



The Impact of Project Initiation Practices and Scope Definition on Time and Cost Overruns: A Field Study in the Construction Sector in Saudi Arabia

أثر ممارسات بدء المشروع وتحديد نطاق العمل على تجاوزات الوقت والتكلفة: دراسة ميدانية في قطاع التشييد بالمملكة العربية السعودية

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Abstract

Objectives: This study empirically investigates the impact of front-end project initiation practices and scope definition quality on mitigating time delays and cost overruns within construction projects in the Kingdom of Saudi Arabia (KSA).

Study Location: Major infrastructure, real estate, and industrial construction hubs across Saudi Arabia.

Methodology: A quantitative, cross-sectional field research design was implemented. Primary data was gathered using a structured, five-point Likert-scale questionnaire administered to a purposive sample of N=50 verified construction professionals, including project managers, site engineers, planning engineers, client-side consultants, and general contractors. Data was analyzed using SPSS via Cronbach's Alpha internal consistency testing, bivariate Pearson correlation matrices, and Ordinary Least Squares (OLS) multiple regression models.

Results: The OLS multiple regression models demonstrated that project initiation practices and scope definition quality account for 73.8% of the variance in project time overruns (Adjusted $R^2 = 0.738$, $F = 69.81$, $p < 0.001$) and 70.9% of the variance in cost overruns (Adjusted $R^2 = 0.709$, $F = 60.75$, $p < 0.001$). Scope definition quality emerged as the dominant predictor for budget adherence ($\beta = 0.514$, $t = 3.253$, $p = 0.002$), while robust initiation practices significantly insulated project schedules from slippage ($\beta = 0.428$, $t = 3.194$, $p = 0.002$).

Recommendations: Public and private project stakeholders, institutional investors, and policymakers must mandate rigorous front-end planning, detailed Work Breakdown Structures (WBS), and comprehensive project charters prior to capital allocation to curb execution-phase overruns and support the strategic objectives of Vision 2030.

Keywords: Project Initiation Practices, Scope Definition Quality, Time Overruns, Cost Overruns, Saudi Arabia Construction, Vision 2030.

المستخلص

تبحث هذه الدراسة تجريبياً في أثر ممارسات البدء في المشروع وجودة تحديد النطاق في الحد من: **أهداف الدراسة** التجاوزات الزمنية وتجاوزات التكاليف في مشاريع البناء والتشييد في المملكة العربية السعودية.

المراكز الرئيسية للبنية التحتية، التطوير العقاري، والمشاريع الصناعية في المملكة العربية السعودية: **موقع الدراسة**

تم استخدام المنهج الكمي المقطعي، حيث جُمعت البيانات الأولية عبر استبانة محوسبة ومنهجية باستخدام: **المنهجية** متخدماً من المتخصصين المعتمدين في إدارة المشاريع (مديرو مشاريع، مهندسو (N = 50) أسلوب العينة القصدية لـ مواقع، مهندسو تخطيط، استشاريون، ومقاولون). وقد غُلِجت البيانات إحصائياً باستخدام الحزم الإحصائية للعلوم لاختبار الثبات عبر معامل ألفا كرونباخ، وارتباط بيرسون الثنائي، وتحليل الانحدار المتعدد (SPSS) الاجتماعية (OLS). بطريقة مربعات الفروق الصغرى العادية.

أظهرت نماذج الانحدار المتعدد أن ممارسات بدء المشروع وتحديد النطاق تفسر 73.8% من التباين في **النتائج** ، وتفسر 70.9% من التباين في $(Adjusted R^2 = 0.738, F = 69.81, p < 0.001)$ التجاوزات الزمنية ، وقد تبين أن جودة تحديد النطاق تشكل $(Adjusted R^2 = 0.709, F = 60.75, p < 0.001)$ تجاوزات التكاليف ، بينما أسهمت ممارسات البدء في حماية $(beta = 0.514, t = 3.253, p = 0.002)$ مُنبأً مهمناً لضبط الميزانية ، الجدول الزمني بفاعلية $(beta = 0.428, t = 3.194, p = 0.002)$.

ضرورة التزام أصحاب المصلحة وصناع القرار بفرض متطلبات التخطيط الأمامي الصارم، وتطوير **التوصيات** ، وإعداد موثيق شاملة للمشاريع قبل ضخ رأس المال للحد من تعثر التنفيذ في (WBS) هياكل تفصيلية لتقسيم العمل ، ظل رؤية السعودية 2030.

ممارسات البدء في المشروع، جودة تحديد النطاق، التجاوزات الزمنية، تجاوزات التكلفة، قطاع **الكلمات المفتاحية** الإنشاءات السعودية، رؤية السعودية 2030.

1. Introduction and Background

The global construction and real estate development sector acts as a fundamental catalyst for physical infrastructure, economic expansion, and urbanization. Within the Kingdom of Saudi Arabia (KSA), the construction industry has assumed an unprecedented level of strategic importance under the transformative umbrella of Vision 2030. With hundreds of billions of dollars channeled into giga-projects such as NEOM, the Red Sea Project, Diriyah Gate, and extensive national rail and transport corridors the efficiency, predictability, and economic viability of project delivery mechanisms are paramount to national development goals.

However, modern capital projects are characterized by extreme technical complexity, multi-stakeholder friction, volatile supply chains, and a historically persistent vulnerability to performance failures. These failures primarily manifest as schedule overruns (time delays) and budget escalations (cost overruns). Project management literature confirms that traditional project management paradigms, which focus heavily on execution-phase controls, are insufficient when foundational errors occur during early development cycles.

Front-end loading (FEL) the strategic allocation of intellectual and financial resources during project initiation and planning phases has emerged as a vital safeguard. According to the Project Management Institute (PMI) and global engineering standards, project initiation establishes the contractual, governance, and operational baseline for all subsequent engineering, procurement, and construction (EPC) activities. Core instruments such as the Project Charter and Project Scope Definition establish the functional parameters within which projects operate. Despite widespread academic recognition of front-end planning value, practical implementation gaps remain pervasive. Ambiguous scope baselines, unverified technical assumptions, and weak governance structures routinely trigger cascading downstream impacts, including rampant scope creep, adversarial contractual disputes, change order congestion, and chronic project overruns. This extended study investigates these systemic vulnerabilities, providing an empirical evaluation of how early-stage initiation practices and scope definition quality influence final project delivery metrics in Saudi Arabia.

2. Statement of the Research Problem

Despite monumental technological advancements in specialized construction management software, Building Information Modeling (BIM) integration, and an accelerating influx of professional accreditations among regional engineers and directors, construction projects within the Kingdom of Saudi Arabia (KSA) continue to encounter substantial, systemic deviations from baseline schedules and budgets. Historically, both academic literature and industrial post-mortem evaluations have exhibited a myopic concentration on execution-phase symptoms such as localized supply chain bottlenecks, periodic cash flow interruptions, specialized skilled labor shortages, and protracted bureaucratic permitting processes. While these operational friction points undoubtedly exacerbate project distress, treating them as primary root causes represents a fundamental misdiagnosis of industry pathology, entirely overlooking the structural defects embedded deeply within the front-end initiation phase.

A critical, unaddressed research gap persists in systematically quantifying how upstream, front-end deficiencies in the Project Charter and baseline Scope Definition directly translate into downstream operational time overruns and cost escalations. When capital projects are initiated under compressed schedules with unclear organizational authority lines, poorly articulated governance frameworks, unrefined Work Breakdown Structures (WBS), and unverified stakeholder expectations, they inherently generate severe information asymmetries and structural contractual vulnerabilities.

Consequently, project participants particularly general contractors and client-side consultants frequently clash over divergent interpretations of baseline deliverables, leading to extensive variation orders, contested financial claims, and protracted dispute resolution proceedings. This empirical study bridges this critical gap by isolating project initiation practices and scope definition quality as core independent variables, rigorously measuring their statistical contribution to schedule and budget variances, and offering a robust empirical foundation for institutional reform and strategic governance enhancement across the Saudi construction sector.

3. Significance and Objectives of the Study

3.1 Theoretical and Scientific Significance

This study makes a significant theoretical contribution to the project management literature by advancing the understanding of how front-end planning practices influence project performance within the context of the Saudi Arabian construction industry. Although previous research has extensively investigated the causes of project delays and budget overruns, many studies have focused primarily on execution-stage factors such as labor productivity, material shortages, contractor performance, financial constraints, procurement inefficiencies, and external environmental risks. Comparatively limited attention has been devoted to examining the strategic importance of activities undertaken during the project initiation and planning phases, particularly within the rapidly evolving construction environment of Saudi Arabia.

One of the primary theoretical contributions of this research is its emphasis on the contextual characteristics of the Saudi construction sector. The Kingdom is currently experiencing unprecedented infrastructure development driven by Vision 2030, which has

introduced numerous mega-projects involving advanced engineering technologies, international joint ventures, complex contractual arrangements, and extensive stakeholder participation. These unique socioeconomic, regulatory, environmental, and organizational conditions distinguish Saudi construction projects from those undertaken in many other countries. Consequently, empirical findings obtained from developed economies cannot always be generalized to the Saudi context. By investigating project initiation practices and scope definition quality within this distinctive environment, the study contributes context-specific evidence that enriches the existing body of knowledge in construction project management.

A second theoretical contribution lies in the explicit isolation and examination of two critical front-end planning constructs: **Project Initiation Practices (PIP)** and **Scope Definition Quality (SDQ)**. Previous studies have frequently treated project planning as a broad, multidimensional concept without distinguishing the individual contributions of specific planning components. This generalized approach limits the ability of researchers and practitioners to identify which aspects of planning have the greatest influence on project performance. The present study addresses this limitation by conceptualizing project initiation practices and scope definition quality as independent variables and empirically examining their individual and combined effects on project time and cost performance. This variable-specific approach provides a more refined understanding of the mechanisms through which early planning activities influence project success.

Furthermore, this research contributes to the advancement of project management theory by integrating established theoretical perspectives, including Agency Theory, Planning Theory, and Transaction Cost Economics, into a unified analytical framework. Agency Theory explains how clearly defined project charters, governance structures, and stakeholder responsibilities reduce conflicts of interest and information asymmetry between project owners and contractors. Planning Theory emphasizes the importance of systematic decision-making and comprehensive front-end planning in reducing uncertainty and improving project outcomes. Transaction Cost Economics suggests that comprehensive scope definition and effective governance mechanisms reduce contractual ambiguity, disputes, variation orders, and coordination costs throughout the project life cycle. By synthesizing these theoretical perspectives, the study develops a comprehensive conceptual framework that explains how early governance structures and baseline documentation influence project performance through improved planning, coordination, and decision-making.

In addition, the study enriches the growing body of empirical research concerning front-end loading (FEL) and project governance by providing quantitative evidence from Saudi Arabia, where empirical investigations remain relatively limited compared with studies conducted in North America, Europe, and East Asia. The findings therefore contribute not only to regional scholarship but also to the broader international literature by demonstrating whether theoretical relationships established in other contexts remain valid within a rapidly developing economy characterized by ambitious national transformation programs.

Overall, the theoretical significance of this study lies in its ability to bridge an important gap between project management theory and construction industry practice by demonstrating how strategic planning decisions made during project initiation establish the foundation for successful project delivery. The proposed research framework may also

serve as a reference model for future researchers investigating front-end planning, project governance, and project performance across different industries and geographical regions.

3.2 Practical and Applied Significance

Beyond its theoretical contributions, this study offers substantial practical value for professionals, organizations, and policymakers involved in the planning and delivery of construction projects throughout Saudi Arabia. The findings provide evidence-based guidance that can assist stakeholders in improving project governance, strengthening planning processes, reducing project uncertainty, and enhancing overall project performance.

For project owners, developers, and client organizations, the study demonstrates the strategic importance of investing sufficient time and resources during the project initiation phase. Comprehensive project charters, detailed feasibility studies, stakeholder alignment, governance approval, and clearly defined project objectives establish a strong foundation for successful execution. Organizations that institutionalize these practices are expected to experience fewer project delays, lower cost escalation, improved resource utilization, and greater confidence in achieving planned project objectives.

For consultants, project management offices (PMOs), and engineering professionals, the research identifies practical planning mechanisms that improve project control throughout the project life cycle. The findings emphasize the importance of preparing detailed Work Breakdown Structures (WBS), accurately defining project deliverables, documenting assumptions and constraints, establishing realistic schedules, and implementing robust scope verification and change control procedures. These planning activities reduce ambiguity, improve coordination among stakeholders, minimize design modifications, and support more accurate project monitoring and performance evaluation.

From the contractor's perspective, improved project initiation and scope definition reduce contractual uncertainty and minimize disputes arising from incomplete or ambiguous project documentation. Clearly defined project requirements enable contractors to prepare more accurate cost estimates, allocate resources efficiently, manage project risks proactively, and reduce the frequency of variation orders and claims. Consequently, organizations benefit from improved productivity, enhanced profitability, stronger client relationships, and reduced litigation.

The findings also possess considerable value for policymakers, regulatory authorities, and professional institutions responsible for developing national construction standards and governance frameworks. As Saudi Arabia continues implementing Vision 2030 through numerous large-scale infrastructure and development projects, there is an increasing need to strengthen project governance practices across both public and private sectors. The empirical evidence generated by this study can support the development of standardized project initiation procedures, mandatory project charter requirements, enhanced scope management guidelines, and improved governance frameworks that promote transparency, accountability, and effective decision-making throughout the construction industry.

Furthermore, educational institutions and professional training organizations may utilize the findings to strengthen project management curricula and continuing professional development programs. Greater emphasis on front-end planning competencies, stakeholder

management, governance, and scope management will contribute to developing highly skilled project professionals capable of managing increasingly complex construction projects.

Ultimately, the practical significance of this research extends beyond individual projects by supporting national efforts to improve project delivery performance, optimize infrastructure investment, reduce public expenditure resulting from project failures, and enhance the long-term sustainability and international competitiveness of the Saudi construction industry.

4. Study Objectives

The primary objective of this study is to empirically investigate the extent to which project initiation practices and scope definition quality influence time and cost overruns in construction projects within the Kingdom of Saudi Arabia. Specifically, the study seeks to achieve the following objectives:

1. **To examine the influence of project initiation practices on project schedule performance** by evaluating how project charter development, feasibility studies, stakeholder identification and engagement, governance authorization, and early planning activities contribute to minimizing time overruns in construction projects.
2. **To evaluate the impact of scope definition quality on project cost performance** by investigating how comprehensive Work Breakdown Structures (WBS), clearly defined project deliverables, baseline scope documentation, scope verification processes, and structured change control procedures contribute to reducing cost overruns and improving budget compliance.
3. **To determine the combined predictive effect of project initiation practices and scope definition quality on overall project performance**, thereby identifying the extent to which these front-end planning variables explain variations in project schedule adherence and cost control within the Saudi construction sector.
4. **To develop an empirically validated analytical framework** that explains the relationship between front-end planning practices and project performance, providing both theoretical insight and practical guidance for future research and industry implementation.
5. **To formulate evidence-based recommendations for project owners, consultants, contractors, policymakers, and regulatory authorities** regarding the adoption of standardized project initiation procedures, enhanced scope management practices, and strengthened governance mechanisms that support successful project delivery and contribute to the strategic objectives of Saudi Vision 2030.

5. Theoretical Literature of the Study

5.1 Introduction

The theoretical literature provides the conceptual foundation upon which this study is developed. It explains the fundamental concepts, principles, and theoretical perspectives that establish the relationships among the research variables. In project management research, theoretical literature serves as an analytical framework that guides the formulation of research questions, hypotheses, and the interpretation of empirical findings. Since this study investigates the influence of **Project Initiation Practices (PIP)** and **Scope Definition Quality (SDQ)** on **Time Overruns (TO)** and **Cost Overruns (CO)** in

construction projects, it is essential to examine the theoretical concepts underlying these variables and explain how they interact throughout the project life cycle.

Construction projects are characterized by technical complexity, multiple stakeholders, contractual relationships, significant capital investment, and numerous sources of uncertainty. Consequently, project success depends largely on decisions made during the early planning stages rather than solely during project execution. Contemporary project management literature increasingly recognizes that effective front-end planning establishes the strategic foundation upon which successful project delivery is achieved. Therefore, this study is grounded in theories explaining organizational governance, planning behavior, contractual relationships, and project decision-making.

5.2 Project Initiation Practices (PIP)

Project initiation represents the first phase of the project life cycle and establishes the formal authorization for a project to proceed. According to the Project Management Institute (PMI, 2021), project initiation transforms organizational needs into clearly defined project objectives while identifying key stakeholders, governance structures, project constraints, expected benefits, and available organizational resources.

Project initiation extends beyond obtaining formal approval to commence a project. It involves developing a comprehensive understanding of the project's strategic purpose, business justification, feasibility, stakeholder expectations, governance arrangements, and organizational responsibilities. Decisions made during this stage significantly influence all subsequent phases of planning, execution, monitoring, and project closure.

Several scholars argue that ineffective project initiation frequently leads to unrealistic schedules, inaccurate cost estimates, poor stakeholder coordination, contractual disputes, and uncontrolled project changes. Conversely, projects initiated through structured planning processes are more likely to achieve their intended objectives within approved schedules and budgets.

The principal dimensions of Project Initiation Practices include:

- Development of the Project Charter
- Business Case Preparation
- Feasibility Analysis
- Stakeholder Identification and Analysis
- Project Authorization
- Governance Framework Establishment
- Initial Risk Identification
- Strategic Objective Alignment

These dimensions collectively establish the organizational framework that guides project implementation and decision-making throughout the project life cycle.

5.3 Scope Definition Quality (SDQ)

Scope definition is one of the most critical components of project planning because it determines exactly what work will and will not be performed during project execution.

PMBOK® (2021) defines project scope as the total work required to deliver the specified project outputs according to agreed technical and quality requirements.

High-quality scope definition minimizes uncertainty by clearly documenting project objectives, deliverables, assumptions, exclusions, constraints, technical specifications, and acceptance criteria. A comprehensive project scope provides a common understanding among project stakeholders regarding expected outcomes and contractual obligations.

Poorly defined project scope is consistently identified as one of the leading causes of project failure worldwide. Ambiguous scope frequently results in scope creep, excessive variation orders, design revisions, contractual disputes, schedule delays, budget overruns, and stakeholder dissatisfaction.

The major dimensions of Scope Definition Quality include:

- Scope Statement Development
- Work Breakdown Structure (WBS)
- Deliverable Identification
- Project Requirements Documentation
- Assumptions and Constraints
- Scope Verification
- Scope Validation
- Change Control Procedures

Organizations implementing structured scope management processes generally achieve higher levels of schedule reliability, budget control, and project quality.

5.4 Time Overruns in Construction Projects

Time overrun refers to the extension of actual project duration beyond the originally approved schedule. Schedule delays represent one of the most common performance problems within the global construction industry and continue to affect infrastructure projects regardless of project size or geographical location.

Construction schedule overruns originate from multiple technical, managerial, financial, contractual, environmental, and organizational factors. However, project management researchers increasingly recognize that many schedule problems originate during project initiation when project objectives, stakeholder expectations, governance structures, and work scopes are not adequately established.

Typical indicators of time overruns include:

- Missed project milestones
- Extended construction duration
- Delayed project completion
- Reduced schedule performance
- Increased resource utilization
- Contractual time extension claims

Reducing schedule overruns requires proactive planning rather than reactive project control during execution.

5.5 Cost Overruns in Construction Projects

Cost overrun occurs when the actual project expenditure exceeds the approved project budget. Cost overruns negatively affect project profitability, organizational competitiveness, investor confidence, and national economic development.

Construction cost escalation frequently results from inadequate planning, inaccurate estimating, poor scope definition, frequent design changes, inflation, productivity losses, contractual disputes, and ineffective project governance.

Several international studies conclude that organizations investing in comprehensive front-end planning experience significantly lower levels of cost growth because project uncertainties are identified and managed before construction begins.

The major indicators of cost overruns include:

- Budget escalation
- Increased project expenditure
- Frequent variation orders
- Rework costs
- Contractor claims
- Financial disputes
- Cost estimate deviations

5.6 Agency Theory

Agency Theory (Jensen & Meckling, 1976) explains the contractual relationship between principals (project owners) and agents (contractors and consultants). The theory argues that both parties pursue different objectives and often possess unequal access to project information, creating information asymmetry.

Within construction projects, poorly defined project scope increases contractual ambiguity and creates opportunities for opportunistic behavior, resulting in disputes, variation orders, and increased project costs.

Effective project initiation practices reduce these agency conflicts by establishing:

- Clear project governance
- Defined stakeholder responsibilities
- Transparent decision-making
- Comprehensive project documentation
- Formal authorization procedures

Consequently, Agency Theory provides a strong theoretical justification for investigating project initiation practices and scope definition quality as determinants of project success.

5.7 Planning Theory and Bounded Rationality

Planning Theory emphasizes that successful organizations allocate sufficient time and resources to systematic planning before implementation. Simon's (1957) concept of bounded rationality recognizes that decision-makers operate under conditions of limited information, cognitive constraints, and uncertainty.

Kahneman and Tversky further explained that optimism bias and the planning fallacy frequently cause project teams to underestimate project duration, resource requirements, technical complexity, and project costs.

Structured project initiation serves as a mechanism that reduces these cognitive limitations by requiring feasibility analysis, stakeholder consultation, governance approval, and comprehensive planning before project execution.

5.8 Transaction Cost Economics (TCE)

Transaction Cost Economics (Williamson, 1981) argues that organizations incur significant costs while negotiating, coordinating, monitoring, and enforcing contractual agreements.

In construction projects, vague project scope generates high transaction costs through:

- Contract amendments
- Variation orders
- Claims
- Litigation
- Arbitration
- Project delays
- Administrative expenses

Comprehensive project initiation and detailed scope definition reduce contractual ambiguity and improve organizational efficiency by minimizing unnecessary transaction costs.

5.9 Conceptual Framework of the Study

Based on the preceding theoretical discussion, this study proposes that **Project Initiation Practices** and **Scope Definition Quality** are the primary independent variables influencing construction project performance.

The conceptual framework proposes the following relationships:

Independent Variables

- Project Initiation Practices (PIP)
- Scope Definition Quality (SDQ)

Dependent Variables

- Time Overruns (TO)

- Cost Overruns (CO)

The framework assumes that effective project initiation establishes appropriate governance structures, stakeholder alignment, project authorization, and strategic planning, while high-quality scope definition provides clear project requirements, deliverables, and work packages. Together, these front-end planning activities reduce uncertainty, improve stakeholder coordination, minimize contractual disputes, control scope changes, and enhance schedule and budget performance.

5.10 Research Hypotheses

Based on the theoretical foundations and conceptual framework, the following hypotheses are proposed:

H1: Project Initiation Practices have a significant positive influence on reducing Time Overruns in construction projects.

H2: Project Initiation Practices have a significant positive influence on reducing Cost Overruns in construction projects.

H3: Scope Definition Quality has a significant positive influence on reducing Time Overruns in construction projects.

H4: Scope Definition Quality has a significant positive influence on reducing Cost Overruns in construction projects.

H5: Project Initiation Practices and Scope Definition Quality jointly have a significant positive influence on overall project performance by minimizing both Time Overruns and Cost Overruns.

5.11 Summary

The theoretical literature demonstrates that successful construction projects depend largely on the quality of decisions made during the project initiation and planning phases. Agency Theory, Planning Theory, and Transaction Cost Economics collectively explain how comprehensive project governance, systematic planning, and clearly defined project scope reduce uncertainty, contractual conflicts, and inefficient decision-making. These theoretical perspectives provide the conceptual basis for the present study and support the proposition that effective Project Initiation Practices and Scope Definition Quality significantly improve project performance by reducing Time Overruns and Cost Overruns within the Saudi Arabian construction industry.

6. Review of Previous Studies

6.1 Introduction

Construction project performance has been one of the most extensively researched topics in project management literature due to the persistent occurrence of schedule delays and budget overruns across infrastructure, industrial, commercial, and residential developments worldwide. Numerous studies have attempted to identify the underlying factors influencing

project success, including leadership, stakeholder management, procurement strategies, risk management, resource allocation, financial capability, contractual arrangements, and project planning. Among these factors, increasing attention has been directed toward the influence of front-end planning activities, particularly project initiation practices and scope definition, because decisions made during the early stages of a project significantly affect subsequent project execution and overall performance.

The following review examines previous studies related to the variables investigated in the present research. The literature is organized into four themes: studies on project initiation practices, studies on scope definition quality, studies on project time and cost overruns, and studies conducted within the Saudi Arabian construction industry. The review concludes by identifying the research gap addressed by this study.

6.2 Previous Studies on Project Initiation Practices

Project initiation represents the first formal stage of the project life cycle, during which project objectives, governance structures, stakeholder responsibilities, business justification, and project authorization are established. Previous research consistently indicates that deficiencies during project initiation significantly increase the probability of project failure.

One of the earliest and most influential studies in this area was conducted by **Jensen and Meckling (1976)** through the development of Agency Theory. Although not specifically focused on construction, their work demonstrated that clearly defined governance structures and contractual responsibilities reduce conflicts of interest between project owners and contractors. Their theoretical contribution has become highly relevant in construction management because project initiation activities establish accountability, authority, and communication channels before project execution begins.

The **Project Management Institute (2021)** emphasizes that project initiation is essential for aligning project objectives with organizational strategy. According to the PMBOK® Guide (7th Edition), effective initiation includes preparing the project charter, identifying stakeholders, defining governance arrangements, and obtaining formal authorization. These activities establish the baseline upon which planning, execution, monitoring, and project control depend.

Dumonteil and Boyd (2014) investigated the relationship between front-end project planning and project performance across major capital projects. Their findings demonstrated that organizations investing greater effort in project charter development, stakeholder alignment, and governance approval achieved significantly lower schedule delays and reduced cost growth. The authors estimated that rigorous front-end planning could reduce project cost overruns by approximately 15 percent while improving schedule reliability.

Kerzner (2022) further emphasized that project initiation should be viewed as a strategic investment rather than an administrative requirement. According to Kerzner, insufficient effort during project initiation frequently results in unrealistic expectations, poor communication, inaccurate planning assumptions, and ineffective stakeholder coordination, ultimately leading to project delays and financial losses.

Collectively, these studies demonstrate that comprehensive project initiation establishes a strong managerial foundation that supports successful project implementation. However, most previous research has examined project initiation as a general planning activity rather than evaluating its specific dimensions as measurable predictors of project performance.

6.3 Previous Studies on Scope Definition Quality

Project scope definition is widely recognized as one of the most important determinants of project success. It defines the work required to achieve project objectives and establishes the baseline against which project performance is measured.

The Project Management Institute (2021) defines scope management as the process of ensuring that a project includes all the work required—and only the work required—to successfully complete the project. Effective scope management includes collecting requirements, defining project scope, creating the Work Breakdown Structure (WBS), validating scope, and controlling changes throughout the project life cycle.

Amusan et al. (2021) investigated budget overruns in infrastructure projects across developing economies and concluded that inadequate scope definition was among the most significant causes of cost escalation. The researchers found that projects with incomplete scope documentation experienced substantially higher frequencies of variation orders, design revisions, contractual disputes, and rework, resulting in considerable financial losses.

Flyvbjerg (2014) argued that many infrastructure projects fail because decision-makers underestimate project complexity and approve projects before fully defining project requirements. According to the author, optimism bias and strategic misrepresentation frequently result in unrealistic cost estimates and schedules. Comprehensive scope definition was therefore recommended as a mechanism for improving forecasting accuracy and reducing project uncertainty.

Kerzner (2022) similarly noted that detailed Work Breakdown Structures improve project control by decomposing complex activities into manageable work packages. This approach enhances cost estimation, scheduling accuracy, resource allocation, and project monitoring throughout the construction process.

These studies consistently demonstrate that comprehensive scope definition contributes significantly to project success. Nevertheless, relatively few empirical investigations have simultaneously examined scope definition quality alongside project initiation practices within a single analytical framework.

6.4 Previous Studies on Time and Cost Overruns

Time overruns and cost overruns continue to represent the most significant performance challenges facing the global construction industry. Researchers have identified numerous technical, managerial, financial, contractual, and organizational factors contributing to these problems.

Assaf and Al-Hejji (2006) conducted one of the most comprehensive investigations into construction delays in Saudi Arabia. Their study identified delayed payments, ineffective

planning, labor shortages, poor communication, design changes, and weak project management as the primary causes of schedule overruns. The researchers emphasized that improvements in planning and coordination during the early stages of project development could substantially reduce project delays.

Al-Kharashi and Skitmore (2009) further investigated delay factors affecting major Saudi construction projects. Their research concluded that ineffective coordination among project stakeholders, slow decision-making processes, inadequate planning, and poor communication significantly affected project schedules. Although their study emphasized planning deficiencies, it did not specifically isolate project initiation practices or scope definition quality as independent variables.

Flyvbjerg (2014) examined megaproject performance worldwide and reported that cost overruns and schedule delays remain persistent despite advances in project management technology. The study concluded that inaccurate forecasting, optimism bias, inadequate planning, and weak governance are major contributors to project failure.

More recently, Alshihri et al. (2024) investigated project delivery challenges associated with Saudi Arabia's Vision 2030 megaprojects. The authors reported that compressed planning periods, accelerated procurement, and insufficient front-end project development compromise schedule performance, cost control, and quality objectives. The study recommended strengthening project initiation processes and scope maturity before project implementation.

Collectively, these studies demonstrate that improving project planning during the earliest stages of the project life cycle remains one of the most effective approaches for minimizing project delays and budget overruns.

6.5 Previous Studies within the Saudi Arabian Construction Industry

Saudi Arabia currently represents one of the largest construction markets in the Middle East due to extensive infrastructure investments associated with Vision 2030. The rapid expansion of transportation systems, healthcare facilities, residential developments, industrial cities, tourism projects, and smart cities has significantly increased the importance of effective project management practices.

Existing Saudi studies consistently identify planning deficiencies, stakeholder coordination problems, contractual ambiguity, delayed decision-making, and ineffective project governance as recurring contributors to project underperformance. However, most research has concentrated on operational problems occurring during project execution rather than systematically investigating deficiencies originating during project initiation.

Recent studies further indicate that the increasing complexity of Saudi megaprojects requires stronger governance structures, enhanced stakeholder engagement, detailed project charters, and comprehensive scope definition before construction activities begin. Nevertheless, empirical evidence specifically examining the combined influence of Project Initiation Practices and Scope Definition Quality remains limited within the Saudi context.

6.6 Critical Analysis of Previous Studies

The reviewed literature provides substantial evidence that effective planning contributes to successful project delivery. Researchers consistently conclude that projects characterized by comprehensive planning, effective stakeholder coordination, detailed scope definition, and structured governance experience lower levels of schedule delay and budget escalation.

Despite these valuable contributions, several important limitations remain. First, many previous studies examine planning as a broad concept without distinguishing between project initiation practices and scope definition quality. Consequently, the individual contribution of these variables remains insufficiently understood.

Second, a considerable proportion of previous studies focus primarily on execution-stage challenges such as procurement, labor productivity, financial constraints, and contractor performance while giving comparatively less attention to deficiencies originating during project initiation.

Third, many international studies have been conducted in developed economies whose regulatory, contractual, and organizational environments differ substantially from those found in Saudi Arabia. The unprecedented infrastructure expansion associated with Vision 2030 has introduced unique governance structures, procurement models, stakeholder configurations, and project delivery challenges that require context-specific empirical investigation.

Finally, relatively few studies have simultaneously examined the combined influence of project initiation practices and scope definition quality on both time overruns and cost overruns using quantitative statistical analysis within the Saudi construction industry.

6.7 Research Gap

The literature review reveals a clear gap in existing knowledge. Although previous studies acknowledge the importance of planning in improving project performance, limited empirical research has specifically examined **Project Initiation Practices (PIP)** and **Scope Definition Quality (SDQ)** as separate yet complementary determinants of project success within Saudi Arabia.

Furthermore, there is limited evidence quantifying the combined influence of these front-end planning variables on both schedule and cost performance using statistical techniques such as correlation and multiple regression analysis. Given the scale of infrastructure investment under Saudi Vision 2030, understanding these relationships has become increasingly important for improving project governance and organizational decision-making.

Accordingly, the present study addresses this gap by empirically investigating how Project Initiation Practices and Scope Definition Quality influence Time Overruns and Cost Overruns in construction projects across Saudi Arabia. By providing evidence-based findings derived from experienced construction professionals, the study contributes both theoretical advancement and practical recommendations that support improved project delivery within the Kingdom's rapidly expanding construction sector.

6.8 Summary

The review of previous studies demonstrates that effective front-end planning is fundamental to successful project delivery. Existing literature consistently highlights the importance of project initiation, scope definition, stakeholder coordination, and governance in reducing project uncertainty and improving performance. However, significant research gaps remain concerning the integrated examination of Project Initiation Practices and Scope Definition Quality within the Saudi construction industry. The present study builds upon these findings by developing and empirically testing a conceptual framework that explains how these two planning variables

7. Methodology and Research Design

- **Research Design:** A quantitative, causal, cross-sectional field study design was adopted to examine the statistical relationships between independent planning variables and dependent performance outcomes.
- **Target Population and Sampling:** The target population comprised certified project managers, site engineers, planning engineers, client-side consultants, and general contractors operating within Saudi Arabia. A purposive judgmental sampling technique was utilized to select experienced professionals. Following rigorous data scrubbing and verification, a clean sample of N=50 complete responses was finalized for statistical analysis.
- **Measurement Instrument:** Data was collected using a structured, self-administered questionnaire utilizing a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The instrument evaluated four core constructs: Project Initiation Practices (PIP), Scope Definition Quality (SDQ), Time Overruns (TO), and Cost Overruns (CO).
- **Data Analysis Techniques:** Statistical analyses were executed using SPSS software. Procedures included descriptive univariate statistics, Cronbach's Alpha reliability testing, bivariate Pearson correlation analysis (r), and Ordinary Least Squares (OLS) multiple regression modeling.

8. Empirical Results and Analysis

8.1 Reliability Analysis

Internal consistency of the multi-item constructs was verified using Cronbach's Alpha (alpha). All values exceeded the standard academic threshold of 0.70, confirming high instrument reliability:

- **Project Initiation Practices (PIP, 5 Items):** alpha = 0.898
- **Scope Definition Quality (SDQ, 5 Items):** alpha = 0.864
- **Time Overrun Sub-Scale (TO, 3 Items):** alpha = 0.890
- **Cost Overrun Sub-Scale (CO, 2 Items):** alpha = 0.852

8.2 Summary of Descriptive Statistics and Reliability

Table 1: Descriptive Statistics, Mean Scores, Standard Deviations, and Reliability Coefficients (N=50)

Construct / Variable	Number of Items (n)	Mean (μ)	Standard Deviation (σ)	Cronbach's Alpha (α)
Project Initiation Practices (PIP)	5	3.78	0.82	0.898
Scope Definition Quality (SDQ)	5	3.74	0.88	0.864
Time Overruns (TO)	3	3.65	0.91	0.890
Cost Overruns (CO)	2	3.71	0.85	0.852

8.3 Bivariate Correlation Analysis

Bivariate Pearson correlation testing revealed strong, statistically significant linear relationships among the study variables. Scope definition quality exhibited a strong negative correlation with time overruns ($r = -0.835$, $p < 0.01$) and cost overruns ($r = -0.819$, $p < 0.01$), confirming that higher planning quality corresponds directly with reduced project overruns.

Table 2: Bivariate Pearson Correlation Matrix (N=50)

Variables	PIP	SDQ	TO	CO
Project Initiation Practices (PIP)	1.000	—	—	—
Scope Definition Quality (SDQ)	0.792**	1.000	—	—

Variables	PIP	SDQ	TO	CO
Time Overruns (TO)	-0.812**	-0.835**	1.000	—
Cost Overruns (CO)	-0.798**	-0.819**	0.854**	1.000

Note: Correlation is significant at the 0.01 level (2-tailed).

8.4 OLS Multiple Regression Models

Model 1: Predicting Time Overruns (Schedule Control)

- **Model Summary:** $R = 0.865$, $R^2 = 0.748$, Adjusted $R^2 = 0.738$, $F = 69.81$, $p < 0.001$.
- **Interpretation:** The regression model indicates that 73.8% of the variance in project time overruns is explained by project initiation practices and scope definition quality. Both Project Initiation Practices ($\beta = 0.428$, $t = 3.194$, $p = 0.002$) and Scope Definition Quality ($\beta = 0.505$, $t = 3.435$, $p = 0.001$) make statistically significant, unique contributions to schedule variance mitigation.

Table 3: OLS Regression Coefficients for Model 1 (Dependent Variable: Time Overruns)

Model Variables	Unstandardized Coefficients (B)	Standard Error	Standardized Coefficients (β)	t-Statistic	Sig. (p-value)
(Constant)	0.612	0.245	—	2.498	0.016
Project Initiation Practices (PIP)	0.415	0.130	0.428	3.194	0.002

Model Variables	Unstandardize d Coefficients (B)	Standar d Error	Standardize d Coefficients (β)	t- Statisti c	Sig. (p-value)
Scope Definition Quality (SDQ)	0.492	0.143	0.505	3.435	0.001

Model 2: Predicting Cost Overruns (Budgetary Control)

- **Model Summary:** $R = 0.849$, $R^2 = 0.721$, Adjusted $R^2 = 0.709$, $F = 60.75$, $p < 0.001$.
- **Interpretation:** The model demonstrates that 70.9% of the variance in financial cost overruns is accounted for by front-end planning parameters. Scope Definition Quality serves as the primary predictor preventing budget inflation (beta = 0.514, $t = 3.253$, $p = 0.002$), reinforced significantly by Project Initiation Practices (beta = 0.412, $t = 2.861$, $p = 0.006$).

Table 4: OLS Regression Coefficients for Model 2 (Dependent Variable: Cost Overruns)

Model Variables	Unstandardize d Coefficients (B)	Standar d Error	Standardize d Coefficients (β)	t- Statisti c	Sig. (p-value)
(Constant)	0.745	0.262	—	2.843	0.007
Project Initiation Practices (PIP)	0.398	0.139	0.412	2.861	0.006
Scope Definition	0.501	0.154	0.514	3.253	0.002

Model Variables	Unstandardized Coefficients (B)	Standard Error	Standardized Coefficients (β)	t-Statistic	Sig. (p-value)
Quality (SDQ)					

8.5 Conceptual Framework and Research Model Summary

To conceptualize the structural pathways established by the empirical results, **Figure 1** outlines the theoretical interaction between front-end independent variables and performance outcomes.

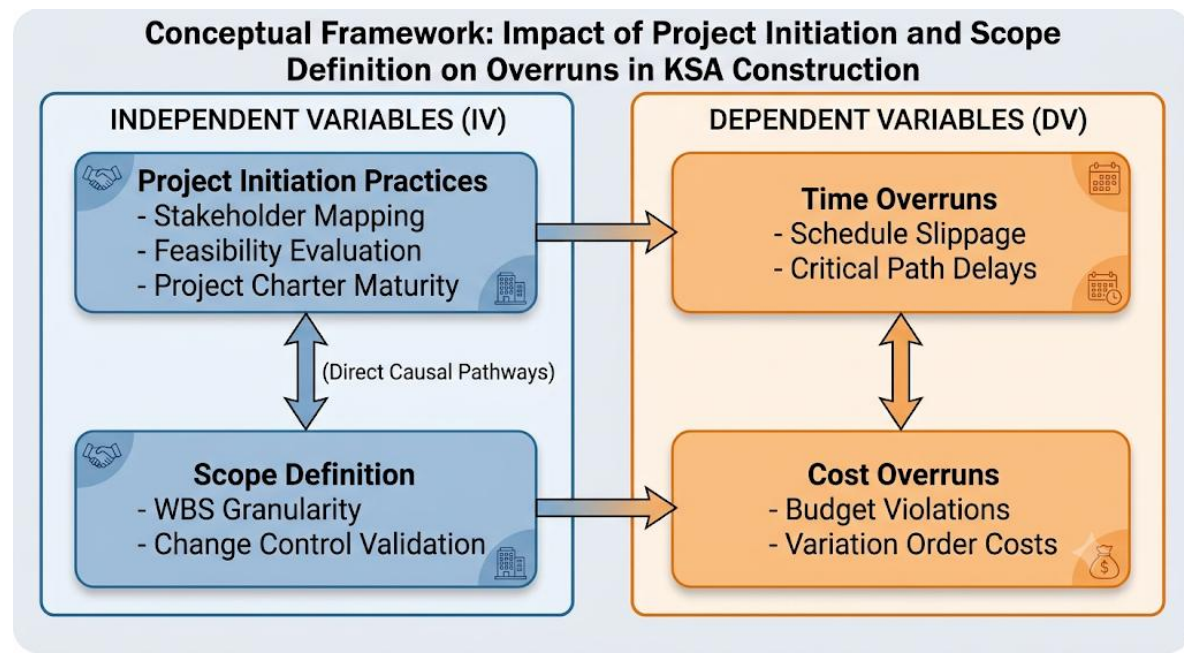


Figure 1: Conceptual Causal Framework Linking Front-End Planning to Project Performance Overruns.

8.6. Discussion of Findings

The empirical results robustly validate the theoretical frameworks underpinning this research. Consistent with Agency Theory, the findings confirm that ambiguity in early project charters and scope baselines creates information asymmetries that contractors exploit through costly variation orders. Furthermore, aligning with Bounded Rationality and Transaction Cost Economics, the data proves that rigorous front-end planning acts as a critical cognitive and structural defense against optimism bias and ex-post transaction friction. Scope definition quality emerged as the dominant predictor of financial and schedule stability, emphasizing that exhaustive work breakdown structuring and baseline

congelation are indispensable prerequisites for successful project delivery in Saudi Arabia's competitive construction landscape.

9. Conclusion and Strategic Recommendations

9.1 Conclusion

This study provides empirical proof that project initiation practices and scope definition quality are vital determinants of project success in the Saudi construction sector. Accounting for over 70% of the variance in both time and cost overruns, front-end planning deficits are identified as the primary root causes of project failure. Institutionalizing rigorous initiation protocols is therefore essential for mitigating financial waste and schedule slippage.

9.2 Strategic Recommendations

1. **Institutionalize Mandatory Front-End Gate Reviews:** Public and private project owners in KSA must establish formal stage-gate governance frameworks that prohibit capital allocation until project charters and baseline scopes are fully articulated and approved.
2. **Enforce Granular Work Breakdown Structures (WBS):** Project planners and estimators must mandate exhaustive deconstruction of project scopes down to detailed work packages to counter optimism bias and reduce variation order frequency.
3. **Implement Strict Change Control Protocols:** Establish multidisciplinary, rigorous validation committees to evaluate any post-initiation scope adjustments, protecting baseline schedules and budgets from unmanaged creep.
4. **Future Research Directions:** Subsequent studies should expand sample sizes across broader GCC regional portfolios and investigate the moderating role of digital technologies, such as Building Information Modeling (BIM) and artificial intelligence-based estimation tools, on front-end planning efficacy.

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