that scale. The general PMO-performance link is reasonably well established in conventional project and program contexts. Its extension to the unusually large, fast-scaling, multi-contractor coordination problem that defines a giga-project PMO has not been directly tested. The closest Saudi evidence sits on either side of that question without closing it: Alghaseb and Alali (2024) show which PMO model Saudi public construction projects tend to adopt, while Alotaibi et al. (2025) show that Saudi construction projects generally, giga-projects included, face substantial schedule and cost variance. Neither answers whether PMO functional effectiveness, broken down the way this study proposes, statistically relates to that variance. The survey proposed here tests each of the four functional dimensions separately against that open question, applying an established framework in a new context rather than claiming a wholly new theoretical contribution.

2.5 Conclusion

Two decades of PMO research converge on a reasonably stable expectation. A PMO that has developed its governance, resourcing, knowledge, and monitoring routines far enough to function as an organizational capability should reduce variance in project delivery (Barney, 1991; Teece et al., 1997). Hobbs and Aubry (2008, 2010) and Hill (2004) give that capability a functional vocabulary precise enough to measure, although the capability itself does not stay fixed. Aubry et al. (2008) and Hobbs et al. (2008) both found that PMOs change shape over time, and Aubry et al. (2010) reported the same pattern across seventeen organizations. Measured against Atkinson's (1999) iron triangle, this expectation has generally held up in conventional project and program settings, with both Bae et al. (2008) and Sandhu et al. (2024) reporting support for it. Pemsel and Wiewiora (2013) are more cautious, though, noting that not every PMO function delivers what is expected of it.

That evidence, however, stops at conventional project and program scale. The Saudi research available so far establishes which PMO model owners tend to adopt (Alghaseb &

Alali, 2024) and how much schedule and cost variance the sector carries (Alotaibi et al., 2025), but neither line of work shows whether PMO functional effectiveness explains that variance. Zani et al. (2024) report much the same absence across megaproject research more generally. This study's four-dimension model responds to precisely that shortfall, testing each function on its own rather than folding them into one composite measure. Chapter 3 develops the instrument and sampling procedure needed to do so.

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