

Midocean University
College of Management
Master\ Project Management



**The impact of risk management practices on project
performance: A case study of construction projects in
Jeddah**

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Year:2026

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DEDICATION

To every aspiration that begins as an idea and grows through
persistence into achievement.

To the quiet determination that drives continuous learning and the
pursuit of excellence.

To the value of knowledge as a path toward progress and
meaningful contribution.

This work is dedicated to the spirit of perseverance,
to the discipline of inquiry,
and to the belief that every effort invested in learning today
shapes a more capable and purposeful tomorrow.

ACKNOWLEDGEMENT

All praise is due to Allah for granting me the strength, patience, and guidance to complete this work. I am deeply grateful for His countless blessings and for enabling me to reach this stage of my academic journey.

I would like to express my sincere appreciation to Midocean University for providing a supportive and stimulating academic environment that made the completion of this research possible. The knowledge, resources, and encouragement I received have played a vital role in shaping my academic and professional development.

My heartfelt thanks also go to the faculty members whose dedication and expertise greatly enriched my learning experience. I am especially grateful to my supervisors, Dr. Faisal Abdulhamid and Dr. Fayez Ali Jarad, for their valuable guidance, insightful feedback, and continuous support throughout this research journey.

Finally, I extend my appreciation to my fellow colleagues for their constructive discussions and shared experiences, which contributed to creating a motivating and collaborative academic atmosphere.

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Abstract

This study investigates the impact of risk management practices on project performance in construction projects in Jeddah, Saudi Arabia. It focuses on three key dimensions of risk management: risk identification, risk assessment, and risk response strategies, and examines their influence on project performance in terms of cost, time, and quality. A descriptive-analytical approach was adopted, and data were collected through a structured questionnaire distributed to a sample of 384 construction professionals. Statistical analysis was conducted using SPSS, including descriptive statistics, correlation analysis, and regression analysis.

The findings reveal that risk management practices are implemented at a high level, while project performance is achieved at a very high level. The results also indicate a strong positive and statistically significant relationship between risk management practices and project performance. Furthermore, regression analysis confirms that all dimensions of risk management have a significant effect on project performance, with risk assessment demonstrating the highest impact. The study concludes that effective risk management plays a critical role in improving project outcomes and enhancing overall performance in construction projects.

The study recommends strengthening risk management frameworks, improving time management practices, and promoting continuous professional development to further enhance project performance.

Keywords: Risk Management, Project Performance, Construction Projects, Risk Assessment, Jeddah

CHAPTER ONE

INTRODUCTION

Introduction

Project management has become an essential discipline for ensuring the successful delivery of projects across various industries, particularly in environments characterized by complexity, uncertainty, and resource constraints. Within this context, the construction sector stands out as one of the most dynamic and risk-prone industries, where projects are often exposed to numerous uncertainties related to time, cost, quality, and external conditions. These uncertainties, if not properly managed, can significantly hinder project success and lead to delays, budget overruns, and compromised performance outcomes.

Risk is an inherent element in construction projects due to their unique characteristics, including large capital investments, multiple stakeholders, and changing environmental and regulatory conditions. Consequently, effective risk management practices have emerged as a critical component of project management, aiming to systematically identify, assess, and respond to potential risks throughout the project lifecycle. Proper implementation of these practices enables project teams to minimize negative impacts while enhancing the likelihood of achieving project objectives. (Alruqi, 2026)

Project performance, which is typically evaluated in terms of time, cost, quality, and overall efficiency, is directly influenced by how well risks are managed. Despite the recognized importance of risk management, its practical application and effectiveness may vary across different contexts, particularly in rapidly developing construction markets. (Assaad et al., 2020)

In Saudi Arabia, the construction industry has experienced significant growth in recent years, driven by large-scale infrastructure and urban development projects. Within this national context, Jeddah represents a major urban and economic hub where construction activities are both extensive and complex. However, the increasing scale and complexity of projects in Jeddah also amplify exposure to various risks, making the role of risk management practices even more critical. Therefore, examining how these practices influence project performance in construction projects in Jeddah provides valuable insights into improving project outcomes in similar environments.

Problem Statement

Despite the growing recognition of risk management as a fundamental component of effective project management, construction projects continue to experience significant

challenges related to delays, cost overruns, and suboptimal performance outcomes. This issue is particularly evident in developing and rapidly expanding construction environments, where projects are exposed to a wide range of uncertainties stemming from financial, technical, managerial, and external factors. In such contexts, the presence of risks is unavoidable; however, the extent to which these risks are systematically managed often determines the overall success or failure of projects.

Previous studies have emphasized the importance of risk management practices—particularly risk identification, risk assessment, and risk response strategies—in enhancing project outcomes. Nevertheless, much of the existing literature has either focused on general project environments or examined limited aspects of risk management without providing a comprehensive analysis of its multidimensional impact on project performance. Furthermore, while several studies have been conducted in different geographical contexts, there remains a relative lack of empirical research that specifically investigates the effectiveness of these practices within the Saudi construction sector.

More specifically, in the context of construction projects in Jeddah, there is insufficient evidence regarding how risk management practices are implemented in practice and how each dimension contributes to improving project performance. This gap limits the ability of practitioners and decision-makers to adopt evidence-based strategies for managing risks effectively and enhancing project outcomes.

Accordingly, this study seeks to address this gap by examining the impact of risk management practices—namely risk identification, risk assessment, and risk response strategies—on project performance within construction projects in Jeddah.

Main Research Question:

What is the impact of risk management practices (risk identification, risk assessment, and risk response strategies) on project performance in construction projects in Jeddah?

Significance of the Study

This study is significant as it examines the role of risk management practices in enhancing project performance within the construction sector, particularly in a complex and rapidly developing environment such as Jeddah. By focusing on key dimensions of risk management—risk identification, risk assessment, and risk response strategies—the study provides a structured understanding of how these practices contribute to achieving

better project outcomes. It also offers insights into current practices and highlights areas that require improvement to support more effective project delivery.

Academic Significance:

This study contributes to the existing body of knowledge in project management by providing empirical evidence on the relationship between risk management practices and project performance within the construction industry. It extends prior research by examining the combined and individual effects of key risk management dimensions in a specific regional context. Additionally, it helps bridge the gap in the literature related to construction projects in Jeddah, offering a foundation for future academic research in similar environments.

Practical Significance:

From a practical perspective, the findings of this study provide valuable guidance for project managers, contractors, and decision-makers in the construction sector. By identifying the most influential risk management practices, the study supports practitioners in improving their risk handling approaches, minimizing potential disruptions, and enhancing overall project performance. It also aids organizations in developing more effective risk management frameworks tailored to the challenges of construction projects in Jeddah.

Research Objectives

Main Objective:

This study aims to investigate the extent to which risk management practices—specifically risk identification, risk assessment, and risk response strategies—contribute to improving project performance in construction projects in Jeddah.

Sub-objectives:

1. To examine the current level of application of risk management practices in construction projects in Jeddah.
2. To measure the degree of project performance achieved in construction projects in Jeddah in terms of cost efficiency, time adherence, and quality outcomes.
3. To analyze the influence of each risk management dimension (risk identification, risk assessment, and risk response strategies) on project performance.

Research Questions

Main Research Question:

What is the extent of the impact of risk management practices—risk identification, risk assessment, and risk response strategies—on project performance in construction projects in Jeddah?

Sub-questions:

1. What is the current level of implementation of risk management practices in construction projects in Jeddah?
2. What is the level of project performance achieved in construction projects in Jeddah?
3. To what extent do risk identification, risk assessment, and risk response strategies individually and collectively influence project performance?

Research Hypotheses

Based on the research problem and its objectives, as well as benefiting from previous studies, and in order to study the cognitive model shown in the figure below:

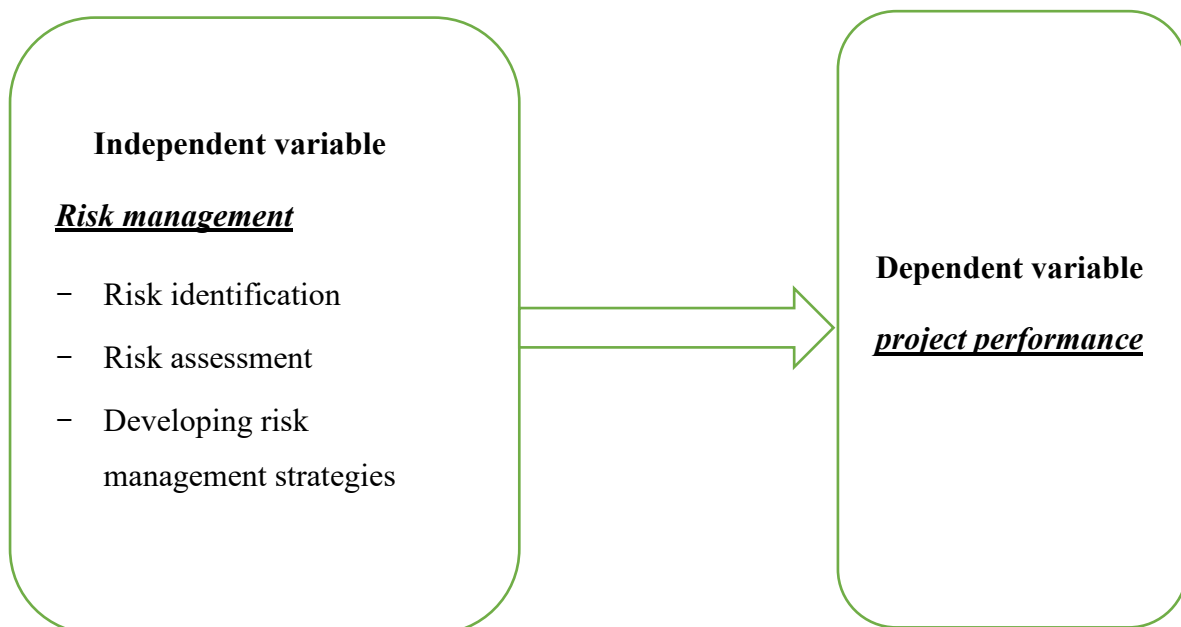


Figure (1) Study Model

Source: Prepared by the Researcher

The research hypotheses were formulated as follows:

Main Hypothesis: There is a statistically significant effect at the significance level ($\alpha \leq 0.05$) of risk management practices—comprising risk identification, risk assessment, and risk response strategies—on project performance in construction projects in Jeddah.

Sub-hypotheses:

1. There is a statistically significant effect of risk identification on project performance in construction projects in Jeddah.
2. There is a statistically significant effect of risk assessment on project performance in construction projects in Jeddah.
3. There is a statistically significant effect of risk response strategies on project performance in construction projects in Jeddah.

Operational Definitions

To ensure clarity and consistency in the interpretation of the study variables, the following operational definitions are provided based on how each construct will be measured within the context of this research:

Risk Management:

Risk management refers to the systematic process adopted in construction projects to identify, assess, and respond to potential risks that may affect project objectives. In this study, it is operationally defined as the collective practices of risk identification, risk assessment, and risk response strategies as perceived by project stakeholders in construction projects in Jeddah.

Risk Identification:

Risk identification is the process of systematically recognizing and documenting potential events or conditions that may negatively affect project objectives. Operationally, it is measured by the extent to which construction project teams in Jeddah actively detect and document possible risks during different phases of the project lifecycle.

Risk Assessment:

Risk assessment refers to the process of evaluating identified risks in terms of their likelihood of occurrence and potential impact on project objectives. In this study, it is operationally defined as the degree to which construction professionals in Jeddah analyze and prioritize risks to support informed decision-making.

Risk Response Strategies:

Risk response strategies refer to the planned actions taken to mitigate, transfer, avoid, or accept identified risks in order to minimize their negative impact. Operationally, this construct is measured by the effectiveness and implementation level of risk response actions adopted in construction projects in Jeddah.

Project Performance:

Project performance refers to the degree to which construction projects achieve their intended objectives in terms of time, cost, and quality. In this study, it is operationally defined as the perceived effectiveness of project outcomes as evaluated by stakeholders in construction projects in Jeddah, based on adherence to schedules, budget compliance, and quality standards.

CHAPTER TWO
LITERATURE REVIEW

Introduction

This chapter provides the theoretical foundation upon which the study is built by examining the key concepts related to risk management and project performance within the construction industry. It begins by exploring the concept of risk management, its importance, and its core processes, including risk identification, risk assessment, and risk response strategies. The chapter also discusses the concept of project performance, highlighting its key dimensions, particularly cost, time, and quality, as essential indicators of project success.

In addition, this chapter reviews a range of previous empirical studies that have addressed the relationship between risk management practices and project outcomes in different contexts. These studies are critically analyzed to identify areas of agreement and divergence, as well as to highlight existing research gaps. Through this review, the chapter aims to establish a clear theoretical and empirical basis for the current study, demonstrating the relevance of investigating the impact of risk management practices on project performance in construction projects in Jeddah.

LITERATURE REVIEW

Section 1: Arabic Studies

(Alghuried, 2026)

The purpose of this study was to identify and evaluate critical success factors (CSFs) for sustainable construction project management in Saudi Arabia. The research adopted a mixed quantitative approach beginning with an extensive literature review that identified 24 CSFs, followed by a survey of industry experts. Data were analyzed using the Relative Importance Index (RII) and Analytic Hierarchy Process (AHP). The results categorized CSFs into five main groups, with strategic planning, resource allocation efficiency, project manager expertise, and governance compliance emerging as the most influential factors. The study also emphasized the importance of integrating modern tools and sustainable practices to improve project outcomes. It concluded that sustainability-oriented risk-aware management enhances project performance. The study recommended adopting structured frameworks and advanced technologies to support sustainable and efficient project delivery.

(Alqahtani et al., 2026)

This study aimed to systematically assess risk factors affecting construction supply chain management in Saudi Arabia and to establish a prioritized hierarchy of these risks. A quantitative methodology was used, beginning with the identification of 50 risk factors from literature, which were refined to 23 through expert consultation. A structured questionnaire was then distributed to 112 industry professionals, and data were analyzed using the Relative Importance Index (RII) and Risk Index (RI). The findings identified financial instability, supplier delivery failure, demand fluctuations, and single sourcing as the most critical risks impacting supply chain performance. A strong correlation between risk probability and impact was also confirmed. The study concluded that effective risk prioritization is essential for improving supply chain resilience. It recommended developing targeted mitigation strategies and strengthening risk management frameworks for large-scale projects.

(Alsulami et al., 2026)

This study aimed to identify early warning signs (EWS) of construction project failure in Saudi Arabia and propose effective mitigation strategies. A mixed-methods approach

was employed, combining a quantitative survey of construction professionals with a qualitative Nominal Group Technique (NGT) session. The survey included 41 items and demonstrated high reliability (Cronbach's $\alpha = 0.86$), with data analyzed using descriptive statistics. The findings revealed key early warning indicators such as ineffective leadership, poor project definition, inaccurate cost estimation, and inadequate managerial response. The qualitative phase further prioritized these indicators and proposed mitigation measures, including improved front-end planning, enhanced reporting systems, and institutionalization of risk registers. The study concluded that early detection significantly improves risk management effectiveness. It recommended implementing structured early warning systems to enhance project performance.

(Rashid et al., 2026)

This study aimed to analyze internal and external risk factors influencing construction project failure in Saudi Arabia by developing and testing a comprehensive research model. Data were collected from 76 construction firms and analyzed using Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM). Reliability and validity tests confirmed the robustness of the model, with strong statistical indicators supporting data suitability. The findings revealed that internal risk factors have a direct and significant impact on project failure, while external factors also contribute through indirect relationships. Additionally, natural events and the COVID-19 pandemic were found to mediate the relationship between risk factors and project failure. The study concluded that risk management must consider both internal and external dynamics. It recommended expanding future research beyond the Saudi context to enhance generalizability and deepen understanding.

(Alruqi, 2026)

The objective of this study was to examine the relationship between productivity pressure and workers' risk perception within a multinational construction workforce in Saudi Arabia. A quantitative approach was employed using survey data collected from 247 workers representing five nationalities on a university construction site. The data were analyzed using correlation analysis, regression models, and linear mixed-effects modeling while controlling for demographic variables. The findings indicated that productivity pressure does not significantly influence workers' risk perception, and this relationship is not moderated by age or nationality. Although cultural differences were

observed, they did not affect the relationship between pressure and risk perception. The study concluded that risk perception is influenced by factors beyond productivity pressure. It recommended focusing on improving communication, decision-making processes, and risk assessment competencies to enhance safety outcomes in multicultural construction environments.

(Alotaibi et al., 2025)

This study sought to develop and empirically test a comprehensive model for evaluating the effectiveness of Project Control Systems (PCS) in construction project delivery in Saudi Arabia. A quantitative cross-sectional survey was conducted on 222 completed construction projects, and data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) and Importance–Performance Map Analysis (IPMA). The findings supported 17 out of 20 hypotheses, demonstrating that organizational, human, and technological factors significantly influence project performance through control processes. Post-operational controls were identified as the most influential, while leadership capacity, stakeholder integration, and estimation accuracy emerged as critical improvement areas. The study emphasized the indirect role of control systems in enhancing performance outcomes. It recommended strengthening leadership, improving knowledge management, and enhancing control mechanisms to address delays and cost overruns.

(Rehman & Ishak, 2024)

This study aimed to assess the level of construction risk management practices among contractors in the Kingdom of Saudi Arabia and to develop a benchmark for evaluating performance. A quantitative research design was adopted using a structured questionnaire distributed to 303 large contracting firms, employing simple random sampling and a five-point Likert scale. Data analysis included descriptive statistics, multicollinearity testing, Common Method Variance (CMV), and Relative Importance Index (RII) to prioritize risk factors. The findings revealed that the overall level of risk management practices was moderate, with a mean score of 2.587. Key risk factors identified included safety inspection deficiencies, contract modifications, material transportation challenges, financial losses, and quality control issues. The study concluded that risk management practices require further improvement to enhance project outcomes. It recommended

establishing standardized frameworks and benchmarking systems to strengthen risk management performance in the Saudi construction industry.

(Algremazy et al., 2023)

The objective of this study was to investigate the effect of risk management practices on project performance within the Libyan construction industry, focusing on major cities such as Tripoli and Benghazi. The study employed a quantitative research design using a structured questionnaire distributed through cluster sampling, yielding 250 valid responses from construction company managers. Data were analyzed using Structural Equation Modeling (SEM) via Smart-PLS. The results demonstrated that risk management processes—particularly risk identification, assessment, and monitoring—have a significant and positive impact on project success, including financial performance. Furthermore, the study highlighted the importance of integrating quality management awareness into risk-related activities. It was recommended that construction firms adopt systematic and integrated risk management frameworks to improve project outcomes and strengthen performance efficiency.

(Su & Khallaf, 2022)

This study aimed to systematically review existing research on the influence of risk on construction project performance. A systematic literature review methodology was adopted, analyzing 54 relevant studies and categorizing them based on research content and methods. The findings revealed that most prior research focused on developing tools to assess risk impact, identifying risk factors, and modeling risk interdependencies, particularly concerning cost and schedule performance. However, several gaps were identified, including limitations in quantitative accuracy, lack of innovative methodologies, insufficient consideration of decision-making processes, and absence of comprehensive frameworks. The study concluded that existing research does not fully capture the complexity of risk-performance relationships. It recommended expanding research scope to include additional performance dimensions and developing integrated analytical models.

(Boustani, 2021)

This study aimed to examine the impact of the relationship between risk management practices and the development of construction projects in the Kingdom of Saudi Arabia. A quantitative approach was adopted using a structured questionnaire distributed to 230

participants, with 200 valid responses collected (87.4% response rate). The instrument consisted of two sections addressing risk management procedures and project success criteria based on seven key performance indicators. The findings revealed that both risk identification and risk assessment significantly influence project success in terms of time, cost, and compliance with technical specifications, whereas no significant effect was found on avoiding legal claims. Additionally, risk response strategies were found to positively impact scope achievement, timely completion, and quality standards. The study recommends strengthening systematic risk management practices, particularly in identification and response phases, to enhance overall project performance.

(ALSaadi & Norhayatizakuan, 2021)

This study aimed to examine the impact of risk management practices on construction project performance in Oman, where many projects suffer from delays and cost overruns. A quantitative methodology was employed using a structured questionnaire distributed among construction companies of varying classifications. The findings revealed a significant positive relationship between the implementation of risk management practices and improved project performance in terms of time, cost, and quality. The study emphasized that effective risk management contributes to reducing project failures and financial losses. It concluded that the lack of proper risk management is a major contributor to poor project outcomes. The study recommended hiring qualified project managers with strong knowledge of risk management processes to ensure effective implementation and improved performance.

(Bukar & Ibrahim, 2021)

This study aimed to investigate the impact of risk management on construction project performance in Nigeria, particularly under conditions of uncertainty such as the COVID-19 pandemic. A quantitative descriptive research design was employed using questionnaires distributed to 84 respondents across major cities including Abuja, Lagos, and Port Harcourt. Data were analyzed using linear regression techniques. The findings revealed that both internal and external risks significantly affect project performance, and that effective risk management plays a crucial role in mitigating these impacts. The study also identified the absence of a regulatory framework as a major challenge in managing risks. It concluded that structured risk management systems are essential for improving

performance. The study recommended the development and enforcement of regulatory frameworks supported by risk audits and continuous monitoring mechanisms.

(Assaad et al., 2020)

This study aimed to develop an integrated framework for predicting construction project performance by incorporating various risk factors affecting cost and schedule outcomes. A multi-step methodology was adopted, beginning with a survey of 63 construction experts to evaluate 25 critical risk factors, followed by statistical and mathematical modeling techniques. The study developed a predictive model capable of mapping risk variables to project performance indicators such as cost overruns and schedule delays. The findings demonstrated that risk factors significantly influence project performance and that the proposed model effectively supports prediction and decision-making. The study concluded that integrating risk assessment into performance prediction enhances project control and management. It recommended the adoption of holistic modeling approaches to improve planning, forecasting, and execution in construction projects.

(Tahir et al., 2019)

The purpose of this study was to examine the relationship between risk management practices and project success in the construction industry of Pakistan. A quantitative approach was adopted using questionnaires adapted from previous studies and distributed to relevant stakeholders. The study focused on four key components of risk management: identification, assessment, response, and control. The findings confirmed a positive relationship between effective risk management practices and project success, particularly in improving cost, time, and quality outcomes. It was also found that the initial stages of risk management reinforce overall risk control effectiveness. The study concluded that implementing structured risk management processes enhances project success rates. It recommended increasing organizational awareness and strengthening policies related to risk management practices.

(Algahtany et al., 2016)

This study aimed to introduce a new risk management model tailored to the Saudi Arabian construction industry to address persistent performance issues. The research adopted a developmental and applied methodology based on integrating Information Measurement Theory (IMT) and the Performance Information Procurement System

(PIPS). The proposed model was empirically tested across more than 1,800 projects in both construction and non-construction sectors. Findings indicated a substantial reduction in owner management effort by up to 80% and an increase in operational efficiency by approximately 40%. The model also minimized risks associated with client decision-making by leveraging expert-driven processes. The study concluded that adopting structured and performance-based risk management systems can significantly enhance project delivery. It recommended implementing the proposed model to improve decision-making processes and overall project performance.

Section 2: Foreign Studies

(Song et al., 2025)

This study aimed to examine the impact of risk management practices on sustainable project performance in the construction industry, with a focus on the mediating role of stakeholder engagement in emerging economies. A quantitative research design was employed using data collected from construction project managers involved in sustainability-oriented projects. The findings revealed that risk identification, assessment, and mitigation significantly enhance project performance across environmental, economic, and social dimensions. Furthermore, stakeholder engagement was found to play a critical mediating role by strengthening the effectiveness of risk management practices. The study concluded that integrating stakeholder involvement into risk management enhances sustainability outcomes. It recommended promoting collaborative decision-making and communication to maximize project performance.

(Olateju et al., 2025)

This study aimed to examine the relationship between risk control techniques and project success in building construction companies in Lagos State, Nigeria. A cross-sectional survey design was employed, using a structured questionnaire administered to 147 participants, with data analyzed through descriptive statistics and regression analysis. The findings revealed a significant positive relationship between risk control techniques and project success criteria. Additionally, the study identified key risk control measures, including insurance mechanisms, as critical tools for enhancing project sustainability and safety. The results also emphasized the importance of ranking risk control strategies based on their effectiveness. The study concluded that effective risk control enhances project

outcomes. It recommended stronger regulatory enforcement and increased awareness among contractors regarding risk control mechanisms.

(Bhatti & Nazir, 2024)

This study aimed to examine the impact of project process management on sustainable project success in the construction sector, with a focus on the moderating role of risk management practices. A quantitative research design was employed using data collected from 328 professionals through structured questionnaires, analyzed using SmartPLS. The findings indicated that effective process management significantly improves project performance in terms of time, cost, and scope. Furthermore, risk management practices were found to moderate the relationship between process management and project success, particularly for time and cost performance. However, the moderating effect was not significant for project scope. The study concluded that integrating process management with proactive risk management enhances sustainable outcomes. It recommended adopting comprehensive management strategies that combine both approaches to achieve better project performance.

(Oyekunle, 2024)

This study aimed to examine risk management practices in the Nigerian construction sector and their impact on project performance. A quantitative survey methodology was used, with 85 questionnaires distributed using a five-point Likert scale. The findings revealed a strong positive relationship between risk management practices and project performance, particularly in achieving cost, time, and quality objectives. The study also highlighted challenges such as lack of expertise and insufficient skilled personnel as barriers to effective risk management. It concluded that improving knowledge and experience in risk management is essential for enhancing project outcomes. The study recommended investing in capacity building and professional training to strengthen risk management implementation.

(Goswami, 2024)

This study aimed to investigate the effectiveness of risk management practices in achieving project success within agile software development environments. A qualitative research approach was adopted, collecting data from agile teams to explore challenges and strategies related to risk management. The findings indicated that effective integration of risk management into project planning and execution significantly

improves outcomes related to time, cost, quality, and stakeholder satisfaction. Additionally, organizational culture, leadership, and stakeholder engagement were found to influence risk management effectiveness. The study concluded that tailored risk management frameworks are necessary for agile environments. It recommended the use of advanced digital tools and structured approaches to enhance proactive risk identification and mitigation.

(Kallow et al., 2023)

This study aimed to explore how risk management practices contribute to project success in the construction industry, focusing on the mediating role of risk coping capacity and the moderating role of risk transparency. A quantitative approach was used, collecting data from 320 project managers through structured questionnaires. The analysis demonstrated that risk management practices—particularly identification, monitoring, and prevention—significantly influence project success. Additionally, risk coping capacity was found to mediate this relationship, while risk transparency moderated the effect. The study concluded that both internal capabilities and transparency mechanisms enhance the effectiveness of risk management. It recommended strengthening organizational capacities and improving transparency to achieve better project outcomes.

(Feven, 2023)

This study aimed to assess the relationship between risk management practices and project performance in construction projects in Addis Ababa, Ethiopia, while examining the mediating role of construction risks. A quantitative research design was adopted using a structured questionnaire, and the collected data were analyzed using SPSS and Structural Equation Modeling (SEM). The results indicated that economic, political, logistical, and managerial risks significantly affect project performance, with internal risks having a greater impact than external ones. Furthermore, risk identification and monitoring were identified as the most influential processes in improving project outcomes. The study confirmed a statistically significant relationship between risk management and project performance. It recommended enhancing training programs and workshops to improve stakeholders' understanding and implementation of risk management practices.

(Kassem & Ali, 2023)

The objective of this study was to investigate the mediating role of effective risk management in reducing the impact of external risk factors on construction project success, particularly in oil and gas projects. A quantitative approach was used, collecting data from 348 project participants, which were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings demonstrated that effective risk management significantly mitigates the negative effects of external risks and enhances project success. Time overruns were identified as the most critical factor affecting performance, while risk analysis emerged as the most essential phase of the risk management process. The study concluded that integrating risk management strategically can improve organizational competitiveness. It recommended adopting advanced risk management practices to enhance project integration and performance outcomes.

(Chilumo et al., 2020)

The aim of this study was to investigate the relationship between risk management practices and the performance of building construction projects, with particular attention to the consequences of poor implementation. The study employed a desktop literature review methodology, analyzing empirical journal articles that examined risk management and project performance. The findings indicated that inadequate risk management leads to project delays, cost overruns, and reduced efficiency, whereas proper implementation enhances positive outcomes. The study also confirmed a direct and positive relationship between risk management practices and project performance. It highlighted both convergence and divergence across prior research findings and identified existing research gaps. The study recommended that policymakers and practitioners adopt comprehensive risk management frameworks to improve construction project outcomes.

(Rahman & Adnan, 2020)

The objective of this study was to analyze risk management practices and performance measurement in construction projects in Finland. A qualitative case study approach was employed, examining two complex construction projects to identify risk management processes and evaluation strategies. The findings highlighted the importance of not only managing risks but also measuring the effectiveness of risk management practices. The study revealed that performance measurement plays a critical role in ensuring successful risk mitigation. It concluded that integrating risk management with performance

evaluation enhances project outcomes. The study recommended further research into risk management performance measurement to improve construction project success.

(Nawaz et al., 2019)

This study aimed to explore risk management practices in construction projects in Pakistan and develop an innovative framework suitable for developing countries. A survey-based quantitative approach was used, collecting data from 22 contractor firms involved in 100 projects. The analysis revealed that risk management practices are still implemented at a relatively low level in the local construction industry. However, a strong positive correlation was found between effective risk management and project success. The study emphasized the importance of applying appropriate risk management techniques to improve project outcomes. It concluded that increased awareness and adoption of risk management practices are essential. The study recommended educating project stakeholders about the benefits and applications of risk management to enhance project performance.

(Musonda et al., 2015)

This study aimed to examine risk management practices in construction projects across developing countries and identify commonly used techniques. The research adopted a qualitative approach through a comprehensive literature review covering studies published between 2000 and 2015, using content analysis to extract key themes. The findings revealed that risk management practices in developing countries are often inconsistent and largely based on subjective judgment rather than standardized methodologies. Despite these limitations, the study confirmed that systematic risk management can significantly improve project delivery and performance. It concluded that the lack of formalized practices is a major challenge in these contexts. The study recommended adopting more structured and standardized risk management approaches to enhance effectiveness.

(Serpella et al., 2014)

The purpose of this study was to address inefficiencies in construction risk management by proposing a knowledge-based approach in the Chilean context. The research adopted a conceptual and developmental methodology, introducing a three-component model involving risk function modeling, evaluation, and best practice implementation. The findings indicated that risk management practices are often not

systematically applied due to a lack of knowledge and experience among stakeholders. This deficiency leads to poor project performance and ineffective risk handling. The study concluded that enhancing knowledge and adopting structured methodologies can significantly improve risk management effectiveness. It recommended implementing knowledge-based systems and best practice frameworks to strengthen project outcomes.

Commentary on Previous Studies and Research Gap Identification

Based on the review of both Arabic and international previous studies, it can be observed that there is a high degree of convergence in the overall findings, alongside some fundamental differences that highlight the importance of the current study and reveal the research gap it seeks to address.

In terms of similarities, most studies such as (Boustani, 2021), (Algremazy et al., 2023), (ALSaadi & Norhayatizakuan, 2021), (Tahir et al., 2019), (Oyekunle, 2024), and (Feven, 2023) consistently agreed that there is a direct positive relationship between risk management practices and construction project performance, particularly in relation to time, cost, and quality outcomes. Similarly, other studies such as (Kassem & Ali, 2023), (Kallow et al., 2023), and (Song et al., 2025) emphasized the mediating or moderating role of risk management in enhancing project success and reducing the impact of external risks. In addition, several studies such as (Nawaz et al., 2019), (Musonda et al., 2015), and (Serpella et al., 2014) highlighted that weak or inadequate implementation of risk management practices is one of the key causes of poor project performance, particularly in developing countries.

Regarding differences, the reviewed studies varied in their focus areas and methodological approaches. Some studies, such as (Alqahtani et al., 2026) and (Rashid et al., 2026), concentrated on analyzing specific categories of risks, such as supply chain risks or internal and external risk factors, while others such as (Assaad et al., 2020) and (Alotaibi et al., 2025) focused on predictive models and control systems aimed at improving project performance. On the other hand, studies like (Alsulami et al., 2026) and (Alruqi, 2026) addressed more specialized aspects such as early warning signs and individual risk perception, reflecting the diversity of research perspectives in this field. Moreover, studies such as (Su & Khallaf, 2022) pointed out the existence of limitations in developing comprehensive frameworks that integrate risk management with overall project performance in a holistic manner.

In terms of the research gap, it is evident that most previous studies have either focused on isolated elements of risk management (such as risk identification or assessment) or on limited dimensions of project performance (mainly time and cost). There is also a lack of integrated models that comprehensively link all risk management practices with overall construction project performance. Furthermore, there is a relative shortage of empirical studies focusing on specific contexts such as construction projects in Jeddah, despite their unique characteristics in terms of project scale, complexity, and associated challenges.

Accordingly, the current study distinguishes itself by aiming to provide a comprehensive and integrated analysis of the impact of risk management practices (across all stages: identification, analysis, response, and monitoring) on construction project performance. It focuses specifically on construction projects in Jeddah, thereby addressing the contextual and geographical research gap. In addition, it integrates multiple performance dimensions (time, cost, quality, and scope) within a unified analytical model, which adds both theoretical and practical value compared to previous studies.

Theoretical Framework

Section One: Construction Projects

1. Definition of Construction Projects

Construction projects represent a fundamental pillar of economic growth and urban development, as they play a central role in establishing and upgrading infrastructure across residential, industrial, and institutional sectors. These projects can be conceptualized as a sequence of interrelated and coordinated activities that involve planning, design, execution, and maintenance of physical structures and facilities. They integrate human, material, financial, and technological resources in order to achieve predefined objectives within specific time and cost constraints (Flanagan, 2019)

What distinguishes construction projects from other types of projects is their inherent complexity. This complexity arises from the multiplicity of stakeholders involved, the interdependence of project phases, and the dynamic nature of the construction environment. Projects typically evolve through several stages, beginning with conceptualization and feasibility assessment, followed by detailed planning and design, and culminating in execution and operation. Each stage requires a high level of

coordination and communication among project participants to ensure alignment with technical specifications and quality standards (Jasim, 2016).

The execution phase, in particular, is often regarded as the most critical stage of the project lifecycle, as it translates theoretical designs and engineering plans into tangible outputs. This phase demands rigorous planning, efficient resource allocation, and continuous monitoring to prevent deviations related to time delays or cost overruns. Any shortcomings in execution may significantly affect the overall performance and success of the project (Clough, 2000)

2. Success Factors of Construction Projects

The success of construction projects is commonly evaluated based on a set of well-established performance criteria. Among the most widely recognized indicators are adherence to the planned schedule, compliance with the allocated budget, and the achievement of the required quality standards. These criteria collectively form what is often referred to as the “triple constraint” of project management.

In addition to these traditional measures, successful construction projects are also characterized by the absence of major disputes or legal claims during implementation, as well as the existence of effective collaboration among key stakeholders, including project owners, consultants, and contractors. Such collaboration enhances communication, reduces conflicts, and facilitates timely decision-making. Furthermore, delivering a final product that meets or exceeds technical specifications and stakeholder expectations remains a critical determinant of project success.

3. Key Participants in Construction Projects

The construction industry involves a diverse range of participants, each contributing to different aspects of the project lifecycle. Despite this diversity, three primary parties play a pivotal role in the successful delivery of construction projects:

a. Clients (Owners):

Clients represent the entities that initiate and finance construction projects. They may include individuals, private developers, or government organizations. Their primary objective is to ensure that the project is completed within the agreed timeframe and budget while meeting the intended functional and quality requirements.

b. Consultants:

Consultants encompass engineers, architects, project managers, and designers who are responsible for planning, designing, and supervising the project. They provide technical expertise, develop project specifications, and ensure that the construction process adheres to established standards and contractual requirements.

c. Contractors:

Contractors are responsible for the physical execution of the project. This category includes main contractors, subcontractors, and suppliers. Their performance is critical to project success, as they manage on-site activities, coordinate resources, and ensure that construction works are completed according to schedule and contractual obligations (Braimah, 2008).

4. Types of Construction Projects

Construction projects can be categorized into several types based on their purpose and functional characteristics. According to the classification provided by the Project Management Institute (PMI), construction projects are generally divided into four main categories (Project Management Institute, 2000):

- Residential construction projects, which involve the development of housing units and communities.
- Institutional construction projects, such as schools, hospitals, and government buildings.
- Infrastructure projects, including roads, bridges, water supply systems, and sewage networks.
- Industrial projects, such as factories, power plants, and manufacturing facilities.

Each type of project presents unique challenges and requires specific management approaches depending on its scale, complexity, and the nature of the stakeholders involved.

5. Legal and Financial Environment of Construction Projects

Construction projects operate within a complex legal and financial framework that governs various aspects of project execution. This framework includes building codes,

safety regulations, environmental requirements, and contractual obligations that must be strictly adhered to throughout the project lifecycle.

From a financial perspective, construction projects require comprehensive feasibility studies, cost estimation, and financial planning to ensure their economic viability. In addition, risk assessment plays a crucial role in identifying potential financial uncertainties and mitigating their impact. Compliance with legal and financial requirements is not only essential for project success but also for avoiding disputes, penalties, and delays that may arise from non-compliance.

Section Two: Risk Management in Construction Projects

1. Concept of Risk in Construction Projects

Risk is generally understood as the likelihood of uncertain events that may adversely affect the achievement of project objectives (Royal Society, 1991). However, risk is not limited to probability alone; it also encompasses the magnitude of its potential impact and the duration of its effect on project outcomes (Akintoye, 2003). In the context of construction projects, risks arise from a wide range of sources and can influence key performance dimensions such as cost, time, and quality.

Construction projects are particularly vulnerable to risks due to their inherent complexity, dynamic environments, and the involvement of multiple stakeholders. These risks may originate from internal factors, such as inefficiencies in project teams, poor coordination, or design errors, as well as external factors, including economic fluctuations, regulatory changes, and unforeseen events such as natural disasters (Zou P.X., 2007). Given this complexity, risk management has become a critical strategic function aimed at minimizing uncertainty and enhancing the likelihood of project success.

2. Sources and Nature of Risks

Risks in construction projects can be broadly categorized into internal and external sources. Internal risks are typically associated with project-related factors such as inadequate planning, poor communication, contractor delays, and design deficiencies. In contrast, external risks stem from environmental and contextual factors, including legislative changes, market volatility, and unexpected global or local events (IRWRC, 2005).

These risks affect all aspects of project performance and may lead to cost overruns, schedule delays, or compromised quality if not properly managed (Smith M. T., 2013). Importantly, risk should not be viewed solely as a negative concept. In project management literature, risk is often described as having both negative (threats) and positive (opportunities) dimensions, reflecting the inherent uncertainty associated with project activities (Cretu, 2011)

A distinction is frequently made between risk and uncertainty. While risk refers to situations where the probability of occurrence can be estimated, uncertainty describes conditions where such probabilities are unknown due to a lack of sufficient information or historical data (Smith, 2013; Flanagan, 2019). Both risk and uncertainty can lead to deviations from planned project outcomes, either positively or negatively.

3. Evolution and Importance of Risk Management

The concept of risk management has evolved significantly over time. Historically, early forms of risk management were intuitive and based on experiential judgment rather than structured methodologies. Over time, with the advancement of statistical techniques and analytical tools, risk management has developed into a systematic and data-driven discipline.

In modern project management, risk management is considered an integral component of decision-making processes. It plays a vital role in ensuring project safety, maintaining scope, controlling costs, adhering to schedules, and managing resources effectively. Risk management can be defined as a structured approach aimed at identifying, analyzing, and responding to project risks in order to support informed decision-making and improve project outcomes (Zou et al., 2007).

Effective risk management in construction projects also involves balancing potential risks against expected returns, thereby enabling project stakeholders to make strategic choices that optimize overall project value. This aligns with the broader objectives of construction project management, which include planning, coordinating, and controlling project activities from inception to completion while meeting client expectations in terms of functionality, quality, time, and cost (Walker, 2000).

4. Risk Management Process

Risk management in construction projects is typically implemented through a structured process consisting of several interrelated stages. These stages are designed to systematically address uncertainties and minimize their impact on project performance.

4.1 Risk Identification

Risk identification represents the initial and most critical step in the risk management process. It involves recognizing and documenting potential risks that may affect the project. This stage requires a comprehensive understanding of project activities and their associated uncertainties. Tools such as the Work Breakdown Structure (WBS) are often used to ensure that all project components are examined and that no potential risks are overlooked.

Risks identified at this stage can be classified into controllable and uncontrollable risks. Controllable risks are those that can be influenced by project stakeholders, whereas uncontrollable risks lie outside the scope of direct intervention. Accurate identification provides the foundation for subsequent analysis and response planning.

4.2 Risk Analysis and Assessment

Following identification, risks are analyzed to determine their likelihood of occurrence and potential impact on the project. This process can be conducted using both qualitative and quantitative techniques, depending on the nature of the risk and the availability of data (Smith, 2014).

Risk assessment enables project managers to prioritize risks based on their significance, allowing resources to be allocated efficiently. Analytical tools, statistical models, and expert judgment are commonly employed to evaluate risk severity and support decision-making (Jasim, 2016). Moreover, periodic review of risk assessments is essential to account for changes in project conditions.

4.3 Risk Response Strategies

Risk response involves developing appropriate strategies to address identified and analyzed risks. The primary objective is to reduce the likelihood of risks occurring or to mitigate their impact if they do occur. Risk response strategies are generally classified into several categories:

- Risk Mitigation: Reducing either the probability of occurrence or the severity of the impact.

- Risk Avoidance: Eliminating the risk by altering project plans or reducing complexity.
- Risk Transfer: Shifting the risk to another party, such as through insurance or contractual arrangements.
- Risk Sharing: Distributing risk responsibilities among project stakeholders through contractual agreements.
- Risk Retention: Accepting the risk and preparing contingency plans to manage its consequences.

Different contractual arrangements also influence how risks are allocated among project participants. For example, fixed-price contracts place greater risk responsibility on contractors, while cost-plus contracts shift a larger portion of risk to clients.

4.4 Risk Monitoring and Control

Risk management does not end with the implementation of response strategies. Continuous monitoring and control are essential to ensure that risks are effectively managed throughout the project lifecycle. This includes tracking identified risks, identifying new risks, evaluating the effectiveness of response strategies, and making necessary adjustments.

Risk control activities typically involve maintaining and updating a risk register, reviewing mitigation measures, and ensuring that contingency plans are ready for التنفيذ when needed. Effective monitoring enhances the project's ability to respond proactively to uncertainties and maintain alignment with project objectives (Cretu, 2011).

5. Significance of Risk Management in Construction Projects

Empirical evidence highlights the importance of effective risk management in improving project outcomes. For instance, studies have shown that a significant proportion of construction projects experience cost overruns and delays due to inadequate risk management practices. Cretu (2011) reported that approximately 86% of analyzed public projects exceeded their initial cost estimates.

In addition, effective risk management contributes to reducing contractual disputes, enhancing communication among stakeholders, and improving overall project efficiency (Braimah, 2018). Financial risks, in particular, have been identified as a major source of

instability in construction projects, especially in regions characterized by rapid economic growth and market fluctuations (Al-Anzi & Al-Dailami, 2015).

Overall, risk management serves as a critical tool for navigating the complexities of construction projects. By systematically identifying, assessing, and responding to uncertainties, it enhances the likelihood of achieving project objectives and supports sustainable project performance.

Section Three: Construction Projects in Saudi Arabia and Project Performance

1. Construction Projects in Saudi Arabia

Saudi Arabia has emerged as one of the fastest-growing economies in the Middle East, with significant expansion in infrastructure development across both urban and rural areas. The construction sector, in particular, represents a cornerstone of the national economy, driven by large-scale investments in public infrastructure, housing, and industrial development. Historical data indicate that public construction spending reached approximately USD 575 billion between 2008 and 2013, with further projections estimating that the market size approached USD 610 billion during the period from 2015 to 2020. This substantial growth reflects the strategic importance of construction activities in supporting economic diversification and urban transformation.

Despite this growth, construction projects in Saudi Arabia face considerable challenges related to performance efficiency. Risks within this sector are commonly defined as uncertain events or conditions that negatively affect project timelines and financial outcomes. Delays and schedule overruns are among the most visible manifestations of such risks, often indicating deficiencies in planning, coordination, or risk management practices.

Empirical evidence over the past decades highlights persistent issues within the Saudi construction sector, including inefficiencies, cost overruns, and delays in project delivery. Several studies have reported that approximately 60% to 70% of public construction projects experience delays, with an average delay ranging between 10% and 30% of the original contract duration. In some cases, delays have reached up to 39% of the planned project timeline. Furthermore, the total value of delayed projects has been estimated at approximately USD 147 billion (Abdul Ghafour, 2015).

Cost overruns represent another critical challenge. Survey-based studies have indicated that nearly 80% of construction projects in Saudi Arabia experience increases in costs beyond initial estimates. These findings suggest systemic inefficiencies in project planning, cost estimation, and risk mitigation.

A key factor contributing to these challenges is the limited adoption of effective risk management practices. Research has shown that inadequate risk management is one of the primary causes of infrastructure project failures. For instance, weak stakeholder engagement—particularly from clients—has been identified as a major source of risk. Traditional practices in the sector often shift risk responsibility to contractors and suppliers, despite evidence indicating that many critical risks originate from early-stage decisions made by project owners due to limited experience or insufficient planning.

Additionally, studies on change orders have demonstrated that clients are often the primary drivers of scope changes, leading to an average increase of 11.3% in project costs. Similarly, research findings indicate that more than half of project delays (approximately 53%) are attributed to client-related factors, particularly inadequate planning during the early project stages.

The construction market in Saudi Arabia is diverse and can be categorized into residential, commercial, industrial, and infrastructure sectors. Among these, the industrial sector—especially energy and resource-related projects—has shown consistent growth due to technological advancements and sustained investment flows. Geographically, construction activities are distributed across four main regions: central, western, eastern, and other areas, with the central region, particularly Riyadh, dominating in terms of large-scale projects.

2. Major Construction Projects and Sectoral Growth

Saudi Arabia is home to some of the largest and most ambitious construction projects globally. The most prominent of these projects is the Neom project, which is valued at approximately USD 500 billion and spans an area of 26,500 square kilometers along the Red Sea coast. In addition, numerous development initiatives have been launched across different regions, including over 150 projects in Tabuk, 600 projects in Qassim, and 200 projects in Hail, alongside major developments in Makkah and Riyadh.

The scale of these projects highlights the strategic importance of the construction sector in driving national development. Infrastructure, construction, and energy sectors

collectively account for a significant share of material consumption and economic activity in the region. Despite fluctuations in government spending, recent reports indicate renewed optimism in the Gulf construction market due to stabilized oil prices and the launch of major strategic projects.

3. Concept of Project Performance in Construction

Project performance is a multidimensional concept that reflects the extent to which a project achieves its predefined objectives. In construction projects, performance is typically evaluated based on three primary criteria: cost efficiency, time adherence, and quality of execution. These dimensions collectively represent the core indicators of project success.

High-performing projects are those that are completed within the allocated budget, delivered on schedule, and meet the required quality standards. However, achieving these objectives is often challenging due to the complex and uncertain nature of construction environments. Performance can be significantly affected by various internal and external factors, including project management practices, stakeholder coordination, and risk exposure.

4. Relationship Between Risk Management and Project Performance

A substantial body of literature emphasizes the strong and positive relationship between effective risk management practices and improved project performance. The ability to systematically identify, assess, and respond to risks enhances an organization's capacity to anticipate potential challenges and taking proactive measures to mitigate their impact.

Zou et al. (2007) argue that integrating risk management into core project processes significantly reduces the likelihood of delays, cost overruns, and quality deficiencies, particularly in large-scale construction projects. Effective risk management enables project teams to allocate resources more efficiently, improve decision-making, and enhance overall project control.

In the Saudi context, empirical studies have highlighted that the absence of structured risk management practices remains a major barrier to achieving optimal project performance. For example, Al-Shahri (2021) found that many construction projects in the

Kingdom suffer from reliance on ad hoc decision-making rather than systematic risk management approaches, leading to increased failure rates and project delays.

Overall, the relationship between risk management and project performance can be described as directly proportional: the more effectively risks are managed, the higher the likelihood of achieving project objectives. This underscores the importance of adopting comprehensive and proactive risk management frameworks to enhance the performance and sustainability of construction projects.

CHAPTER THREE
METHODOLOGY

Introduction

This chapter outlines the methodological framework adopted to achieve the objectives of the study and to answer its research questions. It describes the research approach and design, justifying the use of the descriptive-analytical method as appropriate for examining the relationship between risk management practices and project performance.

Furthermore, the chapter presents the study population and sample, explaining the procedures used to determine the sample size and select participants. It also details the data collection methods, including the design and development of the questionnaire as the primary research instrument. In addition, the chapter discusses the procedures used to ensure the validity and reliability of the instrument, as well as the statistical techniques employed for data analysis. Overall, this chapter provides a clear and systematic description of the research process, ensuring the transparency and credibility of the study.

3.1 Research Approach and Design

To achieve the objectives of this study, a descriptive-analytical approach was adopted. The descriptive aspect of the approach is concerned with examining the current state of risk management practices within construction projects in Jeddah, as they exist in real-world settings. This involves systematically collecting data related to risk identification, risk assessment, and risk response strategies. The analytical component, on the other hand, focuses on investigating the relationship between these practices and project performance, particularly in terms of cost, time, and quality. This approach is widely recognized as appropriate for studies that aim to interpret relationships between variables and provide evidence-based conclusions.

3.2 Study Population

The population of this study consists of professionals working in construction projects in the city of Jeddah, Saudi Arabia. This includes project managers, engineers, supervisors, contractors, and other personnel involved in project planning, execution, and monitoring. These individuals were selected as they possess direct experience and practical knowledge related to risk management practices and project performance within the construction sector.

3.3 Sample and Sampling Technique

Given the large and potentially undefined size of the study population, a representative sample was determined using a scientific and widely accepted method. The sample size was calculated based on Cochran's formula (Cochran, 1977), which is commonly used for large populations to ensure adequate representation.

The formula is expressed as:

$$\frac{z^2 \times p \times q}{2e} = 0n$$

Where:

Z= 1.96, representing the standard score corresponding to a 95% confidence level

p= 0.5, representing the estimated proportion of the population possessing the characteristic under study (used as a conservative estimate)

q= 1-p=0.5

$e = 0.05$, representing the acceptable margin of error

By substituting these values into the formula, the required sample size was determined to be:

$$\frac{0.5 \times 0.5 \times 1.96^2}{(0.05)^2} = 384$$

Accordingly, a sample of 384 respondents was selected from construction professionals in Jeddah. The sampling process followed a non-probability (convenience) sampling technique due to accessibility considerations and the practical challenges of reaching all members of the population.

3.4 Data Collection Methods

3.4.1 Sources of Data

Data for this study were collected from both primary and secondary sources:

- ✓ **Primary Data:** Collected through a structured questionnaire designed specifically for this study. The questionnaire targeted professionals working in construction projects in Jeddah and was distributed electronically using online platforms.
- ✓ **Secondary Data:** Obtained from a variety of academic and professional sources, including books, peer-reviewed journal articles, previous studies, reports, and relevant online resources related to project management and construction risk management.

3.4.2 Data Collection Procedure

The questionnaire was developed and distributed in accordance with ethical research standards. Participants were informed about the purpose of the study and their consent was obtained prior to participation. The survey was administered electronically (e.g., via Google Forms), allowing for efficient distribution and response collection. A total of 384 questionnaires were distributed to eligible participants, and all valid responses were included in the analysis.

3.5 Research Instrument (Questionnaire)

The primary instrument used in this study was a structured questionnaire designed to measure the impact of risk management practices on project performance in construction projects in Jeddah. The questionnaire was developed based on an extensive review of

relevant literature and previous empirical studies, with modifications to suit the context of this research.

3.6 Instrument Design

The questionnaire consists of two main sections:

✓ Section One: Demographic Information

This section includes general information about respondents such as age, educational level, years of experience, and job position.

✓ Section Two: Study Variables

This section is divided into two main parts:

1. Independent Variable (Risk Management Practices):

This part measures the extent of implementation of risk management practices and includes three dimensions:

- Risk Identification
- Risk Assessment
- Risk Response Strategies

It consists of 15 items.

2. Dependent Variable (Project Performance):

This part measures project performance in terms of cost, time, and quality, and consists of 10 items.

All items were measured using a five-point Likert scale ranging from (Very High) to (Very Low).

3.7 Validity and Reliability of the Instrument

To ensure the quality of the research instrument, both validity and reliability were assessed:

Validity: The questionnaire was reviewed by academic experts and specialists in project management to ensure content validity and clarity of items. Additionally, internal consistency validity was examined by calculating correlation coefficients between each item and its respective dimension.

Reliability: The reliability of the instrument was tested using Cronbach's Alpha coefficient, which measures the internal consistency of the questionnaire. A satisfactory alpha value (≥ 0.70) was considered acceptable for this study.

3.8 Data Analysis Techniques

Data collected from the questionnaires were analyzed using the Statistical Package for the Social Sciences (SPSS). The following statistical methods were employed:

Descriptive Statistics:

- Frequencies and percentages to describe the sample characteristics
- Means and standard deviations to assess the level of responses
- Inferential Statistics:
 - ❖ Correlation analysis to examine relationships between variables
 - ❖ Cronbach's Alpha to assess reliability
 - ❖ Regression analysis to test the study hypotheses and determine the impact of risk management practices on project performance

3.9 Study Limitations

- **Scope Limitation:** This study focuses on examining the impact of risk management practices on project performance within construction projects.
- **Geographical Limitation:** The study is limited to construction projects in the city of Jeddah, Saudi Arabia.
- **Time Limitation:** The study was conducted during the year 2026.

Reliability Analysis

The reliability of the research instrument was assessed using Cronbach's Alpha coefficient, which is widely used to evaluate the internal consistency of questionnaire items and the degree of similarity among respondents' answers. This test helps determine the extent to which the instrument produces stable and consistent results.

The results of the reliability analysis are presented in Table (1) below:

Table (1): Cronbach's Alpha Coefficient for Assessing the Reliability of the Questionnaire

Study Variables	Cronbach's Alpha	Number of Items
Risk Management Practices	0.923	15
Project Performance	0.867	10
Overall Questionnaire	0.942	25

Source: Prepared by the researcher based on SPSS output.

The results presented in Table (1) indicate that the overall reliability coefficient of the questionnaire reached 0.942, which is considered an excellent level of internal consistency, as it exceeds the commonly accepted threshold of 0.60 in social science research. This finding confirms that the instrument demonstrates a high degree of stability and consistency.

With regard to the study variables, the reliability coefficient for risk management practices was 0.923, while project performance recorded a coefficient of 0.867. These values reflect strong internal consistency across the respective items measuring each construct.

Overall, these results provide substantial confidence in the reliability and suitability of the questionnaire for data analysis. Accordingly, the instrument can be considered appropriate for interpreting the findings and addressing the research questions of the study.

Validity of the Questionnaire

To ensure the validity of the research instrument, internal consistency validity was examined by administering the questionnaire to a pilot sample and analyzing the relationships between items and their respective constructs. This was achieved by calculating Pearson correlation coefficients between each item and the total score of the dimension to which it belongs. In addition, the correlation between each main variable and the overall questionnaire score was assessed using SPSS.

Table (2) presents the correlation coefficients between each item of the risk management practices variable and the total score of the construct.

Dimension	Statement	Correlation Coefficient	Significance
Risk Identification	Structured tools and techniques (such as brainstorming or SWOT analysis) are utilized to identify risks.	0.527	0.000
	All potential risks that may affect the project are identified in a comprehensive and systematic manner.	0.623	0.000
	The risk register is regularly updated to ensure continuous coverage throughout the project lifecycle.	0.765	0.000

	All relevant stakeholders (engineers, contractors, and suppliers) are actively involved in the risk identification process.	0.612	0.000
	Identified risks are clearly and systematically documented to facilitate future reference.	0.626	0.000
Risk Assessment	Both internal and external factors (such as environmental conditions or regulatory changes) are considered during risk assessment.	0.806	0.000
	Risk assessments are periodically reviewed and updated to reflect changes in project conditions.	0.713	0.000
	The likelihood and potential impact of each identified risk are evaluated in an objective manner.	0.696	0.000
	Clear criteria (such as numerical or qualitative scales) are used to assess risks.	0.584	0.000
	Risks are prioritized (high, medium, low) to support effective decision-making.	0.693	0.000
Risk Response Strategies	Risk response strategies are selected based on a careful cost-benefit analysis.	0.694	0.000
	Adequate resources (such as budget and workforce) are allocated to implement risk response strategies.	0.545	0.000
	The effectiveness of risk response strategies is regularly reviewed and evaluated.	0.684	0.000
	Appropriate and effective response strategies are developed for high-priority risks.	0.690	0.000
	Contingency plans are established to address risks if they occur.	0.718	0.000

The results presented in Table (2) indicate that all correlation coefficients are positive and statistically significant at ($p \leq 0.05$), with values ranging between 0.527 and 0.806. This demonstrates a strong internal consistency between the individual items and their corresponding dimension.

These findings confirm that all items are appropriately aligned with their respective constructs and contribute meaningfully to measuring risk management practices. Therefore, the instrument exhibits a satisfactory level of internal validity and is suitable for further statistical analysis and hypothesis testing within the context of this study.

Table (3): Pearson Correlation between Project Performance Items and the Total Score of the Variable

Project Performance Statements	Correlation Coefficient	Significance
Projects are executed within the approved budgets without significant cost overruns.	0.673	0.002
Project costs are effectively controlled throughout all phases of implementation.	0.784	0.000
Projects adhere to the planned schedules for completing the required activities.	0.650	0.000
Project phases are completed within the planned timeframe without noticeable delays.	0.803	0.000
Projects are delivered within the agreed timeframe set with the project owners.	0.657	0.000
Construction projects achieve a high level of quality in execution in accordance with approved specifications.	0.779	0.000
Quality standards are consistently maintained throughout all stages of project implementation.	0.852	0.000
The quality of materials used contributes to enhancing the overall quality of construction projects.	0.729	0.000
Construction activities are carried out in a manner that minimizes rework and errors.	0.657	0.000
Client and stakeholder satisfaction is achieved in terms of project quality, cost, and completion time.	0.607	0.000

The results presented in Table (3) demonstrate that all correlation coefficients between the individual items and the overall project performance construct are positive and statistically significant at ($p \leq 0.05$). The correlation values range from 0.607 to 0.852, indicating a strong level of internal consistency among the items.

These findings confirm that each statement contributes meaningfully to measuring project performance in terms of cost, time, and quality, and that the items are well-aligned with the overall construct. Accordingly, the scale used to assess project performance in this study can be considered valid and appropriate for further statistical analysis and hypothesis testing.

Construct Validity

To further ensure the robustness of the research instrument, construct validity was examined by assessing the correlation between each study variable and the overall score of the questionnaire. This procedure helps verify that all variables meaningfully contribute to the overall construct being measured and that no items weaken the explanatory power of the instrument. The results of this analysis are presented in Table (4):

Table (4): Correlation between Study Variables and the Overall Questionnaire Score

Study Variables	Dimensions of the Independent Variable	Correlation Coefficient	Significance
Risk Management Practices	Risk Identification	0.915	0.000
	Risk Assessment	0.946	0.000
	Risk Response Strategies	0.954	0.000
	Overall Independent Variable	0.974	0.000
Project Performance		0.936	0.000

The results shown in Table (4) indicate that all study variables and their respective dimensions are positively and strongly correlated with the overall questionnaire score, with all values being statistically significant at ($\alpha \leq 0.05$). The correlation coefficients range from 0.915 to 0.974 for the independent variable and reach 0.936 for the dependent variable.

These high correlation values demonstrate that all variables are well-constructed and effectively measure the intended concepts. Accordingly, the instrument exhibits a high level of construct validity, confirming that it is suitable for analyzing the relationships between risk management practices and project performance in this study.

CHAPTER FOUR
RESULTS
AND
DISCUSSION

Introduction

This chapter presents the empirical findings of the study based on the data collected from the research sample. It begins with a descriptive analysis of the sample characteristics, followed by an examination of respondents' perceptions regarding the main study variables, namely risk management practices and project performance in construction projects in Jeddah.

The chapter then proceeds to analyze the data using appropriate statistical techniques, including descriptive and inferential analysis, to test the study hypotheses. The results are presented in a structured manner through tables and statistical indicators, accompanied by detailed interpretation and discussion. The aim of this chapter is to provide a comprehensive understanding of the study findings and to explain how risk management practices influence project performance within the context of the construction sector.

First: Descriptive Analysis of the Study

This section presents a descriptive overview of the study sample and summarizes respondents' perceptions regarding the main variables of the study, namely risk management practices and project performance in construction projects.

Description of the Study Sample

The questionnaire included a section dedicated to collecting demographic information in order to identify the characteristics of the study sample. These characteristics include gender, age, educational level, job position, and years of experience. The results are presented in the following tables:

1. Distribution of the Study Sample by Gender

Table (5): Distribution of Respondents by Gender

Gender	Frequency	Percentage (%)
Male	234	60.9
Female	150	39.1
Total	384	100.0

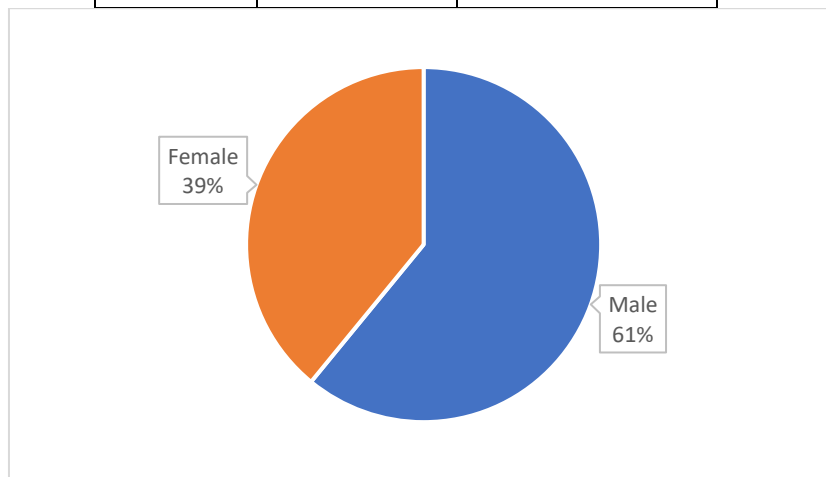


Figure (2); Distribution of Respondents by Gender

The results in Table (5) indicate that the majority of respondents are male, representing 60.9% of the total sample, while female respondents account for 39.1%. This distribution reflects the workforce composition commonly observed in the construction sector, where male participation tends to be higher.

2. Distribution of the Study Sample by Educational Level

Table (6): Distribution of Respondents by Educational Level

Educational Level	Frequency	Percentage (%)
(High School or Below)	64	16.7
(Bachelor's Degree)	169	44.0
(Master's Degree)	120	31.3
(PhD)	31	8.1
Total	384	100.0

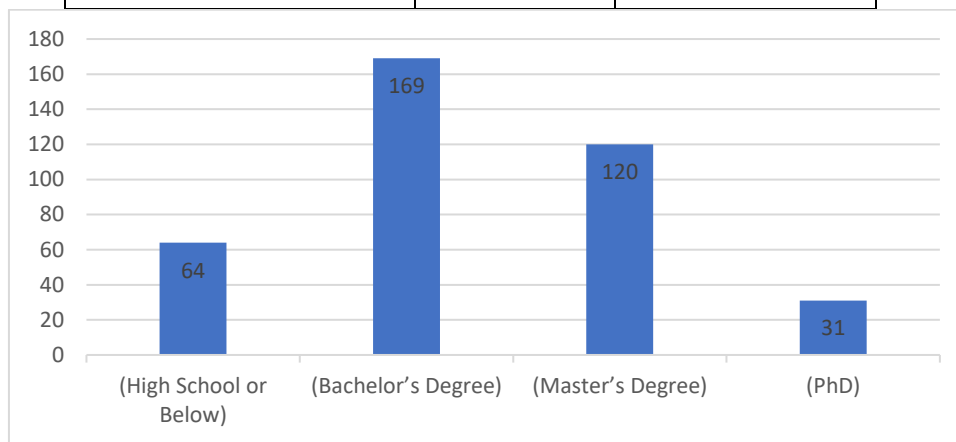


Figure (3); Distribution of Respondents by Educational Level

The results presented in Table (6) show that the majority of respondents hold a Bachelor's degree, accounting for 44.0% of the sample. This is followed by those with a Master's degree at 31.3%, while 16.7% have a high school qualification or below. Respondents holding a PhD represent the smallest proportion at 8.1%. This distribution indicates that a substantial proportion of participants possess higher education qualifications, which enhances the reliability of the responses given their expected level of knowledge and professional competence in construction project environments.

3. Distribution of the Study Sample by Years of Experience

Table (7): Distribution of Respondents by Years of Experience

Years of Experience	Frequency	Percentage (%)
Less than 5 years	39	10.2
5–10 years	119	31.0
10–20 years	180	46.9

More than 20 years	46	12.0
Total	384	100.0

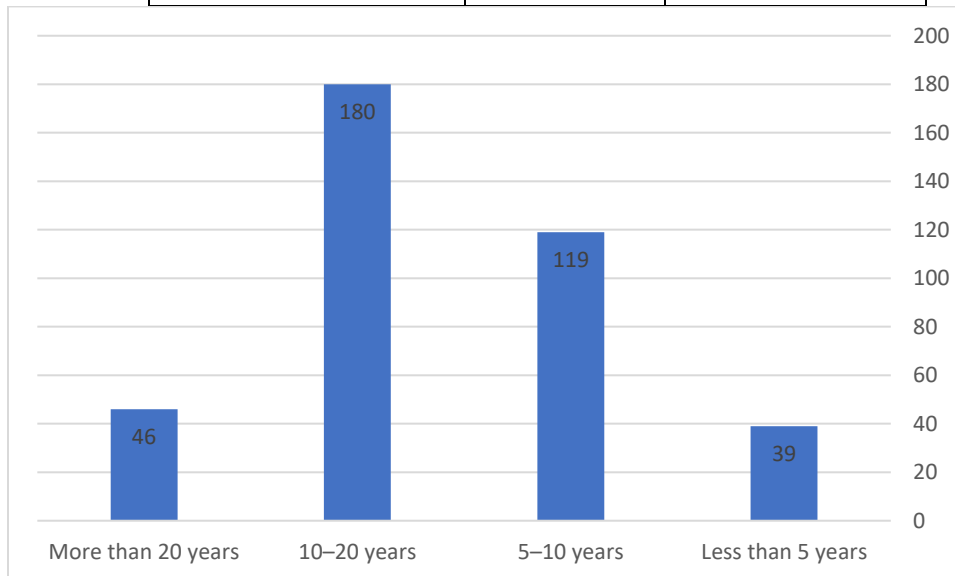


Figure (4); Distribution of Respondents by Years of Experience

The results in Table (7) indicate that the largest proportion of respondents, 46.9%, have 10–20 years of experience, followed by 31.0% with 5–10 years of experience. Participants with more than 20 years of experience represent 12.0%, while those with less than 5 years account for 10.2% of the sample.

This distribution suggests that the majority of respondents possess substantial professional experience in the construction sector, which strengthens the credibility of their responses and enhances the reliability of the study findings.

Second: Analysis of Respondents' Opinions

The responses to the questionnaire items for both the independent and dependent variables were measured using a five-point Likert scale (Very High, High, Moderate, Low, Very Low), with corresponding weights assigned as follows: (5, 4, 3, 2, 1) respectively. To interpret the results, the real limits of the arithmetic mean categories were calculated. This was done by determining the range of the scale, which is the difference between the highest and lowest weights ($5 - 1 = 4$). The class interval was then obtained by dividing this range by the number of scale categories ($4 \div 5 = 0.80$). Based on this, the boundaries of the mean scores were established as shown in Table (8).

Table (8): Real Limits of the Arithmetic Mean Categories

Mean Range (Real Limits)	Verbal Interpretation (Level of Practice)
1.00 – 1.80	Very Low (Strongly Disagree)
1.81 – 2.60	Low (Disagree)
2.61 – 3.40	Moderate (Neutral)
3.41 – 4.20	High (Agree)
4.21 – 5.00	Very High (Strongly Agree)

These classifications were used as a basis for interpreting the results of the study variables and for determining the level of agreement of respondents toward risk management practices and project performance in construction projects in Jeddah.

First: Risk Management Practices

This section addresses the following research question: What is the level of risk management practices and its dimensions (risk identification, risk assessment, and risk response strategies) in construction projects in Jeddah, Saudi Arabia? To answer this question, the mean, standard deviation, relative weight, and level of agreement were calculated for each item within the risk management dimensions. The results are presented in Table (9).

Table (9): Means, Standard Deviations, Relative Weights, and Agreement Level for Risk Management Practices

Dimension	Statement	Mean	Std. Deviation	Relative Weight	Level of Agreement
Risk Identification	Structured tools and techniques (such as brainstorming or SWOT analysis) are utilized to identify risks.	4.53	0.535	91%	Very High
	All potential risks that may affect the project are identified in a comprehensive and systematic manner.	4.28	0.718	86%	Very High
	The risk register is regularly updated to ensure continuous coverage throughout the project lifecycle.	4.17	0.960	83%	High

	All relevant stakeholders (engineers, contractors, and suppliers) are actively involved in the risk identification process.	4.25	0.814	85%	High
	Identified risks are clearly and systematically documented to facilitate future reference.	4.22	0.791	84%	High
Overall mean of the dimension		4.29	0.7636	86%	Very High
Risk Assessment	Both internal and external factors (such as environmental conditions or regulatory changes) are considered during risk assessment.	4.28	0.777	86%	Very High
	Risk assessments are periodically reviewed and updated to reflect changes in project conditions.	4.23	0.798	85%	High
	The likelihood and potential impact of each identified risk are evaluated in an objective manner.	4.23	0.845	85%	High
	Clear criteria (such as numerical or qualitative scales) are used to assess risks.	4.26	0.777	85%	High
	Risks are prioritized (high, medium, low) to support effective decision-making.	4.30	0.783	86%	Very High
Overall mean of the dimension		4.257	0.5012	85%	High
Risk Response Strategies	Risk response strategies are selected based on a careful cost–benefit analysis.	4.21	0.905	84%	High
	Adequate resources (such as budget and workforce) are allocated to implement risk response strategies.	4.25	0.815	85%	High
	The effectiveness of risk response strategies is regularly reviewed and evaluated.	4.28	0.743	86%	Very High
	Appropriate and effective response strategies are developed for high-priority risks.	4.26	0.771	85%	High
	Contingency plans are established to address risks if they occur.	4.30	0.756	86%	Very High
Overall mean of the dimension		4.258	0.5603	85%	High
Overall Risk Management Variable		4.248	0.6083	85%	High

First Dimension: Risk Identification

The results of this dimension indicate that construction organizations in Jeddah place considerable emphasis on risk identification practices, as reflected by the high overall mean (4.29) and relative weight (86%), indicating a very high level of implementation.

Rank 1: The statement ***“Structured tools and techniques (such as brainstorming or SWOT analysis) are utilized to identify risks”*** ranked first with a mean of 4.53. This result suggests that organizations rely heavily on systematic and professional methods for identifying risks, which reflects a mature and structured approach to risk management practices. Rank 2: The statement ***“All potential risks that may affect the project are identified in a comprehensive and systematic manner”*** ranked second with a mean of 4.28. This indicates that respondents perceive a strong commitment to thorough risk identification, ensuring that potential threats are not overlooked during project planning and execution. Rank 3: The statement ***“All relevant stakeholders (engineers, contractors, and suppliers) are actively involved in the risk identification process”*** ranked third with a mean of 4.25. This reflects the importance of collaborative efforts in identifying risks, as involving multiple stakeholders enhances the ability to capture diverse perspectives and potential uncertainties. Rank 4: The statement ***“Identified risks are clearly and systematically documented to facilitate future reference”*** ranked fourth with a mean of 4.22. This suggests that documentation practices are generally well-established, although there may be slight variations in how consistently organizations maintain and update risk records. Rank 5: The statement ***“The risk register is regularly updated to ensure continuous coverage throughout the project lifecycle”*** ranked fifth with a mean of 4.17. While still at a high level, this result indicates that continuous updating of risk registers may not be uniformly practiced across all organizations, highlighting a potential area for improvement.

Second Dimension: Risk Assessment

The findings of this dimension reveal that risk assessment practices are implemented at a high level, with an overall mean of 4.2578 and a relative weight of 85%, indicating consistent attention to evaluating risks in construction projects.

Rank 1: The statement ***“Risks are prioritized (high, medium, low) to support effective decision-making”*** ranked first with a mean of 4.30. This demonstrates that organizations actively categorize risks based on their severity, which enhances decision-making and resource allocation. Rank 2: The statement ***“Both internal and external factors (such as***

environmental conditions or regulatory changes) are considered during risk assessment” ranked second with a mean of 4.28. This reflects a comprehensive evaluation approach, where organizations consider a wide range of influencing factors when assessing risks. Rank 3: The statement *“Clear criteria (such as numerical or qualitative scales) are used to assess risks”* ranked third with a mean of 4.26. This indicates that structured assessment frameworks are commonly used, supporting consistency and objectivity in risk evaluation. Rank 4 (tie): The statement *“Risk assessments are periodically reviewed and updated to reflect changes in project conditions”* ranked fourth with a mean of 4.23. This suggests that organizations recognize the dynamic nature of risks and attempt to update assessments accordingly, although not always at the highest level of consistency. Rank 4 (tie): The statement *“The likelihood and potential impact of each identified risk are evaluated in an objective manner”* also ranked fourth with a mean of 4.23. This reflects a generally strong practice of evaluating risks analytically, though there may be some variation in how rigorously this is applied.

Third Dimension: Risk Response Strategies

The results for this dimension indicate a high level of implementation, with an overall mean of 4.2582 and a relative weight of 85%, highlighting the importance of responding effectively to identified risks.

Rank 1 (tie): The statement *“Contingency plans are established to address risks if they occur”* ranked first with a mean of 4.30. This suggests that organizations prioritize preparedness and proactive planning to mitigate the impact of unexpected risks. Rank 1 (tie): The statement *“The effectiveness of risk response strategies is regularly reviewed and evaluated”* also ranked first with a mean of 4.28. This reflects a continuous improvement approach, where organizations assess and refine their response strategies over time. Rank 3: The statement *“Appropriate and effective response strategies are developed for high-priority risks”* ranked third with a mean of 4.26. This indicates that organizations focus their efforts on addressing the most critical risks, ensuring efficient use of resources. Rank 4: The statement *“Adequate resources (such as budget and workforce) are allocated to implement risk response strategies”* ranked fourth with a mean of 4.25. This shows a strong commitment to supporting risk responses, although resource allocation may vary across projects. Rank 5: The statement *“Risk response strategies are selected based on a careful cost–benefit analysis”* ranked fifth with a mean

of 4.21. While still rated highly, this suggests that economic evaluation of response strategies may not always be fully optimized in practice.

Overall Interpretation of Risk Management Practices

Overall, the findings indicate that risk management practices in construction projects in Jeddah are implemented at a high level (mean = 4.2486). Among the three dimensions, risk identification achieved the highest level, followed closely by risk response strategies and risk assessment. These results suggest that construction organizations in Jeddah demonstrate strong awareness and application of risk management practices. However, certain aspects—such as continuous updating of risk registers and cost–benefit evaluation of response strategies—present opportunities for further improvement to enhance overall project performance.

Second: Level of Project Performance in Construction Projects in Jeddah

This section addresses the following research question: What is the level of project performance in construction projects in Jeddah, Saudi Arabia? To answer this question, the mean, standard deviation, relative weight, and level of agreement were calculated for each item measuring project performance in terms of cost, time, and quality. The results are presented in Table (10).

Table (10): Means, Standard Deviations, Relative Weights, and Agreement Level for Project

Project Performance Statements	Mean	Std. Deviation	Relative Weight	Level of Agreement
Projects are executed within the approved budgets without significant cost overruns.	4.60	0.569	92%	Very High
Project costs are effectively controlled throughout all phases of implementation.	4.43	0.782	89%	Very High
Projects adhere to the planned schedules for completing the required activities.	4.15	0.716	83%	High
Project phases are completed within the planned timeframe without noticeable delays.	4.22	1.152	84%	High
Projects are delivered within the agreed timeframe set with the project owners.	4.17	0.715	83%	High
Construction projects achieve a high level of quality in execution in accordance with approved specifications.	4.40	0.831	88%	Very High
Quality standards are consistently maintained throughout all stages of project implementation.	4.21	0.719	84%	High

The quality of materials used contributes to enhancing the overall quality of construction projects.	4.50	0.754	90%	Very High
Construction activities are carried out in a manner that minimizes rework and errors.	4.25	0.694	85%	Very High
Client and stakeholder satisfaction is achieved in terms of project quality, cost, and completion time.	4.39	0.835	88%	Very High
Overall mean	4.3326	0.569	87%	Very High

The results of this dimension indicate that construction projects in Jeddah demonstrate a very high level of performance, as reflected by the overall mean of 4.3326 and a relative weight of 87%. This suggests strong performance across the key dimensions of cost, time, and quality.

Rank 1: The statement ***“Projects are executed within the approved budgets without significant cost overruns”*** ranked first with a mean of 4.60. This result indicates that cost control is highly effective in construction projects, reflecting strong financial planning and monitoring practices that minimize budget deviations. Rank 2: The statement ***“The quality of materials used contributes to enhancing the overall quality of construction projects”*** ranked second with a mean of 4.50. This highlights the critical role of material quality in achieving superior project outcomes, suggesting that organizations prioritize high-quality inputs to ensure durability and performance. Rank 3: The statement ***“Project costs are effectively controlled throughout all phases of implementation”*** ranked third with a mean of 4.43. This finding reinforces the consistency of cost management practices across different project stages, indicating ongoing financial oversight rather than one-time control measures. Rank 4: The statement ***“Construction projects achieve a high level of quality in execution in accordance with approved specifications”*** ranked fourth with a mean of 4.40. This reflects a strong commitment to meeting technical standards and specifications, ensuring that project deliverables align with required quality benchmarks. Rank 5: The statement ***“Client and stakeholder satisfaction is achieved in terms of project quality, cost, and completion time”*** ranked fifth with a mean of 4.39. This suggests that the combined outcomes of cost efficiency, timely delivery, and quality execution contribute positively to stakeholder satisfaction. Rank 6: The statement ***“Construction activities are carried out in a manner that minimizes rework and errors”*** ranked sixth with a mean of 4.25. This indicates that effective planning and execution practices help reduce inefficiencies, although minor variations may still occur across projects. Rank 7: The statement ***“Project phases are completed within the planned***

timeframe without noticeable delays” ranked seventh with a mean of 4.22. This suggests that while time management is generally strong, there may be occasional delays affecting some project phases. Rank 8: The statement *“Quality standards are consistently maintained throughout all stages of project implementation”* ranked eighth with a mean of 4.21. This reflects a stable application of quality practices, though maintaining consistency across all stages may present some challenges. Rank 9: The statement *“Projects are delivered within the agreed timeframe set with the project owners”* ranked ninth with a mean of 4.17. This indicates that final project delivery timelines are generally respected, but may not always achieve the highest level of performance compared to other aspects. Rank 10: The statement *“Projects adhere to the planned schedules for completing the required activities”* ranked tenth with a mean of 4.15. Although still rated highly, this suggests that adherence to detailed schedules is relatively the weakest aspect of project performance, potentially due to unforeseen risks or operational challenges.

Overall Interpretation of Project Performance

Overall, the findings demonstrate that construction projects in Jeddah achieve a very high level of performance, particularly in terms of cost control and quality outcomes. However, time-related aspects such as adherence to schedules and timely completion, while still strong, appear slightly lower in ranking compared to cost and quality dimensions. These results suggest that while project performance is generally strong, further improvements in schedule management and time control could enhance overall project success and efficiency.

Third: Hypothesis Testing

To test the study hypotheses, several statistical techniques were employed. First, Pearson correlation analysis was used to examine the relationship between the independent variable (risk management practices) and the dependent variable (project performance). Second, simple linear regression analysis was applied to determine the impact of risk management practices on improving project performance in construction projects in Jeddah. In addition, independent samples t-test and one-way ANOVA were used to examine whether there are statistically significant differences in respondents’ perceptions regarding risk management practices and project performance based on demographic characteristics of the study sample.

The main hypothesis of the study states that:

There is a statistically significant effect at the significance level ($\alpha \leq 0.05$) of risk management practices—comprising risk identification, risk assessment, and risk response strategies—on project performance in construction projects in Jeddah.

The sub-hypotheses are as follows:

- There is a statistically significant effect of risk identification on project performance in construction projects in Jeddah.
- There is a statistically significant effect of risk assessment on project performance in construction projects in Jeddah.
- There is a statistically significant effect of risk response strategies on project performance in construction projects in Jeddah.

To test the main hypothesis and the sub-hypotheses, Pearson correlation coefficients were first calculated to determine the relationship between risk management dimensions and the dependent variable (project performance). The results are presented in Table (11).

Table (11): Correlation between Risk Management Dimensions and Project Performance

Risk Management Dimensions	Correlation Coefficient	Significance Level
Risk Identification	0.752**	0.000
Risk Assessment	0.709**	0.000
Risk Response Strategies	0.872**	0.000
Overall Risk Management	0.893**	0.000

The results presented in Table (11) indicate that there is a strong positive and statistically significant relationship between all dimensions of risk management and project performance at the level of ($\alpha \leq 0.05$). The correlation coefficients range from 0.709 to 0.893, which demonstrates a strong association between risk management practices and project performance in construction projects in Jeddah. These findings provide initial evidence supporting the study hypotheses and indicate that improvements in risk management practices are associated with higher levels of project performance in terms of cost, time, and quality outcomes.

Effect of Risk Identification on Project Performance

To examine the first sub-hypothesis, which states that there is a statistically significant effect of risk identification on project performance in construction projects in Jeddah, a simple linear regression analysis was conducted. This analysis aimed to determine the

extent to which risk identification predicts variations in project performance. The results of the regression analysis are presented in Table (12).

Table (12): Simple Linear Regression Results for Risk Identification on Project Performance

Dependent Variable	R	R ²	F	Sig.	Independent Variable	B	Std.Error	t	Sig.
Project Performance	0.642	0.427	502.95	0.000	Risk Identification	0.725	0.028	28.71	0.000

The results in Table (12) show that risk identification has a statistically significant positive effect on project performance, as indicated by the value of $F = 502.95$ with a significance level of ($p = 0.000$), which is less than 0.05. The coefficient of determination ($R^2 = 0.427$) indicates that risk identification explains approximately 42.7% of the variation in project performance. Furthermore, the regression coefficient ($B = 0.725$) confirms a strong positive relationship between risk identification and project performance, meaning that improvements in risk identification practices lead to a significant enhancement in project performance in terms of cost, time, and quality. Accordingly, the first sub-hypothesis is accepted, confirming that risk identification has a significant impact on project performance in construction projects in Jeddah.

Effect of Risk Assessment on Project Performance

To test the second sub-hypothesis, which states that there is a statistically significant effect of risk assessment on project performance in construction projects in Jeddah, a simple linear regression analysis was conducted. This analysis was used to determine the extent to which risk assessment contributes to explaining variations in project performance. The results of the regression analysis are presented in Table (13).

Table (13): Simple Linear Regression Results for Risk Assessment on Project Performance

Dependent Variable	R	R ²	F	Sig.	Independent Variable	B	Std. Error	t	Sig.
Project Performance	0.789	0.622	608.35	0.000	Risk Assessment	0.972	0.031	25.06	0.000

The results in Table (13) indicate that risk assessment has a statistically significant positive effect on project performance, as shown by the F-value of 608.35 with a significance level of ($p = 0.000$), which is below the threshold of 0.05. The coefficient of determination ($R^2 = 0.622$) reveals that risk assessment explains approximately 62.2% of the variance in project performance, which reflects a strong explanatory power compared

to the other risk management dimensions. Additionally, the regression coefficient ($B = 0.972$) indicates a strong positive influence of risk assessment on project performance, suggesting that improvements in risk evaluation practices significantly enhance project outcomes in terms of cost efficiency, time adherence, and quality performance. Based on these results, the second sub-hypothesis is accepted, confirming that risk assessment has a significant impact on project performance in construction projects in Jeddah.

Effect of Risk Response Strategies on Project Performance

To examine the third sub-hypothesis, which states that there is a statistically significant effect of risk response strategies on project performance in construction projects in Jeddah, a simple linear regression analysis was conducted. This analysis aimed to determine the extent to which risk response strategies contribute to explaining variations in project performance. The results of the regression analysis are presented in Table (14).

Table (14): Simple Linear Regression Results for Risk Response Strategies on Project Performance

Dependent Variable	R	R ²	F	Sig.	Independent Variable	B	Std. Error	t	Sig.
Project Performance	0.732	0.512	521.43	0.000	Risk Response Strategies	0.830	0.035	24.524	0.000

The results in Table (14) indicate that risk response strategies have a statistically significant positive effect on project performance, as evidenced by the F-value of 521.43 with a significance level of ($p = 0.000$), which is less than 0.05. The coefficient of determination ($R^2 = 0.512$) shows that risk response strategies explain approximately 51.2% of the variance in project performance, reflecting a substantial explanatory contribution. Furthermore, the regression coefficient ($B = 0.830$) confirms a strong positive relationship between risk response strategies and project performance, indicating that effective implementation of risk response strategies leads to improved project outcomes in terms of cost control, timely delivery, and quality enhancement. Accordingly, the third sub-hypothesis is accepted, confirming that risk response strategies significantly influence project performance in construction projects in Jeddah.

Study Results

Based on the statistical analysis and hypothesis testing conducted in this study, several key findings can be summarized.

First, the results revealed that risk management practices in construction projects in Jeddah are implemented at a high level, with particular strength in the dimension of risk identification, followed by risk response strategies and risk assessment. This indicates that construction organizations demonstrate a strong awareness of the importance of systematically identifying and managing risks throughout the project lifecycle.

Second, the findings showed that project performance in construction projects in Jeddah is at a very high level, especially in terms of cost control and quality achievement. Organizations appear to effectively manage project budgets and maintain high standards of execution quality. However, while time-related performance indicators were also rated highly, they ranked slightly lower compared to cost and quality dimensions, suggesting minor challenges in schedule adherence.

Third, the results of the correlation analysis confirmed that there is a strong positive relationship between risk management practices and project performance, indicating that improved risk management is associated with better project outcomes. This relationship was statistically significant across all dimensions of risk management.

Fourth, the regression analysis demonstrated that risk management practices have a statistically significant impact on project performance, with each dimension contributing differently. Risk assessment showed the highest explanatory power, followed by risk response strategies and risk identification, indicating that evaluating and prioritizing risks plays a critical role in enhancing project outcomes.

Finally, the study also found that there are variations in respondents' perceptions based on demographic and professional characteristics, suggesting that experience, education, and job roles may influence how risk management practices and project performance are perceived within construction projects.

Recommendations

- Construction organizations should strengthen the integration of risk management practices across all project phases by adopting standardized frameworks that ensure consistency in identifying, assessing, and responding to risks, thereby enhancing overall project performance.

- Greater emphasis should be placed on improving time management practices by implementing advanced scheduling techniques and monitoring tools to minimize delays and ensure better adherence to project timelines.
- Organizations are encouraged to invest in continuous training and professional development programs for project teams to enhance their competencies in risk assessment and decision-making, which have shown a strong influence on project performance.
- It is recommended to enhance stakeholder collaboration during the risk identification process by promoting open communication channels among engineers, contractors, and suppliers to ensure comprehensive risk detection.
- Construction firms should adopt more systematic approaches to evaluating risk response strategies, particularly by incorporating cost-benefit analysis to ensure optimal allocation of resources.
- Continuous monitoring and periodic review of risk registers should be reinforced to ensure that emerging risks are captured and managed proactively throughout the project lifecycle.
- Decision-makers should utilize data-driven tools and technologies, such as project management software and predictive analytics, to improve the effectiveness of risk management practices and support better project outcomes.

Future Solutions and Research Directions

- Future research could explore the application of advanced technologies such as artificial intelligence and big data analytics in improving risk management practices and predicting potential project risks in construction environments.
- Further studies are recommended to examine the role of organizational culture and leadership styles in enhancing the effectiveness of risk management practices and their impact on project performance.
- Expanding the scope of research to include comparative studies across different cities or countries could provide deeper insights into contextual factors influencing risk management practices.

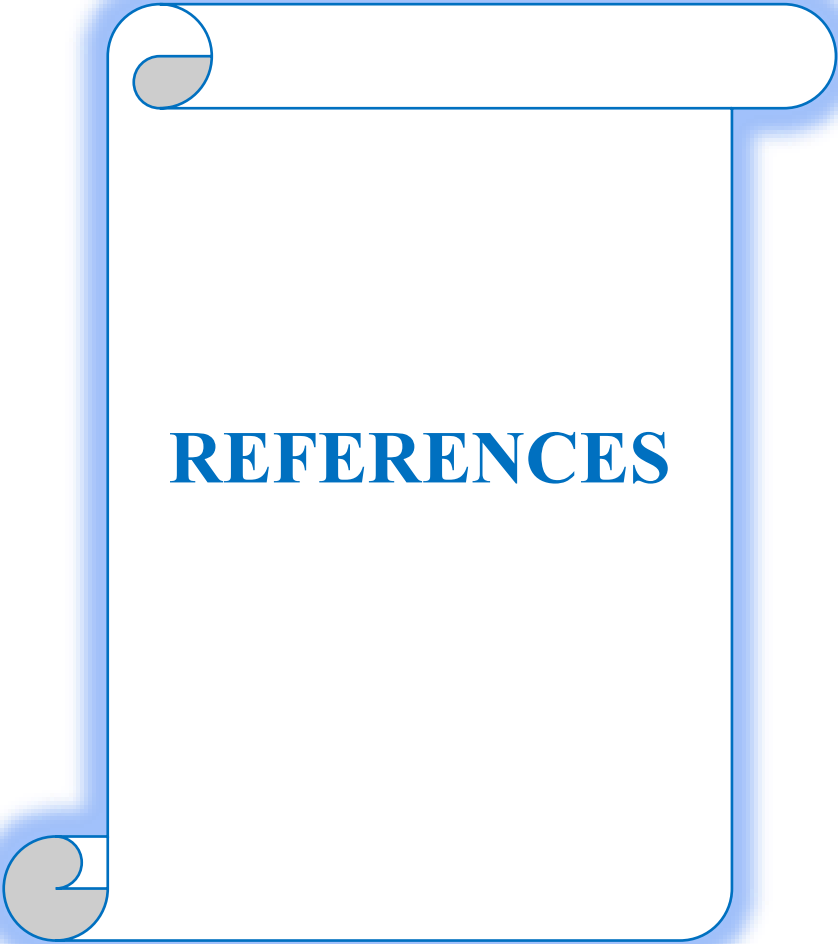
- Future research may also investigate additional dimensions of project performance, such as sustainability, safety performance, and stakeholder satisfaction, to provide a more comprehensive evaluation framework.
- Longitudinal studies could be conducted to assess how risk management practices evolve over time and how they influence project performance across different project phases.

Conclusion

This study aimed to examine the impact of risk management practices—namely risk identification, risk assessment, and risk response strategies—on project performance in construction projects in Jeddah. The findings confirmed that effective risk management plays a critical role in enhancing project outcomes, particularly in terms of cost efficiency, quality standards, and timely delivery.

The study highlights that while construction organizations in Jeddah demonstrate strong implementation of risk management practices, there is still room for improvement, particularly in time management and the continuous evaluation of risk response strategies. The strong relationship between risk management and project performance underscores the importance of adopting systematic and proactive approaches to managing uncertainties in construction projects.

Overall, this research contributes to both academic knowledge and practical applications by providing empirical evidence on the importance of risk management in improving project performance. It also offers valuable insights for practitioners and decision-makers seeking to enhance the success of construction projects in complex and dynamic environments.



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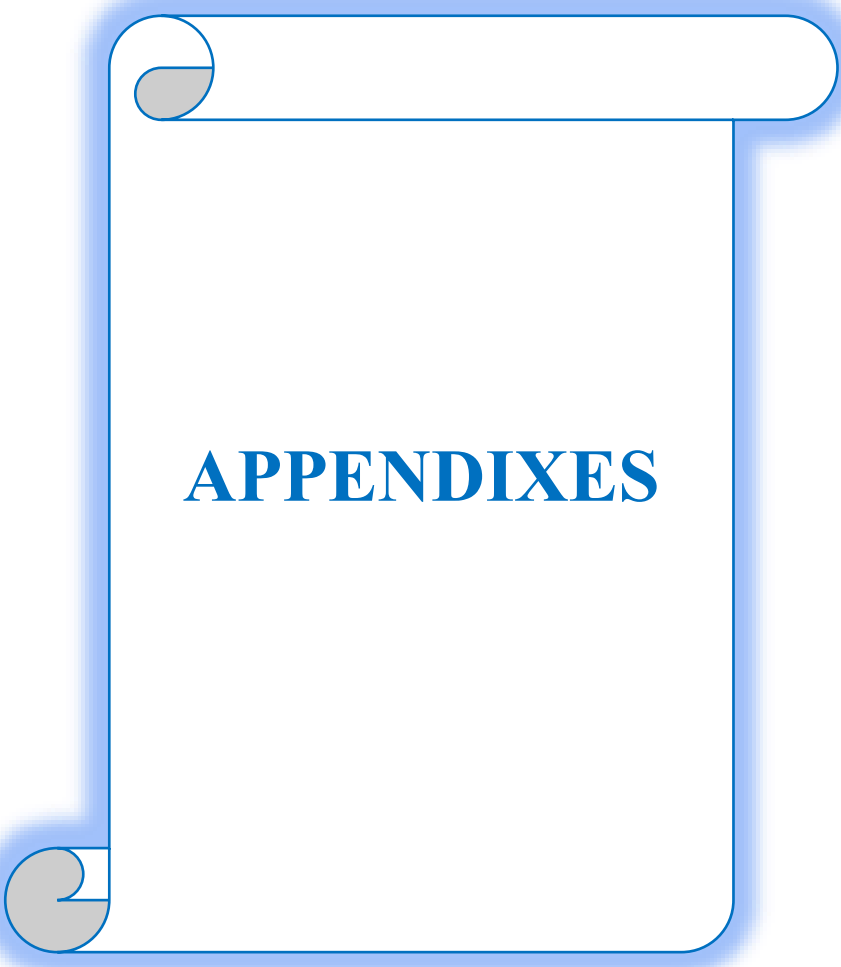
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APPENDIXES

Questionnaire

Dear Respondent,

I am currently a Master's student in Project Management at MediaOcean University, conducting a research study entitled: "*The Impact of Risk Management Practices on Project Performance: A Case Study of Construction Projects in Jeddah.*" This study aims to examine the impact of risk management practices on project performance in construction projects within the city of Jeddah.

I kindly request your cooperation in completing this questionnaire. Your responses will be treated with full confidentiality and will be used strictly for academic research purposes only. There are no right or wrong answers; your honest opinions are highly valuable and will contribute significantly to the success of this study. Your participation is greatly appreciated.

Section A: Demographic Information

Please tick (✓) the appropriate option:

Gender:

- Male
- Female

Years of Experience:

- 5 years and less
- 6–10 years
- 11–20 years
- 21 years and above

Educational Level:

- Secondary school or below
- Bachelor's degree
- Master's degree
- PhD

Section B:

Please indicate the extent of your agreement or disagreement with the following statements by placing a (✓) in the box that best reflects your opinion. Kindly select one of the five options provided for each statement.

First Dimension (Independent Variable): Risk Management Practices

The following statements are designed to measure the level of risk management practices in construction projects in the city of Jeddah. Please indicate your level of agreement by selecting the appropriate option.

Dimensions include: Risk Identification – Risk Assessment – Development of Risk Response Strategies

No.	Statements	Very High	High	Moderate	Low	Very Low
Risk Identification						
1	All potential risks that may affect the project are identified in a comprehensive and systematic manner.					
2	All relevant stakeholders (engineers, contractors, and suppliers) are actively involved in the risk identification process.					
3	Identified risks are clearly and systematically documented to facilitate future reference.					
4	The risk register is regularly updated to ensure continuous coverage throughout the project lifecycle.					
5	Structured tools and techniques (such as brainstorming or SWOT analysis) are utilized to identify risks.					
Risk Assessment						
6	The likelihood and potential impact of each identified risk are evaluated in an objective manner.					
7	Clear criteria (such as numerical or qualitative					

	scales) are used to assess risks.					
8	Risks are prioritized (high, medium, low) to support effective decision-making.					
9	Both internal and external factors (such as environmental conditions or regulatory changes) are considered during risk assessment.					
10	Risk assessments are periodically reviewed and updated to reflect changes in project conditions.					
Risk Response Strategies						
11	Appropriate and effective response strategies are developed for high-priority risks.					
12	Risk response strategies are selected based on a careful cost–benefit analysis.					
13	Adequate resources (such as budget and workforce) are allocated to implement risk response strategies.					
14	Contingency plans are established to address risks if they occur.					
15	The effectiveness of risk response strategies is regularly reviewed and evaluated.					

Second Dimension (Dependent Variable): Project Performance

The following statements are designed to measure the level of construction project performance. Please indicate your level of agreement by placing a (✓) in the box that best reflects your opinion.

No.	Statements	Very High	High	Moderate	Low	Very Low
1	Projects are executed within the approved budgets without significant cost overruns.					
2	project costs are effectively controlled throughout all phases of implementation.					
3	Projects adhere to the planned schedules					

	for completing the required activities.					
4	Project phases are completed within the planned timeframe without noticeable delays.					
5	Projects are delivered within the agreed timeframe set with the project owners.					
6	Construction projects achieve a high level of quality in execution in accordance with approved specifications.					
7	Quality standards are consistently maintained throughout all stages of project implementation.					
8	The quality of materials used contributes to enhancing the overall quality of construction projects.					
9	Construction activities are carried out in a manner that minimizes rework and errors.					
10	Client and stakeholder satisfaction is achieved in terms of project quality, cost, and completion time.					

الملخص

تبحث هذه الدراسة أثر ممارسات إدارة المخاطر على أداء المشاريع الإنشائية في جدة، المملكة العربية السعودية. وتركز على ثلاثة أبعاد رئيسية لإدارة المخاطر: تحديد المخاطر، وتقييمها، واستراتيجيات الاستجابة لها، وتدرس تأثيرها على أداء المشروع من حيث التكلفة والوقت والجودة. وقد تم اعتماد المنهج الوصفي التحليلي، وجمعت البيانات من خلال استبيان مُهيكل وُرِّع على عينة من 384 متخصصًا في مجال الإنشاءات. وأُجري التحليل الإحصائي باستخدام برنامج SPSS، وشمل ذلك الإحصاء الوصفي، وتحليل الارتباط، وتحليل الانحدار.

وتُظهر النتائج أن ممارسات إدارة المخاطر تُطبَّق على مستوى عالٍ، بينما يُحقق أداء المشروع مستوىً عاليًا جدًا. كما تُشير النتائج إلى وجود علاقة إيجابية قوية وذات دلالة إحصائية بين ممارسات إدارة المخاطر وأداء المشروع. علاوة على ذلك، يؤكد تحليل الانحدار أن جميع أبعاد إدارة المخاطر لها تأثير كبير على أداء المشروع، مع كون تقييم المخاطر هو الأكثر تأثيرًا. وتخلص الدراسة إلى أن الإدارة الفعالة للمخاطر تلعب دورًا حاسمًا في تحسين نتائج المشاريع وتعزيز الأداء العام في المشاريع الإنشائية. توصي الدراسة بتعزيز أطر إدارة المخاطر، وتحسين ممارسات إدارة الوقت، وتشجيع التطوير المهني المستمر لتعزيز أداء المشاريع.

الكلمات المفتاحية: إدارة المخاطر، أداء المشاريع، مشاريع البناء، تقييم المخاطر، جدة

**" تأثير ممارسات ادارة المخاطر على أداء المشاريع: دراسة حالة لمشاريع البناء
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العام الدراسي:

2026