



Graduation Project 1

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Research Title :

**Project Risk Management Practices in Saudi Construction
Projects: A Study on Planning and Execution Challenges**

Introduction

Risk management has become a critical aspect of project management, especially in complex and high-stake industries such as construction. Construction projects in Saudi Arabia, known for their scale, innovation, and ambitious timelines, are often prone to various forms of risks ranging from financial and logistical to regulatory and environmental. The rapid growth of the Saudi construction sector, particularly under the umbrella of Vision 2030, highlights the need for effective risk mitigation frameworks. Large-scale developments such as NEOM, The Red Sea Project, and Qiddiya have demonstrated that without proper planning and risk anticipation, projects can face delays, cost overruns, and even failure.

The introduction of modern project management methodologies in Saudi Arabia has significantly transformed the way projects are planned and executed. Despite this advancement, the literature reveals that risk management practices in many Saudi construction projects still lack standardization. Project managers and stakeholders often encounter difficulties in forecasting potential risks and incorporating proactive strategies in the planning phase. Execution challenges such as labor shortages, supply chain disruptions, regulatory changes, and stakeholder misalignment further compound the problem. As such, this study aims to delve into the current practices of risk management in construction projects across Saudi Arabia, with a special focus on the planning and execution phases.

This research is not only timely but necessary, given the growing complexity of modern construction initiatives. While global risk management frameworks offer a foundation, regional and contextual customization is essential for optimal outcomes. The study explores real-world case studies, empirical data, and insights from professionals in the Saudi construction sector to identify

gaps, best practices, and strategic recommendations. Furthermore, the research emphasizes the role of cultural, economic, and institutional factors in shaping risk responses within the Kingdom.

Ultimately, this project aspires to provide both academic and practical contributions to the field of project risk management. By highlighting the unique challenges faced in the Saudi context and examining the strategies employed to overcome them, the research hopes to inform future policy-making, enhance project outcomes, and support the nation's developmental vision. The findings may serve as a guiding reference for project managers, consultants, and policy makers involved in the construction industry.

Research Problem

Despite the evident growth in Saudi Arabia's construction sector, the industry continues to face persistent challenges associated with risk identification, assessment, and mitigation. These challenges are especially pronounced in the planning and execution stages of construction projects, which are critical for determining project success. The absence of a unified, systematic approach to risk management has led to inconsistent practices across different projects. Often, risk-related decisions are reactive rather than proactive, resulting in increased costs, delayed timelines, and reduced project quality.

A key issue is the disconnect between risk planning and execution. While many construction firms in Saudi Arabia may outline a risk management plan during the initial stages of the project, implementation often falls short due to resource constraints, inadequate training, or lack of stakeholder engagement. Furthermore, external risks such as economic fluctuations, changes in government regulations, and geopolitical factors are not always accounted for in project planning. This leads to scenarios where even well-structured

projects are vulnerable to unexpected disruptions.

Another major concern lies in the cultural and organizational attitudes toward risk. Many local firms lack a risk-oriented mindset and tend to underestimate the potential impact of certain variables. This cultural tendency, coupled with

limited access to risk management tools and data analytics, results in suboptimal decision-making. Moreover, the reliance on traditional construction practices, rather than embracing data-driven and technology-enabled risk assessment models, further hampers effective risk handling.

There is also a noticeable gap in academic research that specifically examines the nuances of risk management within the Saudi construction sector. While international literature offers a wide range of models and frameworks, their applicability in the Saudi context remains under-explored. This poses a challenge for industry professionals who seek localized insights to guide their risk mitigation efforts. As such, this research problem is both practical and academic in nature, calling for a comprehensive study that not only identifies the shortcomings in current practices but also proposes feasible improvements.

In summary, the central problem that this research seeks to address is: How can project risk management practices in Saudi construction projects be improved, particularly during the planning and execution phases, to enhance project success and sustainability? This question underscores the need for a contextualized understanding of risk dynamics in Saudi Arabia's construction industry and the development of tailored strategies that align with national goals and operational realities.

3. Research Significance

The significance of this research lies in its ability to address a pressing need in the Saudi Arabian construction industry. By investigating the gaps and inefficiencies in risk management practices, the study contributes to the optimization of project outcomes. Delays and cost overruns in construction projects do not only affect stakeholders financially, but they also hinder economic development, disrupt urban planning, and negatively impact public

perception. This research supports government and private sector efforts in aligning with Saudi Vision 2030 by promoting robust infrastructure delivery methods that are resilient, timely, and cost-effective.

Furthermore, this study helps elevate the role of local project managers by equipping them with evidence-based strategies to handle planning and execution risks. With rising demand for smart cities, green buildings, and digital transformation, the construction sector must evolve to adopt better predictive models for risk. This research also benefits academic institutions, as it fills the gap in literature regarding localized risk management practices. Ultimately, the outcomes of this research could influence policy, guide professional development programs, and encourage adoption of international best practices adapted to local realities.

4. References

- Albogamy, A., Scott, D., & Dawood, N. (2013). Addressing construction delays in the Kingdom of Saudi Arabia. *International Journal of Project Management*, 31(3), 541–549.
- PMI (2021). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Seventh Edition*. Project Management Institute.
- Alzahrani, J. I., & Emsley, M. W. (2013). The impact of contractors' attributes on construction project success: A post-construction evaluation. *International Journal of Project Management*, 31(2), 313–322.
- Loosemore, M., Raftery, J., Reilly, C., & Higgon, D. (2006). *Risk Management in Projects*. Taylor & Francis.
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Vision 2030. (2024). Saudi Vision 2030 Official Website.

<https://vision2030.gov.sa>

Assignment #2 – Project Continuation

1. Research Questions

- What are the most common risk factors affecting construction project planning in Saudi Arabia?
- What are the primary challenges in executing risk management plans in Saudi construction projects?
- How do project managers in Saudi Arabia identify, assess, and mitigate risks during project implementation?
- What are the key differences in risk management approaches between planning and execution phases?

2. Research Objectives

- To identify the major risk factors affecting project planning and execution in the Saudi construction industry.
- To analyze the effectiveness of risk management practices during the project lifecycle.
- To propose improved strategies for managing risks in construction projects within the Saudi context.

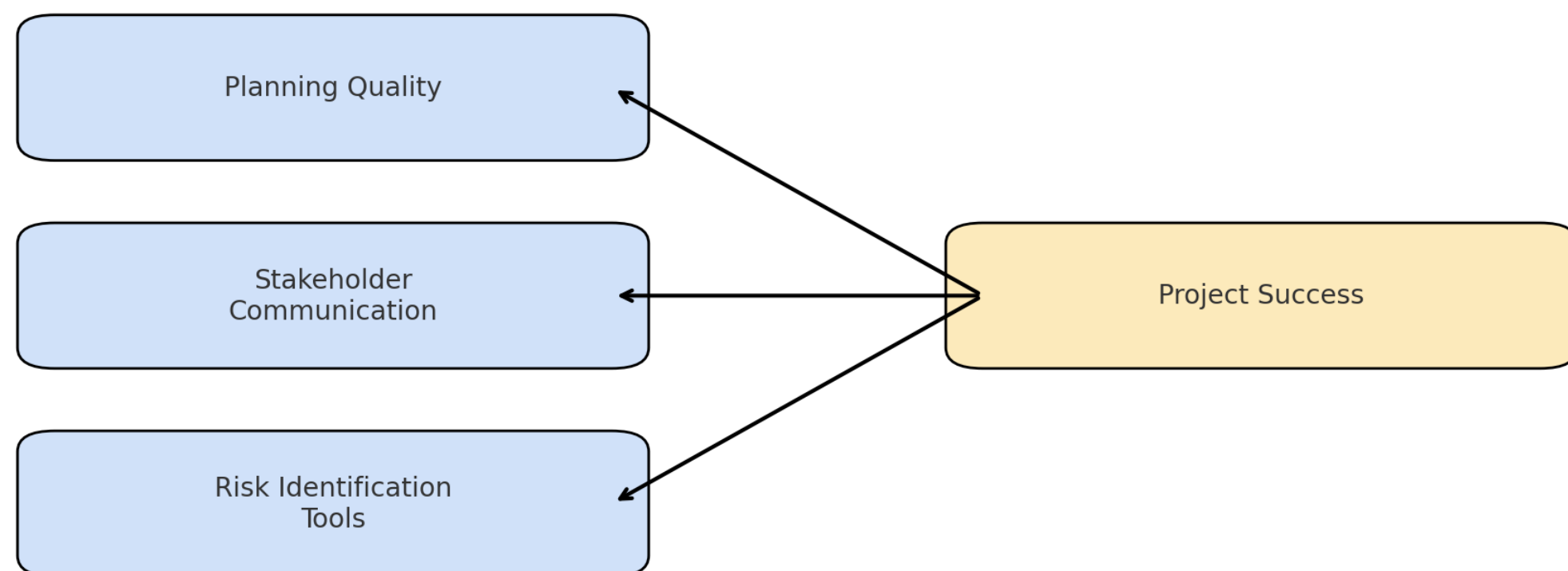
3. Research Hypotheses

- H1: Effective risk identification in the planning phase reduces the likelihood of delays in execution.
- H2: Poor communication among stakeholders is a significant contributor to project risks during execution.
- H3: The adoption of formal risk management frameworks improves overall project success rates.

4. Research Model :

The research model will be based on identifying independent variables (such as planning quality, stakeholder communication, risk identification tools) and their relationship with the dependent variable (project success rate). The model will follow a cause-effect framework to determine how planning-related factors influence execution success.

Proposed Research Model



5. Suggested Industry/Organization for the Empirical Study

The study will focus on construction companies operating in Riyadh and Jeddah, Saudi Arabia. These may include both public-sector projects (e.g., infrastructure projects under Vision 2030) and private-sector developments. Companies like Saudi Binladin Group or Nesma & Partners may serve as case studies.

6. Suggested Research Methodology

The research will follow a qualitative methodology supported by semi-structured interviews and document reviews. Data will be collected from project managers, engineers, and risk officers involved in construction projects in Saudi Arabia. Thematic analysis will be used to interpret responses and extract patterns.

7. Suggested Structure of the Project

- Title Page
- Abstract
- Introduction
- Literature Review
- Research Methodology
- Data Analysis and Results
- Conclusion and Recommendations
- References
- Appendices

8. Table of Contents

- 1.Introduction
- 2.Literature Review
- 3.Research Methodology
- 4.Data Collection and Analysis
5. Results and Discussion
6. Conclusion and Recommendations
7. References
8. Appendices

9. Updated References List

- PMI (2021). A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Seventh Edition.
- Alghamdi, A. (2020). Risk Management in Saudi Construction Projects. *International Journal of Project Management*, 38(4), 215–227.
- Smith, N. J. (2014). *Managing Risk in Construction Projects*. John Wiley & Sons.
- Zwikael, O., & Ahn, M. (2011). The Effectiveness of Risk Management: An Analysis of Project Success Factors. *International Journal of Project Management*, 29(2), 85–97.

Furthermore, the study aims to explore how technological advancements, such as Building Information Modeling (BIM), influence the identification and control of risks during the planning phase. The research also seeks to understand whether project managers with formal risk training handle challenges differently compared to those relying on experience-based approaches.

Another key objective is to assess the alignment of current practices in Saudi Arabia with international risk management standards. The study will also evaluate how effectively lessons learned from previous projects are incorporated into new ones to avoid repeating mistakes.

H4: Projects that integrate digital tools in risk tracking have higher adaptability to unexpected events.

H5: Organizational culture significantly moderates the relationship between planning quality and execution success.

The model assumes that risk management is a continuous process and introduces feedback loops to capture how past project outcomes affect future planning. Additionally, the role of external environmental uncertainties such as supply chain disruptions and labor market shifts are included as moderating variables.

In addition to qualitative analysis, a small-scale quantitative survey may be distributed to validate patterns observed in the interviews. This mixed-method approach will help in triangulating data and enhancing research validity.

Assignment 3 – Literature Review

Project Risk Management Practices in Saudi Construction Projects: A Study on Planning and Execution Challenges

This chapter presents a comprehensive literature review that synthesizes global and regional scholarship on construction risk management, with a specific emphasis on the Saudi Arabian context. The review is structured around theoretical foundations, empirical evidence, and thematic areas that map directly to the research questions and hypotheses of this study.

Table of Contents

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1. Introduction

Construction projects are exposed to high levels of uncertainty due to their multi-disciplinary nature, fragmented supply chains, and exposure to external shocks. As Saudi Arabia accelerates socio-economic transformation under Vision 2030, mega-projects such as NEOM, Qiddiya, and the Red Sea Project magnify traditional risks related to cost, schedule, quality, safety, and sustainability. A robust literature base has evolved over the past three decades to examine how risks can be identified early, assessed rigorously, and treated through prevention, transfer, or mitigation strategies. This review consolidates seminal theories (PMI, ISO 31000), international empirical findings, and Saudi-specific studies to reveal what is known and where important gaps remain. It also contrasts the planning and execution phases, arguing that risk is dynamic and requires continuous monitoring and learning.

2. Theoretical Foundations of Risk Management

The PMI (2021) framework conceptualizes risk management as an iterative process spanning: plan risk management, identify risks, perform qualitative and quantitative analysis, plan risk responses, implement responses, and monitor risks. ISO 31000:2018 extends this logic to the enterprise level, stressing integration with governance, leadership, and culture. Classic texts (Smith, 2014; Hopkin, 2018; Hillson, 2017) distinguish between hazard, uncertainty, and opportunity, emphasizing that risk is not solely negative but includes upside potential when managed intelligently. Quantitative techniques—Monte Carlo simulation, decision trees, sensitivity analysis, and

Bayesian updating— augment qualitative tools such as risk breakdown structures, checklists, and expert workshops. In construction, the theoretical consensus is that risk ownership must be explicit in contracts and aligned with parties best able to control it.

Another theoretical stream focuses on socio-technical systems. Loosemore et al. (2006) argue that risk behaviors are shaped by organizational norms, incentives, and power dynamics. Kerzner's governance lens links risk maturity to clear roles, stage-gate reviews, and knowledge management. These views imply that identical technical tools can produce divergent outcomes across organizations depending on leadership commitment and culture.

3. Global Perspectives on Construction Risk

International studies are remarkably consistent about the top risk drivers: scope creep, design changes, low-bid procurement, supply chain volatility, labor productivity, and inadequate site safety. Flyvbjerg (2017) documents systemic cost overruns in megaprojects due to optimism bias and strategic misrepresentation. Zou, Zhang, and Wang (2007) highlight regulatory shifts and financing constraints in China, while UK/US studies emphasize contractual risk allocation and early contractor involvement. Across contexts, communication effectiveness emerges as a major predictor of success (Zwikael & Ahn, 2011).

Digitization has reshaped global practices: Building Information Modeling (BIM) enables clash detection and constructability reviews; common data environments improve transparency; and ERP platforms enhance procurement and inventory control. Increasingly, owners deploy digital risk registers and dashboards that track triggers, thresholds, and mitigations in real time. However, benefits depend on accurate data, disciplined processes, and stakeholder buy-in—factors frequently underappreciated in traditional project settings.

4. Risk Management in the Saudi Construction Sector

Saudi Arabia's construction market is characterized by a diverse contractor base, extensive subcontracting, and strong public-sector demand. Empirical studies report recurring challenges: planning deficiencies, optimistic scheduling, fragmented coordination, and change orders (Albogamy, Scott, & Dawood, 2013). Contractor capability and governance quality significantly shape outcomes (Alzahrani & Emsley, 2013). Alghamdi (2020) observes a gradual diffusion of formal frameworks, though implementation remains uneven—particularly among small and medium firms. Regulatory reforms, Saudization policies, and supply chain dependencies introduce additional uncertainty that must be accounted for during planning.

Mega-projects under Vision 2030 elevate stakes and complexity. They involve multinational consortia, innovative design, and aggressive timelines. The literature suggests that such projects benefit from early risk workshops, contractual clarity on risk transfer, advanced analytics, and tier-one supplier

development. Yet knowledge transfer from mega-projects to the wider market is limited, creating a maturity gap between leaders and the broader ecosystem.

5. Core Risk Categories in Construction

To structure the review, risks are grouped into financial, schedule, design/quality, health & safety, environmental/sustainability, and stakeholder/governance domains. Each category spans planning and execution phases but manifests differently across the project life cycle.

5.1 Financial and Commercial Risks

Cost escalation, currency volatility, and inflation threaten budgets. In Saudi projects, imported materials and specialized equipment make budgets sensitive to global commodity prices and logistics rates. Fixed-price contracts without escalation clauses can transfer undue risk to contractors, leading to claims and disputes. Best practice emphasizes realistic contingencies, market testing, and proactive contract administration.

5.2 Schedule and Logistics Risks

Schedule risk stems from design changes, late permits, customs clearance delays, and resource bottlenecks. Buffer management and critical chain methods help absorb variability. Integrated logistics planning—linking procurement lead times to look-ahead schedules—reduces idle time on site.

5.3 Design and Quality Risks

Late design freeze and inadequate coordination produce rework. BIM-enabled design reviews and constructability assessments mitigate these issues.

Quality risk also arises from fragmented subcontracting and uneven supervision; robust inspection and test plans (ITPs) and clear acceptance criteria are essential.

5.4 Health, Safety, and Environmental (HSE) Risks

HSE incidents carry human, legal, and reputational consequences. High-risk activities—working at height, heavy lifts, confined spaces—require method statements, permits to work, and competency verification. Environmental risks include waste, noise, dust, and habitat disturbance; Saudi environmental standards and client ESG requirements increasingly influence project methods.

5.5 Stakeholder and Governance Risks

Ambiguous roles, weak change control, and late decision-making create churn. Clear RACI matrices, empowered project boards, and transparent reporting reduce governance risk. For public projects, alignment between client agencies and regulators is critical to avoid conflicting directives.

6. Planning Phase Risks

Planning establishes the baseline against which execution performance is measured. The literature identifies recurring weaknesses: inadequate front-end loading, insufficient stakeholder engagement, optimistic cost/schedule estimates, and generic risk registers that fail to capture project-specific exposures. In Saudi Arabia, early contractor involvement is often limited, reducing the realism of constructability and logistics plans.

Best practice emphasizes phase-gate governance, value engineering, and scenario analysis. Quantitative risk analysis—using Monte Carlo on schedule networks and cost models—produces probabilistic contingency (e.g., P50/P80). Such analysis is especially useful where supply chain lead times and regulatory approvals are uncertain. Integrating these outputs into decision-making improves the credibility of the baseline.

7. Execution Phase Risks

During execution, new risks emerge while known risks evolve. Material delays, labor availability, equipment breakdowns, and weather events disrupt production. Communication breakdowns between contractors, consultants, and client representatives amplify the impact (Zwikael & Ahn, 2011). Daily risk reviews, look-ahead planning, and change control are critical to maintain momentum and protect the critical path.

Claims and disputes are common when contract mechanisms for variations, extensions of time, and compensation events are poorly understood. A

learning-oriented posture— documenting root causes, updating risk registers, and feeding insights to planning— distinguishes mature organizations from others.

8. Technology and Digital Transformation

BIM supports risk reduction by enabling coordinated models, quantity take-off accuracy, and 4D/5D simulations that visualize sequence and cash flow. Common data environments ensure a single source of truth. ERP platforms connect procurement, warehousing, and site installation, reducing stock-outs and expediting. Advanced analytics— machine learning on progress and quality data— can flag anomalies before they escalate.

Despite clear benefits, adoption barriers persist: training costs, resistance to change, and interoperability issues. Saudi firms that invest in capability building and mandate digital deliverables in contracts are more likely to realize value. Literature suggests starting with high-impact use cases (clash detection, document control) and scaling to predictive analytics as data maturity grows.

9. Stakeholder Communication and Organizational Culture

Culture shapes risk perception and behavior. Hierarchical structures may suppress early escalation of issues, while blame-oriented environments discourage learning. The literature recommends psychological safety, clear interfaces, and ritualized communication (daily huddles, weekly coordination, monthly governance) to surface risks early. In Saudi projects, cross-cultural teams heighten the need for protocols and shared glossaries.

A mature risk culture aligns incentives with transparency and collaboration. Leaders model desired behaviors by acting on early warnings and rewarding preventive actions. Training programs, lessons-learned repositories, and communities of practice institutionalize knowledge.

10. Contracts and Procurement as Risk Instruments

Contract strategy determines how risk is allocated among parties. Lump-sum, measure-and-pay, design-build, and EPC contracts each distribute risk differently. Poorly balanced allocation can trigger adversarial behaviors and claims. Best practice tailors contract type to project uncertainty, uses clear change mechanisms, and requires realistic baselines. Supplier prequalification and multi-sourcing mitigate supply risk.

11. Quality and Safety Management

Quality and safety outcomes are interlinked with risk performance. Structured ITPs, non-conformance reporting, and root-cause analysis prevent recurrence. Leading indicators—near misses, permit violations, housekeeping audits—provide foresight. Digital checklists and mobile inspection apps improve coverage and traceability, enabling faster corrective action.

12. Cost and Schedule Control Under Uncertainty

Earned value management (EVM) integrates scope, cost, and time to quantify variance and forecast outcomes. When combined with risk registers, EVM supports scenario planning and more credible forecasts. Contingency

drawdown logs ensure that reserves are used transparently against identified risks.

13. Sustainability and ESG-Related Risks

Environmental permits, carbon requirements, and community impact can introduce schedule and cost risks if not anticipated. Global clients increasingly require waste minimization, water stewardship, and biodiversity protection. Saudi projects near sensitive coastlines or habitats must embed mitigation into method statements, logistics, and design choices.

14. Lessons Learned and Knowledge Management

Repeated pitfalls across projects indicate weak learning systems. Literature advocates structured close-outs, after-action reviews, and searchable repositories that feed forward into new bids and planning. Organizations that institutionalize learning display faster risk identification and more effective responses—improving predictability over time.

15. Comparative Analysis: Planning vs. Execution

Evidence confirms a tight coupling between phases: under-scoped designs, unrealistic schedules, and vague interfaces in planning become rework, idle time, and disputes in execution. Conversely, adaptive execution—with rapid decision cycles, empowered frontline teams, and transparent dashboards—can offset some planning defects. Hence, risk governance must span both phases with feedback loops and clear ownership.

16. Conceptual Link to the Present Study

The reviewed literature aligns with this research model: independent variables (planning quality, stakeholder communication, technology adoption, and risk identification rigor) influence the dependent variable (project success).

Organizational culture moderates these relationships. The synthesis validates the study's hypotheses that effective planning reduces execution delays, communication failures drive risk during execution, and digital tools enhance adaptability.

17. Research Gaps

Despite extensive global research, gaps persist in the Saudi context: (1) limited mixed-methods studies that connect planning practices to execution performance using empirical data; (2) sparse evaluation of BIM/ERP adoption outside mega-projects; (3) insufficient integration of culture into quantitative risk models; (4) weak lessons-learned systems across contractors; and (5) minimal public-private comparisons. Addressing these gaps can inform policy and industry capability building under Vision 2030.

18. Conclusion

The literature converges on a pragmatic message: risk management delivers value when embedded into governance, culture, and digital workflows across the entire project life cycle. For Saudi Arabia's construction sector, elevating planning rigor, strengthening communication, and accelerating digital

adoption are decisive levers to improve outcomes. These insights ground the empirical design of this study and frame its expected contributions.

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Appendix A: Annotated Synthesis of Key Studies

This appendix summarizes influential studies and how they inform the current research design. The annotations emphasize context, methods, and findings relevant to Saudi construction projects and to the planning– execution interface.

PMI (2021) and ISO 31000

Provide the core process logic and governance principles for risk management. They justify the study’ s focus on integration across phases and on culture.

Flyvbjerg (2017)

Explains optimism bias and political– economic drivers of cost overrun in megaprojects, underscoring the need for independent assurance and probabilistic baselines.

Zou et al. (2007)

Offer an empirically grounded taxonomy of construction risks that supports the categorical analysis used in this review.

Albogamy et al. (2013)

Supply Saudi-specific evidence on delay drivers, strengthening the argument that planning system weaknesses remain salient in the Kingdom.

Alzahrani & Emsley (2013)

Connect contractor attributes to project outcomes, motivating the inclusion of capability and governance variables in the research model.

Zwikael & Ahn (2011)

Empirically show that communication effectiveness predicts success, aligning with the study's H2 hypothesis and the culture discussion.