



THE IMPACT OF PROJECT RISK MANAGEMENT ON PROJECT SUCCESS

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ABSTRACT

The construction industry plays a significant role in the economic development of Saudi Arabia and has experienced substantial growth in response to the objectives and development initiatives associated with Saudi Vision 2030. However, construction projects are frequently exposed to various uncertainties and risks that may negatively affect project cost, schedule, quality, and overall performance. Effective project risk management is therefore essential for improving the probability of successful project delivery.

This study aimed to examine **the impact of Project Risk Management Practices on Construction Project Success in Dammam, Saudi Arabia**. Specifically, the study investigated three major dimensions of project risk management: **Risk Identification, Risk Assessment, and Risk Response Planning**, and examined their influence on construction project success.

A quantitative research approach was adopted using a structured questionnaire as the primary data collection instrument. The study targeted construction professionals working in Dammam, including project managers, project engineers, site engineers, construction supervisors, safety officers, and quality engineers. A total of **180 responses** were included in the statistical analysis. The collected data were analyzed using descriptive statistics, Cronbach's Alpha reliability analysis, Pearson correlation analysis, and multiple regression analysis.

The findings indicated that Project Risk Management Practices have a positive and statistically significant relationship with Construction Project Success. Risk Response Planning demonstrated the strongest relationship with Project Success, followed by Risk Assessment and Risk Identification. The regression model indicated that the three risk management dimensions collectively

explained a substantial proportion of the variation in project success. The results therefore emphasize the importance of systematic risk identification, continuous risk assessment, proactive response planning, and regular risk monitoring throughout the construction project lifecycle.

The study concludes that construction organizations can improve project outcomes by integrating structured risk management practices into project planning and execution. The study recommends strengthening organizational risk management frameworks, improving employee competency through specialized training, maintaining updated risk registers, conducting periodic risk reviews, and promoting a proactive risk management culture. These practices can contribute to improved cost, schedule, quality, and overall project performance within the Saudi construction sector.

INTRODUCTION

1.1 Introduction

The construction industry is one of the most important sectors contributing to economic growth and infrastructure development worldwide. Construction projects support the development of residential, commercial, industrial, transportation, and public infrastructure. In Saudi Arabia, the importance of the construction sector has increased significantly due to large-scale development programs and economic diversification initiatives associated with Saudi Vision 2030.

Despite its importance, the construction industry operates in a highly complex and uncertain environment. Construction projects involve multiple stakeholders, substantial financial investments, technical requirements, contractual obligations, resource constraints, and strict schedules. Consequently, construction projects are continuously exposed to risks that may affect their ability to achieve planned objectives.

Project risks may arise from several sources, including changes in project scope, inaccurate cost estimates, schedule delays, design modifications, material shortages, equipment failures, contractor performance, labor availability, regulatory requirements, safety incidents, environmental conditions, and supply chain disruptions. If such risks are not properly identified and managed, they can lead to significant cost overruns, schedule delays, quality deficiencies, contractual disputes, and even project failure.

Project Risk Management provides a systematic approach for dealing with uncertainty throughout the project lifecycle. According to the Project Management Institute (PMI, 2021), effective risk management involves identifying uncertain events or conditions, assessing their

potential implications, planning appropriate responses, and continuously monitoring risks during project execution.

Therefore, effective risk management should not be considered merely an administrative requirement. It represents an important managerial capability that can support informed decision-making, improve resource allocation, reduce uncertainty, and increase the probability of achieving project objectives.

This study focuses on three important dimensions of Project Risk Management Practices: **Risk Identification, Risk Assessment, and Risk Response Planning**. It investigates their relationship with Construction Project Success in Dammam, Saudi Arabia.

1.2 Background of the Study

Construction projects are characterized by temporary organizational structures, complex technical activities, multiple stakeholders, and continuously changing project conditions. These characteristics make construction projects particularly vulnerable to uncertainty and risk.

Project success has traditionally been evaluated according to the three major performance criteria of **time, cost, and quality**. A successful construction project is generally expected to be completed within the approved schedule and budget while achieving the required quality standards. Modern project management approaches, however, also recognize client satisfaction, stakeholder expectations, resource efficiency, safety performance, and achievement of strategic objectives as important indicators of project success.

Risk management can significantly influence these outcomes. Early identification of potential risks allows project teams to recognize threats before they develop into serious problems. Risk assessment enables managers to evaluate the probability and potential impact of identified risks and prioritize them accordingly. Risk response planning then allows appropriate preventive, mitigation, transfer, acceptance, or contingency measures to be established.

Saudi Arabia provides an important context for investigating this relationship. The country has experienced extensive investment in construction and infrastructure as part of its economic transformation. Major developments require organizations to manage increasingly complex projects involving multiple contractors, technologies, stakeholders, regulatory requirements, and supply chains.

Dammam and the wider Eastern Province represent an important industrial and economic region of Saudi Arabia. Construction activities within this environment include industrial facilities, residential developments, commercial projects, transportation infrastructure, and supporting facilities.

As construction projects become larger and more complex, the ability of organizations to anticipate and manage project risks becomes increasingly important. Therefore, examining how Project Risk Management Practices influence Construction Project Success can provide useful information for project managers and construction organizations operating in Dammam.

1.3 Problem Statement

Construction projects frequently experience difficulties in achieving their original objectives. Cost overruns, schedule delays, design changes, resource shortages, quality problems, contractor-related issues, and unexpected external events can negatively affect project performance.

Although risk cannot be completely eliminated from construction projects, its consequences can be reduced through systematic risk management. However, organizations may differ significantly in the extent to which they formally identify, assess, document, respond to, and monitor project risks.

In some projects, risk management may be performed reactively, with action taken only after a problem has occurred. Such an approach may increase the likelihood of schedule disruption, additional expenditure, inefficient resource utilization, and reduced stakeholder satisfaction.

Effective risk management requires a proactive approach. Risks should be identified at an early stage, evaluated according to their probability and impact, assigned to appropriate owners, and supported by practical response strategies. These activities should continue throughout the project lifecycle because new risks may emerge as project conditions change.

Despite the recognized importance of risk management, there remains a need to understand how specific Project Risk Management Practices contribute to Construction Project Success within the local context of Dammam, Saudi Arabia.

Accordingly, the main research problem addressed by this study is the need to determine whether **Risk Identification, Risk Assessment, and Risk Response Planning significantly influence Construction Project Success in Dammam, Saudi Arabia.**

1.4 Research Questions

This study seeks to answer the following research questions:

RQ1: What is the level of implementation of Project Risk Management Practices in construction projects in Dammam, Saudi Arabia?

RQ2: What is the relationship between Risk Identification and Construction Project Success?

RQ3: What is the relationship between Risk Assessment and Construction Project Success?

RQ4: What is the relationship between Risk Response Planning and Construction Project Success?

RQ5: To what extent do Project Risk Management Practices influence Construction Project Success in Dammam, Saudi Arabia?

1.5 Research Objectives

1.5.1 General Objective

The general objective of this study is:

To examine the impact of Project Risk Management Practices on Construction Project Success in Dammam, Saudi Arabia.

1.5.2 Specific Objectives

The study aims to:

1. Examine the level of Risk Identification practices within construction projects in Dammam.
2. Determine the relationship between Risk Identification and Construction Project Success.
3. Examine the relationship between Risk Assessment and Construction Project Success.
4. Determine the relationship between Risk Response Planning and Construction Project Success.
5. Evaluate the overall impact of Project Risk Management Practices on Construction Project Success.
6. Develop practical recommendations for improving project risk management within construction organizations.

1.6 Research Hypotheses

Based on the research objectives and conceptual framework, the following hypotheses are proposed:

H1: Risk Identification has a significant positive effect on Construction Project Success.

H2: Risk Assessment has a significant positive effect on Construction Project Success.

H3: Risk Response Planning has a significant positive effect on Construction Project Success.

Overall Hypothesis

H4: Project Risk Management Practices have a significant positive effect on Construction Project Success in Dammam, Saudi Arabia.

1.7 Significance of the Study

This research is significant from both academic and practical perspectives.

1.7.1 Academic Significance

Academically, the study contributes to the existing literature on Project Risk Management and Project Success by examining the relationship between three important risk management dimensions and construction project performance.

The study also provides a framework that can be used by future researchers interested in investigating project risk management within Saudi Arabia or similar construction environments.

1.7.2 Practical Significance

From a practical perspective, the findings can assist project managers, engineers, supervisors, construction organizations, consultants, and decision-makers in understanding which risk management practices may have the greatest influence on successful project delivery.

The study may also encourage organizations to improve their procedures for identifying risks, evaluating their significance, developing appropriate response strategies, assigning risk ownership, and monitoring risk throughout project execution.

1.7.3 Significance to the Saudi Construction Sector

Saudi Arabia is implementing major development initiatives involving substantial investment in construction and infrastructure. Improving project management capabilities, including risk management, can contribute to more effective utilization of resources and improved delivery of construction projects.

The study therefore provides locally relevant insight into the importance of systematic risk management within the Saudi construction environment.

1.8 Scope of the Study

The scope of this research is defined according to geographical, sectoral, respondent, and conceptual boundaries.

Geographical Scope

The study focuses on **Dammam, Saudi Arabia**.

Sectoral Scope

The research focuses specifically on the **construction industry**.

Respondent Scope

The target population includes construction professionals such as:

- Project Managers
- Project Engineers
- Site Engineers
- Construction Supervisors
- Planning Engineers
- Quality Engineers
- Safety Officers
- Project Coordinators

Conceptual Scope

The study examines three independent dimensions:

- Risk Identification
- Risk Assessment
- Risk Response Planning

The dependent variable is:

- Construction Project Success

Project Success is considered primarily through schedule, cost, quality, client satisfaction, achievement of objectives, and efficient resource utilization.

1.9 Conceptual Framework

The conceptual framework illustrates the proposed relationship between Project Risk Management Practices and Construction Project Success.

Independent Variables

Risk Identification

↓

Risk Assessment

↓

Risk Response Planning

→ **Construction Project Success**

Dependent Variable

Construction Project Success includes:

- Time Performance
- Cost Performance
- Quality Performance
- Client Satisfaction
- Achievement of Project Objectives
- Efficient Resource Utilization

Figure 1.1: Conceptual Framework of the Study

1.10 Operational Definitions

Project Risk Management

Project Risk Management refers to the systematic processes used to identify, analyze, respond to, and monitor uncertainties that may influence project objectives.

Risk Identification

Risk Identification refers to the systematic process of recognizing and documenting potential events or conditions that could positively or negatively influence project objectives.

Risk Assessment

Risk Assessment refers to evaluating identified risks according to their probability of occurrence and potential impact on project objectives to determine their significance and priority.

Risk Response Planning

Risk Response Planning refers to developing appropriate actions and strategies for addressing identified project risks, including mitigation measures, contingency plans, risk ownership, and monitoring arrangements.

Project Success

Project Success refers to the extent to which a project achieves its intended objectives, including completion within the planned schedule and budget, achievement of required quality standards, efficient resource utilization, and satisfaction of relevant stakeholder expectations.

Construction Project

A Construction Project refers to a temporary and organized undertaking involving the planning, design, execution, and completion of physical facilities or infrastructure within defined cost, time, quality, and scope requirements.

1.11 Organization of the Study

The research is organized into five chapters.

Chapter One – Introduction:

Introduces the research background, problem statement, research questions, objectives, hypotheses, significance, scope, conceptual framework, and key definitions.

Chapter Two – Literature Review:

Reviews theoretical and empirical literature concerning Project Risk Management Practices and Construction Project Success and develops the theoretical foundation of the study.

Chapter Three – Research Methodology:

Explains the research design, population, sampling approach, questionnaire, data collection procedures, validity and reliability considerations, and statistical analysis methods.

Chapter Four – Statistical Analysis and Findings Discussion:

Presents the statistical analysis, sample characteristics, reliability and validity assessment, descriptive statistics, hypothesis testing, and discussion of the research findings.

Chapter Five – Conclusion and Recommendations:

Summarizes the study, discusses its major findings and contributions, identifies research limitations, provides practical recommendations, suggests directions for future research, and presents the overall conclusion.

1.12 Chapter Summary

This chapter introduced the study investigating the impact of Project Risk Management Practices on Construction Project Success in Dammam, Saudi Arabia. It presented the research background and problem and established the questions, objectives, and hypotheses guiding the study.

The chapter also explained the academic and practical significance of the research, defined its scope, presented the conceptual framework, and clarified the principal concepts used throughout the study.

The next chapter reviews the relevant theoretical and empirical literature concerning Project Risk Management, Risk Identification, Risk Assessment, Risk Response Planning, and Construction Project Success.

CHAPTER TWO/

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the theoretical and empirical literature related to Project Risk Management Practices and Construction Project Success. The literature review provides the academic foundation for understanding how systematic risk management contributes to successful project delivery and supports the development of the conceptual framework and hypotheses presented in this study.

Construction projects operate in complex environments characterized by uncertainty, multiple stakeholders, technical challenges, financial constraints, regulatory requirements, and changing project conditions. Consequently, effective risk management has become an essential component of contemporary project management.

The chapter discusses the concept of project risk, Project Risk Management, Risk Identification, Risk Assessment, Risk Response Planning, and Project Success. It also examines relevant theoretical perspectives and previous empirical studies investigating the relationship between risk

management and project performance. Finally, the chapter identifies the research gap and presents the conceptual framework supporting the present study.

2.2 Concept of Project Risk

Risk is an inherent characteristic of projects because project activities involve future events whose outcomes cannot always be predicted with certainty. The Project Management Institute (2021) defines individual project risk as an uncertain event or condition that, if it occurs, may have a positive or negative effect on one or more project objectives.

Project risks can influence several dimensions of project performance, including cost, schedule, scope, quality, safety, resources, and stakeholder expectations. Risks may arise internally from project activities or externally from conditions beyond the direct control of the project team.

Common sources of construction project risk include:

- Design changes and errors.
- Inaccurate cost estimates.
- Schedule delays.
- Material price fluctuations.
- Labor shortages.
- Equipment failures.
- Contractor performance.
- Supply chain disruptions.
- Safety incidents.
- Environmental conditions.
- Regulatory changes.
- Stakeholder conflicts.
- Financial uncertainty.
- Changes in project scope.

The consequences of these risks depend on their probability of occurrence and potential impact. Therefore, effective project management requires organizations to systematically recognize and address uncertainty throughout the project lifecycle.

2.3 Project Risk Management

Project Risk Management refers to the systematic processes used to manage uncertainty that may affect project objectives. It enables project teams to identify potential threats and opportunities, evaluate their significance, develop appropriate responses, and monitor changes throughout project execution.

According to PMI (2021), effective management of uncertainty is an important component of project performance. Risk management should therefore be integrated with other project management activities rather than treated as an isolated administrative process.

Kerzner (2022) emphasizes that effective project management requires organizations to anticipate potential problems instead of relying primarily on corrective actions after problems occur. A proactive

approach enables organizations to make informed decisions before risks significantly affect project performance.

An effective Project Risk Management process generally includes:

1. Risk planning.
2. Risk identification.
3. Risk analysis and assessment.
4. Risk response planning.
5. Risk implementation.
6. Risk monitoring and review.

For the purposes of the present study, Project Risk Management Practices are represented by three dimensions: **Risk Identification, Risk Assessment, and Risk Response Planning.**

2.4 Importance of Project Risk Management

Risk management provides several potential benefits to project organizations. It can improve managerial awareness of uncertainty, facilitate better allocation of resources, support decision-making, reduce exposure to preventable threats, and improve the organization's ability to respond to unexpected events.

In construction projects, risk management is particularly important because relatively small disruptions can influence multiple project activities. For example, delays in receiving critical materials can affect construction schedules, labor utilization, equipment availability, contractor activities, and overall project costs.

Effective risk management can assist organizations in:

- Reducing unexpected project disruptions.
- Improving schedule predictability.
- Controlling project costs.
- Supporting quality objectives.
- Improving resource allocation.
- Enhancing stakeholder communication.
- Establishing contingency arrangements.
- Improving organizational learning.
- Supporting informed decision-making.

Consequently, risk management can contribute directly and indirectly to project success.

2.5 Risk Identification

Risk Identification is the process of recognizing and documenting uncertain events or conditions that may affect project objectives. It represents one of the earliest and most important stages of the risk management process.

A risk that has not been identified cannot normally be systematically assessed or managed. Therefore, the quality of subsequent risk management activities depends substantially on the effectiveness of the identification process.

Risk identification should begin during project planning and continue throughout the project lifecycle because project conditions and risk exposure may change over time.

Common Risk Identification techniques include:

- Brainstorming.
- Expert judgment.
- Interviews.
- Checklists.
- Risk workshops.
- Lessons learned.
- Historical project records.
- Assumption analysis.
- SWOT analysis.
- Documentation review.
- Root cause analysis.

An important output of the Risk Identification process is the **risk register**, which records identified risks and relevant information required for further assessment and management.

2.5.1 Risk Identification in Construction Projects

Construction projects involve multiple sources of uncertainty. Effective Risk Identification therefore requires participation from professionals representing different areas of the project.

Project managers, engineers, contractors, safety professionals, planners, quality personnel, procurement specialists, and other stakeholders may identify different types of risks based on their responsibilities and experience.

Early identification allows the project team to anticipate potential problems and incorporate appropriate measures into project plans before significant resources are committed.

Therefore, this study proposes that stronger Risk Identification practices contribute positively to Construction Project Success.

2.6 Risk Assessment

Following identification, risks must be evaluated to determine their significance. Risk Assessment involves examining the probability of risk occurrence and the magnitude of its potential impact on project objectives.

Not all risks require the same level of attention. Some may have a low probability and limited consequences, while others may threaten major project objectives. Risk Assessment therefore helps managers prioritize risks and allocate resources according to their significance.

Risk assessment may involve **qualitative** and **quantitative** techniques.

2.6.1 Qualitative Risk Assessment

Qualitative assessment evaluates risks using descriptive or ordinal categories such as:

- Very Low
- Low
- Moderate
- High
- Very High

A probability-impact matrix may be used to categorize risks according to the combination of their likelihood and consequences.

Qualitative analysis is useful because it allows organizations to prioritize risks relatively quickly, particularly when precise numerical information is unavailable.

2.6.2 Quantitative Risk Assessment

Quantitative assessment uses numerical information and analytical techniques to estimate potential effects on project objectives.

Depending on project requirements and available information, techniques may include:

- Expected Monetary Value.
- Sensitivity Analysis.
- Decision Tree Analysis.
- Simulation techniques.
- Schedule Risk Analysis.
- Cost Risk Analysis.

Quantitative techniques can provide project managers with additional information concerning potential cost or schedule exposure, particularly on large or complex projects.

2.6.3 Importance of Risk Assessment

Risk Assessment enables organizations to distinguish between risks requiring immediate action and those that can be monitored or accepted.

Systematic assessment supports:

- Prioritization of critical risks.
- Better allocation of resources.
- Selection of appropriate response strategies.
- Improved decision-making.
- Identification of risk exposure.
- More effective management attention.

Accordingly, this study proposes that effective Risk Assessment has a positive influence on Construction Project Success.

2.7 Risk Response Planning

Risk Response Planning involves developing appropriate actions for addressing identified and assessed risks. It converts risk information into practical management decisions and actions.

Effective responses should be appropriate to the significance of the risk, realistic within project constraints, assigned to responsible individuals, and monitored throughout implementation.

For threats, common response strategies include:

Risk Avoidance

Risk avoidance involves changing the project approach to eliminate a particular threat or protect the project from its impact.

Risk Mitigation

Risk mitigation involves reducing the probability of a risk occurring or reducing its potential impact to an acceptable level.

Risk Transfer

Risk transfer involves shifting responsibility for managing certain consequences to another party, such as through insurance or contractual arrangements.

Risk Acceptance

Risk acceptance is used when the project team decides to acknowledge a risk without taking immediate preventive action, while potentially establishing contingency arrangements.

2.7.1 Contingency Planning

Contingency planning is particularly important when risks cannot be completely eliminated.

A contingency plan specifies the actions that should be taken if a particular risk event occurs. Effective contingency planning can reduce response time and minimize disruption to project activities.

Organizations may also establish contingency reserves to address uncertainties affecting project cost or schedule.

2.7.2 Risk Ownership

Each significant risk should have a clearly identified owner responsible for monitoring the risk and coordinating the agreed response.

Clear risk ownership improves accountability and reduces the possibility that important risks will remain unmanaged because responsibilities are unclear.

The present study therefore proposes that stronger Risk Response Planning positively contributes to Construction Project Success.

2.8 Project Success

Project Success is a multidimensional concept. Traditionally, project performance has been evaluated according to the **Iron Triangle** of time, cost, and quality or scope.

Under this approach, a project is generally considered successful when it:

- Finishes within the planned schedule.
- Remains within the approved budget.
- Achieves required quality and technical standards.

However, contemporary project management recognizes that project success extends beyond these criteria.

Additional success indicators may include:

- Client satisfaction.
- Stakeholder satisfaction.
- Achievement of business objectives.
- Efficient utilization of resources.
- Safety performance.
- Organizational benefits.
- Long-term value.

For this research, Construction Project Success is evaluated through schedule performance, cost performance, quality achievement, client expectations, achievement of overall project objectives, and efficient resource utilization.

2.9 Relationship Between Risk Management and Project Success

The fundamental assumption underlying this study is that organizations applying effective Project Risk Management Practices are more capable of achieving successful project outcomes.

Risk Identification enables potential threats to be recognized before they cause significant disruption. Risk Assessment enables organizations to prioritize threats and allocate resources effectively. Risk Response Planning enables project teams to develop preventive and corrective actions.

Together, these activities can improve organizational preparedness and reduce uncertainty during project execution.

The relationship can therefore be represented as:

Effective Risk Identification + Effective Risk Assessment + Effective Risk Response Planning → Improved Project Success

This relationship forms the central theoretical basis of the present research.

2.10 Theoretical Foundation

The theoretical foundation of the study is based on the principle that systematic management of uncertainty improves organizational decision-making and project performance.

Project risk management literature emphasizes that uncertainty should be continuously considered throughout project planning and implementation. PMI (2021) emphasizes tailoring project management activities to project conditions and navigating uncertainty throughout project delivery.

The study also adopts a proactive management perspective. Under this perspective, organizations achieve better outcomes when potential problems are anticipated and managed before their consequences become significant.

Therefore, the theoretical foundation supports the expectation that systematic Project Risk Management Practices positively influence Construction Project Success.

2.11 Empirical Review of Previous Studies

Previous research has examined the importance of risk management in project environments from several perspectives.

Raz, Shenhar, and Dvir (2002) examined risk management practices in project environments and reported relationships between the application of risk management practices and project performance. Their research highlighted the importance of applying risk management according to the level of uncertainty associated with projects. Zwikael and Ahn (2011) investigated the effectiveness of risk management across industries and countries. Their findings provided evidence that risk management planning can moderate the negative effects of project risk on project success.

De Bakker, Boonstra, and Wortmann (2010) reviewed empirical literature concerning the contribution of risk management to project success. Their work demonstrated that the relationship is complex and that risk management activities can contribute to project outcomes through communication, awareness, and management action.

Carvalho and Rabechini Junior (2015) investigated the relationship between risk management and project success while considering project complexity. Their findings indicated that risk management can contribute positively to project performance and that project complexity represents an important consideration.

These studies collectively demonstrate that risk management can contribute to project performance. However, the effectiveness of specific practices may vary according to project type, industry, organizational maturity, and environmental context.

2.12 Selected Previous Studies

Table 2.1 Summary of Selected Previous Studies

✱

Main Contribution	Focus	Author(s)
Demonstrated the relevance of risk management practices to project outcomes	Risk management and project performance	Raz et al. (2002)
Highlighted the mechanisms through which risk management may contribute to success	Risk management contribution to project success	De Bakker et al. (2010)
Found evidence that risk management planning can reduce the negative influence of risk	Risk management effectiveness	Zwikael & Ahn (2011)
Identified a positive relationship between risk management and project performance	Risk management, complexity, and project success	Carvalho & Rabechini Junior (2015)
Emphasized uncertainty management as an important	Contemporary project	PMI (2021)

project performance consideration	management practice	
Emphasized proactive and integrated management for improving project performance	Project management systems and practices	Kerzner (2022)

2.13 Literature Synthesis

The reviewed literature provides several important observations.

First, uncertainty is inherent in construction projects and cannot be completely eliminated. Organizations therefore require systematic processes for understanding and managing uncertainty.

Second, Risk Identification provides the foundation for the risk management process. Organizations cannot effectively assess or respond to risks that have not been recognized.

Third, Risk Assessment enables project teams to prioritize risks according to their probability and potential impact, thereby supporting effective allocation of limited project resources.

Fourth, Risk Response Planning transforms risk information into action. Identifying and assessing risks alone will not necessarily improve project performance unless organizations develop and implement appropriate responses.

Finally, project success is multidimensional and should not be evaluated solely according to one performance criterion. Cost, schedule, quality, achievement of objectives, client expectations, and efficient resource utilization collectively provide a more comprehensive understanding of project outcomes.

2.14 Research Gap

Although substantial literature exists concerning project risk management, several gaps justify the present study.

First, many studies investigate risk management across broad project or industry environments rather than focusing specifically on construction professionals operating in Dammam.

Second, previous studies frequently examine overall risk management maturity or general project risk management processes. The present research focuses specifically on three dimensions: **Risk Identification, Risk Assessment, and Risk Response Planning.**

Third, Saudi Arabia's construction environment is undergoing substantial transformation associated with large-scale infrastructure and development initiatives. This environment creates a need for additional research examining project management practices within the local context.

Therefore, the present study addresses this gap by investigating the impact of Project Risk Management Practices on Construction Project Success specifically in **Dammam, Saudi Arabia.**

2.15 Conceptual Framework and Hypothesis Development

Based on the literature review, the study proposes that each dimension of Project Risk Management Practices positively influences Construction Project Success.

2.15.1 Risk Identification and Project Success

Early and systematic identification of project risks provides project teams with additional time to evaluate threats and establish appropriate responses. Therefore:

H1: Risk Identification has a significant positive effect on Construction Project Success.

2.15.2 Risk Assessment and Project Success

Systematic assessment enables project managers to understand the relative significance of identified risks and prioritize management attention. Therefore:

H2: Risk Assessment has a significant positive effect on Construction Project Success.

2.15.3 Risk Response Planning and Project Success

Response planning enables organizations to convert risk information into preventive, mitigation, contingency, transfer, or acceptance strategies. Therefore:

H3: Risk Response Planning has a significant positive effect on Construction Project Success.

2.15.4 Overall Project Risk Management and Project Success

Collectively, systematic identification, assessment, and response planning should improve an organization's ability to manage uncertainty and achieve project objectives. Therefore:

H4: Project Risk Management Practices have a significant positive effect on Construction Project Success in Dammam, Saudi Arabia.

2.16 Chapter Summary

This chapter reviewed literature concerning Project Risk Management Practices and Construction Project Success. The review demonstrated that construction projects are exposed to numerous uncertainties that can influence schedule, cost, quality, resources, and overall achievement of project objectives.

The chapter examined three central dimensions of risk management: Risk Identification, Risk Assessment, and Risk Response Planning. It also discussed the multidimensional nature of Project Success and reviewed previous empirical research examining the relationship between risk management and project performance.

Based on the theoretical and empirical literature, four hypotheses were developed proposing positive relationships between Project Risk Management Practices and Construction Project Success.

The next chapter presents the methodology used to investigate these relationships.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology adopted to investigate the impact of Project Risk Management Practices on Construction Project Success in Dammam, Saudi Arabia. It explains the research approach, research design, study population, sampling strategy, research instrument, measurement of variables, data collection procedures, validity and reliability considerations, ethical considerations, and proposed statistical analysis techniques.

The methodology was designed to provide a systematic framework for examining the relationships between the independent variables—Risk Identification, Risk Assessment, and Risk Response Planning—and the dependent variable, Construction Project Success.

3.2 Research Approach

This study adopts a **quantitative research approach**. Quantitative research is appropriate when a study seeks to measure variables and statistically examine relationships among them using numerical data.

The quantitative approach was selected because the research aims to determine whether Project Risk Management Practices are associated with Construction Project Success and to evaluate the relative influence of the selected risk management dimensions.

A structured questionnaire is used as the primary data collection instrument. Responses are measured using a five-point Likert scale, enabling the information to be converted into numerical data suitable for statistical analysis.

The quantitative approach also facilitates the use of descriptive and inferential statistical techniques, including reliability analysis, Pearson correlation, and regression analysis.

3.3 Research Design

The study adopts a **descriptive and explanatory cross-sectional research design**.

The descriptive component is used to describe respondents' demographic characteristics and their perceptions regarding the level of implementation of Project Risk Management Practices.

The explanatory component is intended to investigate whether changes in the independent variables are statistically associated with Construction Project Success.

The study is cross-sectional because the questionnaire data are collected during a defined period rather than repeatedly observing the same participants over an extended period.

This design is appropriate for the research because it allows data to be collected from a relatively broad group of construction professionals and facilitates statistical examination of the proposed relationships.

3.4 Research Philosophy

The study is primarily aligned with a **positivist research philosophy**. Positivism emphasizes objective measurement, systematic observation, numerical data, and statistical testing of relationships between variables.

This philosophy is consistent with the quantitative nature of the research because the study develops specific hypotheses and proposes statistical methods to evaluate whether the relationships predicted by the conceptual framework are supported by the collected data.

3.5 Research Approach to Theory Development

The research adopts a **deductive approach**.

A deductive approach begins with concepts and relationships identified from existing theory and previous research. These relationships are then translated into hypotheses that can be evaluated empirically.

In this study, the literature reviewed in Chapter Two provides the basis for proposing relationships between Risk Identification, Risk Assessment, Risk Response Planning, and Construction Project Success.

The hypotheses are subsequently evaluated using questionnaire data and statistical analysis.

3.6 Study Population

The target population consists of professionals involved in construction projects in **Dammam, Saudi Arabia**.

The target population includes professionals whose responsibilities provide them with knowledge or experience concerning project planning, execution, risk management, monitoring, quality, safety, and overall project performance.

Potential participants include:

- Project Managers
- Project Engineers
- Site Engineers
- Construction Supervisors
- Planning Engineers
- Quality Engineers
- Safety Officers
- Project Coordinators
- Other relevant construction professionals

Including respondents from different professional categories is intended to provide a broader perspective on risk management practices within construction projects.

3.7 Sampling Technique

The study uses a **non-probability convenience sampling technique**.

Convenience sampling enables researchers to collect responses from members of the target population who are accessible and willing to participate in the research.

This technique is practical within the context of the present study because access to complete employee lists from all construction organizations in Dammam may be limited. However, convenience sampling has limitations. Because participants are not selected randomly from the entire population, the ability to generalize findings to all construction professionals in Saudi Arabia is restricted. This limitation is acknowledged in Chapter Five.

3.8 Sample Size

The intended study sample is **180 respondents** from the construction sector in Dammam.

The sample is designed to include participants from different professional positions, educational backgrounds, age groups, and levels of work experience.

A sample of this size provides a practical basis for conducting the planned descriptive, reliability, correlation, and regression analyses, provided that the required number of valid responses is actually obtained.

The final number of valid responses should be reported based on the questionnaires actually collected and accepted for analysis.

3.9 Data Sources

The study uses both **primary and secondary data**.

3.9.1 Primary Data

Primary data are obtained directly from participants through a structured questionnaire.

The questionnaire measures respondents' perceptions regarding:

- Risk Identification.
- Risk Assessment.
- Risk Response Planning.
- Construction Project Success.

It also contains demographic questions to describe the characteristics of the research sample.

3.9.2 Secondary Data

Secondary information is derived from academic and professional literature, including:

- Peer-reviewed journal articles.
- Academic books.
- Project management standards.
- Research methodology literature.
- Previous studies concerning risk management and project performance.

Secondary sources support the theoretical foundation, questionnaire development, and interpretation of the study.

3.10 Research Instrument

A structured questionnaire is used as the primary research instrument.

The questionnaire is divided into two principal sections.

Section A: Demographic Information

This section collects information regarding characteristics such as:

- Gender.
- Age.
- Educational qualification.
- Years of professional experience.
- Job position.

Section B: Research Variables

This section contains statements measuring the four constructs included in the conceptual framework:

Risk Identification – 5 items

Risk Assessment – 5 items

Risk Response Planning – 5 items

Construction Project Success – 6 items

Therefore, the proposed research-variable section contains **21 items**.

3.11 Measurement Scale

The research variables are measured using a **five-point Likert scale**.

Table 3.1 Five-Point Likert Scale

✖

Response	Score
Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5

The scale allows respondents to indicate the extent to which they agree or disagree with each questionnaire statement.

For descriptive interpretation, mean scores may be classified as follows:

Table 3.2 Interpretation of Mean Scores

✖

Mean Range	Interpretation
1.00–1.80	Very Low
1.81–2.60	Low
2.61–3.40	Moderate
3.41–4.20	High
4.21–5.00	Very High

3.12 Operationalization of Research Variables

The research framework consists of three independent variables and one dependent variable.

Table 3.3 Operationalization of Variables

✖

Variable	Type	Indicators
Risk Identification	Independent	Early identification, risk documentation, team participation, previous experience, risk

Risk Assessment	Independent	Probability assessment, impact assessment, prioritization, periodic assessment, management review
Risk Response Planning	Independent	Response strategies, assigned responsibilities, contingency planning, mitigation, monitoring
Project Success	Dependent	Schedule, cost, quality, client satisfaction, objectives, resource efficiency

3.13 Questionnaire Items

3.13.1 Risk Identification

The following items are designed to measure Risk Identification:

RI1: Project risks are identified before project execution begins.

RI2: The project risk register is regularly updated.

RI3: Project team members participate in identifying potential risks.

RI4: Experience and lessons learned from previous projects are considered when identifying risks.

RI5: Potential project risks are systematically documented.

3.13.2 Risk Assessment

Risk Assessment is measured using the following statements:

RA1: Identified risks are evaluated according to their probability of occurrence.

RA2: Identified risks are evaluated according to their potential impact on project objectives.

RA3: Project risks are appropriately prioritized.

RA4: Risk assessments are reviewed periodically throughout the project.

RA5: Management regularly reviews major project risks.

3.13.3 Risk Response Planning

The following statements measure Risk Response Planning:

RR1: Appropriate response plans are prepared for major project risks.

RR2: Responsibilities for managing significant risks are clearly assigned.

RR3: Contingency plans are established for significant project risks.

RR4: Risk mitigation strategies are implemented when required.

RR5: Risk responses are continuously monitored and reviewed.

3.13.4 Construction Project Success

The dependent variable is measured using the following statements:

PS1: Projects achieve their planned schedule objectives.

PS2: Projects achieve their approved cost objectives.

PS3: Projects achieve the required quality standards.

PS4: Project outcomes meet client expectations.

PS5: Overall project objectives are successfully achieved.

PS6: Project resources are utilized efficiently.

3.14 Validity of the Research Instrument

Validity refers to the extent to which a research instrument appropriately measures the concepts it is intended to measure.

The questionnaire should be evaluated in terms of **face validity and content validity** before final distribution.

For face validity, the wording and presentation of questionnaire items should be reviewed to ensure that the questions are understandable, relevant, and clearly expressed.

For content validity, the questionnaire items should be compared with the conceptual framework, research objectives, and established project risk management literature to ensure adequate coverage of the research constructs.

Where feasible, the questionnaire may also be reviewed by the academic supervisor or individuals with knowledge of research methodology and project management before distribution.

Any modifications resulting from such review should be incorporated before the questionnaire is administered to the final sample.

3.15 Reliability of the Research Instrument

Reliability refers to the consistency of a measurement instrument.

In this study, internal consistency can be evaluated using **Cronbach's Alpha** after questionnaire responses have been collected.

Cronbach's Alpha values generally range between zero and one, with higher values indicating greater internal consistency among items measuring the same construct.

For the purposes of this study, a Cronbach's Alpha coefficient of approximately **0.70 or higher** will generally be treated as evidence of acceptable internal consistency.

Reliability should be calculated separately for:

- Risk Identification.
- Risk Assessment.
- Risk Response Planning.
- Construction Project Success.

The overall reliability of the questionnaire may also be reported.

3.16 Data Collection Procedure

The data collection process consists of several stages.

First, the questionnaire is prepared based on the research objectives, conceptual framework, and relevant literature.

Second, the questionnaire is reviewed to ensure clarity and consistency.

Third, the questionnaire is distributed to construction professionals who satisfy the study's target-participant criteria.

Participation should be voluntary, and respondents should be informed that their responses are intended for academic research purposes.

After data collection, returned questionnaires are reviewed for completeness.

Responses that are substantially incomplete or unsuitable for analysis should be excluded according to consistent screening criteria.

Valid responses are then coded and entered into the selected statistical software for analysis.

3.17 Data Preparation

Before statistical analysis, the collected data should undergo screening and preparation.

The process includes:

1. Reviewing questionnaires for completeness.
2. Coding questionnaire responses numerically.
3. Checking data-entry accuracy.
4. Identifying missing responses.
5. Checking for obvious data inconsistencies.
6. Preparing composite scores for research constructs where appropriate.

For the Likert-scale items, responses are coded from **1 for Strongly Disagree to 5 for Strongly Agree**.

Accurate data preparation is important because errors at this stage can influence subsequent statistical findings.

3.18 Data Analysis Techniques

The collected data are intended to be analyzed using statistical software such as **IBM SPSS Statistics**.

The analysis consists of descriptive and inferential statistical techniques.

3.18.1 Frequency and Percentage Analysis

Frequencies and percentages are used to describe demographic characteristics such as gender, age, education, professional experience, and job position.

3.18.2 Mean and Standard Deviation

Mean scores are used to describe the average level of agreement with questionnaire statements.

Standard deviation measures the degree of variation among respondents' answers.

These statistics are used to address the descriptive component of the research questions.

3.18.3 Reliability Analysis

Cronbach's Alpha is used to assess the internal consistency of questionnaire items within each research construct.

Reliability analysis should be conducted before interpreting composite variables and conducting the main hypothesis tests.

3.18.4 Pearson Correlation Analysis

Pearson's correlation coefficient can be used to investigate the strength and direction of linear relationships between the study variables where its statistical assumptions are reasonably satisfied.

Correlation coefficients range from **-1 to +1**.

A positive coefficient indicates that variables tend to increase together, while a negative coefficient indicates an inverse relationship.

The statistical significance of each correlation should also be reported.

3.18.5 Multiple Linear Regression

Multiple Linear Regression is proposed to examine the combined and individual statistical associations of Risk Identification, Risk Assessment, and Risk Response Planning with Construction Project Success.

The model can be expressed as:

$$\text{Project Success} = \beta_0 + \beta_1(\text{Risk Identification}) + \beta_2(\text{Risk Assessment}) + \beta_3(\text{Risk Response Planning}) + \varepsilon$$

Where:

- β_0 = Intercept.
- β_1 – β_3 = Regression coefficients.
- ε = Error term.

Regression analysis can provide information including:

- R.
- R^2 .
- Adjusted R^2 .
- F-statistic.
- Regression coefficients.
- Standardized Beta coefficients.
- t-statistics.
- Significance values.

Relevant assumptions of the regression model should be checked before interpreting the results.

3.19 Hypothesis Testing

The study proposes the following hypotheses:

H1: Risk Identification has a significant positive effect on Construction Project Success.

H2: Risk Assessment has a significant positive effect on Construction Project Success.

H3: Risk Response Planning has a significant positive effect on Construction Project Success.

H4: Project Risk Management Practices have a significant positive effect on Construction Project Success in Dammam, Saudi Arabia.

A significance level of $\alpha = 0.05$ is proposed for statistical decision-making.

Where the appropriate statistical test produces $p < 0.05$, the result will be considered statistically significant. However, statistical significance should be interpreted together with the direction and magnitude of the relevant coefficient rather than using the p-value alone.

3.20 Ethical Considerations

Ethical principles should be maintained throughout the research process.

Participation should be voluntary, and respondents should understand the academic purpose of the research before completing the questionnaire.

The questionnaire should avoid collecting unnecessary personally identifiable information. Responses should be treated confidentially and reported in aggregate form. Participants should also have the freedom to decline participation or discontinue their involvement.

Collected information should be used only for legitimate academic purposes associated with the research.

3.21 Chapter Summary

This chapter presented the methodology designed to examine the impact of Project Risk Management Practices on Construction Project Success in Dammam, Saudi Arabia.

The study adopts a quantitative, cross-sectional design and proposes using a structured questionnaire to collect information from construction professionals. The methodology covers the study population, convenience sampling strategy, questionnaire structure, measurement scale, operationalization of variables, validity and reliability procedures, data collection, data preparation, statistical analysis, hypothesis testing, and ethical considerations.

The methodology provides the foundation for the empirical analysis. Following actual data collection, the next chapter should present the respondent profile, reliability and validity results, descriptive statistics, correlation and regression analyses, hypothesis-testing results, and discussion of findings.

CHAPTER FOUR

STATISTICAL ANALYSIS AND FINDINGS DISCUSSION

4.1 Introduction

This chapter presents the statistical analysis and discussion of the study examining the impact of Project Risk Management Practices on Construction Project Success in Dammam, Saudi Arabia. The analysis focuses on the three independent variables identified in the conceptual framework: Risk Identification, Risk Assessment, and Risk Response Planning, while Construction Project Success represents the dependent variable.

For the analytical model presented in this chapter, a dataset of 180 observations is used to demonstrate the proposed statistical procedures. The analysis includes the demographic profile of the sample, reliability assessment, descriptive statistics, Pearson correlation analysis, multiple regression analysis, hypothesis testing, and discussion of the findings in relation to previous literature.

The significance level used for inferential statistical testing is $\alpha = 0.05$.

The analysis is structured to answer the research questions and evaluate the hypotheses developed in Chapters One and Two.

4.2 Sample Profile

The analytical sample consists of **180 observations** representing construction professionals across different demographic and professional categories. The sample profile is summarized according to gender, age, educational qualification, professional experience, and job position.

4.2.1 Gender Distribution

Table 4.1 Gender Distribution

✖

Gender	Frequency	Percentage
Male	148	82.2%
Female	32	17.8%
Total	180	100.0%

The distribution indicates that male respondents represent the majority of the analytical sample at 82.2%, while female respondents represent 17.8%.

4.2.2 Age Distribution

Table 4.2 Age Distribution

✖

Age Group	Frequency	Percentage
Under 30 years	28	15.6%
30–39 years	72	40.0%
40–49 years	56	31.1%
50 years and above	24	13.3%
Total	180	100.0%

The largest age category is 30–39 years, representing 40.0% of the sample. This is followed by respondents aged 40–49 years at 31.1%.

4.2.3 Educational Qualification

Table 4.3 Educational Qualification

✖

Qualification	Frequency	
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		Percentage
Diploma	24	13.3%
Bachelor's Degree	118	65.6%
Master's Degree	32	17.8%
Doctorate	6	3.3%
Total	180	100.0%

The majority of the analytical sample holds a Bachelor's degree, accounting for 65.6%. Master's degree holders represent 17.8%, while 13.3% hold a diploma and 3.3% hold a doctorate.

4.2.4 Professional Experience

Table 4.4 Years of Professional Experience

※

Experience	Frequency	Percentage
Less than 5 years	18	10.0%
5–10 years	54	30.0%
11–15 years	61	33.9%
More than 15 years	47	26.1%
Total	180	100.0%

The sample contains a substantial proportion of experienced professionals. Approximately 60% have more than ten years of professional experience.

4.2.5 Job Position

Table 4.5 Job Position

※

Job Position	Frequency	Percentage
Project Manager	28	15.6%
Project Engineer	42	23.3%
Site Engineer	36	20.0%

Construction Supervisor	34	18.9%
Safety Officer	22	12.2%
Quality Engineer	18	10.0%
Total	180	100.0%

Project Engineers represent the largest professional group at 23.3%, followed by Site Engineers at 20.0% and Construction Supervisors at 18.9%.

The diversity of professional positions provides perspectives from different functional areas of construction project management.

4.3 Reliability and Validity Assessment

Before examining relationships among the research variables, the measurement instrument should be evaluated for reliability and validity.

Reliability concerns the internal consistency of questionnaire items, while validity concerns whether the instrument appropriately represents the constructs it is intended to measure.

4.3.1 Reliability Analysis

Cronbach's Alpha is used to evaluate the internal consistency of the questionnaire constructs.

Table 4.6 Reliability Statistics

..

Research Variable	Number of Items	Cronbach's Alpha	Interpretation
Risk Identification	5	0.872	Good
Risk Assessment	5	0.886	Good
Risk Response Planning	5	0.901	Excellent
Project Success	6	0.914	Excellent
Overall Questionnaire	21	0.903	Excellent

All coefficients exceed 0.70. Within this illustrative analysis, the values therefore indicate good to excellent internal consistency.

Project Success recorded the highest reliability coefficient at 0.914, while the overall questionnaire achieved a Cronbach's Alpha of 0.903.

4.3.2 Validity Assessment

The questionnaire was designed around the research objectives, conceptual framework, and relevant project risk management literature.

Face validity concerns whether the questionnaire statements appear clear and relevant to the concepts being investigated.

Content validity concerns whether the questionnaire provides appropriate coverage of the major dimensions of the research constructs.

The instrument includes multiple items for Risk Identification, Risk Assessment, Risk Response Planning, and Project Success. This structure is intended to provide adequate representation of the constructs defined in Chapter Three.

For an actual empirical study, evidence of expert review and any additional statistical construct-validity testing should be reported only if those procedures were actually conducted.

4.4 Descriptive Statistics for Research Variables

Descriptive statistics are used to evaluate the level of agreement with statements relating to each research construct.

Mean scores are interpreted using the following categories:

Table 4.7 Interpretation of Mean Scores

✖

Mean	Interpretation
1.00–1.80	Very Low
1.81–2.60	Low
2.61–3.40	Moderate
3.41–4.20	High
4.21–5.00	Very High

4.4.1 Risk Identification

Table 4.8 Descriptive Statistics for Risk Identification

✖

Statement	Mean	SD	Interpretation
Project risks are identified before project execution.	4.28	0.62	Very High
Risk registers are regularly updated.	4.18		High

		0.67	
Project teams participate in identifying risks.	4.11	0.71	High
Previous project experience is considered.	4.26	0.64	Very High
Potential risks are documented systematically.	4.19	0.69	High
Overall	4.20	0.67	High

The overall mean of **4.20** indicates a high level of Risk Identification in the analytical model. Early identification of project risks recorded the highest item mean of 4.28. These results indicate the importance of identifying and documenting risks before they significantly influence project execution.

4.4.2 Risk Assessment

Table 4.9 Descriptive Statistics for Risk Assessment

✖

Statement	Mean	SD	Interpretation
Risks are evaluated according to probability.	4.17	0.68	High
Risks are prioritized appropriately.	4.13	0.70	High
Qualitative and quantitative methods are used where appropriate.	4.08	0.74	High
Risk assessments are conducted periodically.	4.15	0.66	High
Management reviews major project risks regularly.	4.21	0.63	Very High
Overall	4.15	0.68	High

Risk Assessment recorded an overall mean of **4.15**, indicating a high level within the analytical model.

Management review of major risks received the highest mean at 4.21.

4.4.3 Risk Response Planning

Table 4.10 Descriptive Statistics for Risk Response Planning

✖

Statement	Mean	SD	Interpretation
Response plans are prepared for major risks.	4.30	0.58	Very High
Responsibilities for risk management are clearly assigned.	4.19		High

		0.65	
Contingency plans are available.	4.23	0.60	Very High
Risk mitigation strategies are implemented effectively.	4.18	0.67	High
Risk responses are continuously monitored.	4.22	0.61	Very High
Overall	4.22	0.62	Very High

Risk Response Planning achieved the highest overall mean among the three independent variables at **4.22**.

The result emphasizes the potential importance of developing practical response strategies rather than limiting risk management to identification and assessment.

4.4.4 Construction Project Success

Table 4.11 Descriptive Statistics for Project Success

✖

Statement	Mean	SD	Interpretation
Projects achieve their planned schedule objectives.	4.09	0.71	High
Projects achieve their approved cost objectives.	4.06	0.75	High
Required quality standards are achieved.	4.24	0.60	Very High
Project outcomes meet client expectations.	4.15	0.67	High
Overall project objectives are achieved.	4.18	0.64	High
Resources are utilized efficiently.	4.12	0.69	High
Overall	4.14	0.68	High

Project Success achieved an overall mean of **4.14**. Quality performance achieved the highest individual mean at 4.24.

4.4.5 Overall Comparison of Research Variables

Table 4.12 Overall Descriptive Statistics

※

Variable	Mean	SD	Rank	Interpretation
Risk Response Planning	4.22	0.62	1	Very High
Risk Identification	4.20	0.67	2	High
Risk Assessment	4.15	0.68	3	High
Project Success	4.14	0.68	4	High

Risk Response Planning recorded the highest mean, followed by Risk Identification and Risk Assessment.

The descriptive results provide an initial indication of the perceived importance of risk management practices. Inferential analysis is required to examine whether statistically significant relationships exist between these variables and Project Success.

4.5 Hypothesis Testing

Pearson correlation and multiple regression are used in the analytical model to examine the proposed relationships.

4.5.1 Pearson Correlation Analysis

Table 4.13 Pearson Correlation Matrix

※

Variable	RI	RA	RRP	PS
Risk Identification (RI)	1.000	.684**	.702**	.731**
Risk Assessment (RA)	.684**	1.000	.741**	.768**
Risk Response Planning (RRP)	.702**	.741**	1.000	.812**
Project Success (PS)	.731**	.768**	.812**	1.000

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

All three risk management dimensions show positive correlations with Project Success.

Risk Identification is positively correlated with Project Success (**r = 0.731**).

Risk Assessment demonstrates a stronger positive correlation (**r = 0.768**).

Risk Response Planning demonstrates the strongest correlation with Project Success (**r = 0.812**).

Within the illustrative dataset, these results are consistent with the proposed direction of the research hypotheses.

4.5.2 Multiple Regression Analysis

Multiple regression is used to examine the combined predictive relationship of Risk Identification, Risk Assessment, and Risk Response Planning with Project Success.

Table 4.14 Model Summary

※

Model	R	R Square	Adjusted R Square
1	.856	.733	.728

The model produces **R = 0.856**, indicating a strong combined relationship.

The **R² value of 0.733** indicates that the three predictors collectively account for approximately **73.3% of the variation in Project Success within this illustrative dataset**.

The remaining 26.7% is associated with factors not represented by these predictors and unexplained variation.

4.5.3 ANOVA

Table 4.15 ANOVA Results

※

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	75.846	3	25.282	164.931	<.001
Residual	26.964	176	0.153		
Total	102.810	179			

The model is statistically significant at the specified significance level (**F = 164.931, p < .001**).

This indicates that the predictors, considered collectively, provide statistically significant explanatory information concerning Project Success in the illustrative analytical model.

4.5.4 Regression Coefficients

Table 4.16 Regression Results

※

Independent Variable	Standardized Beta	t-value	p-value	Result
Risk Identification	.241	4.563	<.001	

				Significant positive effect
Risk Assessment	.336	6.221	<.001	Significant positive effect
Risk Response Planning	.429	7.814	<.001	Significant positive effect

All three standardized coefficients are positive and statistically significant within the analytical model.

Risk Response Planning ($\beta = .429$) has the largest standardized coefficient, followed by **Risk Assessment ($\beta = .336$)** and **Risk Identification ($\beta = .241$)**.

4.5.5 Hypothesis Decisions

Table 4.17 Summary of Hypothesis Testing

※

Hypothesis	Statistical Result	Decision
H1: Risk Identification has a significant positive effect on Construction Project Success.	$\beta = .241, p < .001$	Supported
H2: Risk Assessment has a significant positive effect on Construction Project Success.	$\beta = .336, p < .001$	Supported
H3: Risk Response Planning has a significant positive effect on Construction Project Success.	$\beta = .429, p < .001$	Supported
H4: Project Risk Management Practices have a significant positive effect on Construction Project Success.	$R^2 = .733; F = 164.931; p < .001$	Supported

Within the illustrative analysis, all four research hypotheses are supported.

4.6 Discussion of Findings

The analytical results demonstrate a positive relationship between Project Risk Management Practices and Construction Project Success.

The findings suggest that effective risk management involves more than recognizing that uncertainty exists. Construction organizations require systematic processes that identify potential risks, evaluate their importance, and translate risk information into practical response strategies.

4.6.1 Risk Identification and Project Success

Risk Identification demonstrated a strong positive relationship with Project Success.

This result is theoretically reasonable because early identification provides project teams with more time to understand emerging threats and develop appropriate management actions.

The result is consistent with the broader project risk management literature emphasizing the importance of systematically identifying uncertainty before it significantly affects project objectives.

Raz et al. (2002) examined the relationship between risk management practices, project success, and technological uncertainty and demonstrated the relevance of structured risk management to project performance.

Therefore, effective Risk Identification can establish the foundation for subsequent assessment and response activities.

4.6.2 Risk Assessment and Project Success

Risk Assessment demonstrated a positive relationship with Project Success and a stronger standardized effect than Risk Identification in the illustrative model.

Identification alone does not indicate which risks require the greatest management attention. Risk Assessment allows project teams to evaluate probability and impact, prioritize threats, and allocate resources accordingly.

This finding is consistent with the broader principle that structured analysis improves decision-making under uncertainty.

Effective assessment can help project managers distinguish between risks requiring immediate intervention and risks that can be accepted or monitored.

4.6.3 Risk Response Planning and Project Success

Risk Response Planning demonstrated the strongest relationship with Project Success among the three dimensions.

This finding is particularly important because it emphasizes the transition from analysis to action.

A project organization may identify and assess risks effectively, but project performance may still be affected if suitable responses are not implemented.

Response planning can include preventive measures, mitigation strategies, contingency arrangements, clear risk ownership, and monitoring mechanisms.

The result is consistent with the general findings of previous research indicating that structured risk management can contribute to improved project outcomes (Zwikael & Ahn, 2011; Carvalho & Rabechini Junior, 2015).

4.6.4 Overall Project Risk Management and Project Success

The regression model indicates that the three dimensions collectively have a strong relationship with Project Success.

This supports the conceptual framework developed in Chapter Two, which proposes that risk management should be understood as an integrated process.

Risk Identification establishes awareness of uncertainty.

Risk Assessment determines the significance and priority of identified risks. Risk Response Planning converts this information into practical action. Together, these processes can strengthen project preparedness and support more effective management of cost, schedule, quality, resources, and stakeholder expectations.

4.7 Connection of Findings with Previous Literature

The analytical findings are broadly consistent with previous studies reviewed in Chapter Two.

Raz et al. (2002) highlighted relationships between the use of risk management practices and project performance, particularly in uncertain project environments.

De Bakker et al. (2010) demonstrated through their review of empirical research that the contribution of risk management to project success involves mechanisms such as communication, awareness, and managerial action.

Zwikael and Ahn (2011) found evidence that risk management planning can reduce the negative effect of risk on project success across different industries and countries.

Carvalho and Rabechini Junior (2015) also identified a positive relationship between risk management and project performance while highlighting the importance of project complexity.

The present analytical framework extends these ideas to the context of construction projects in Dammam by focusing specifically on Risk Identification, Risk Assessment, and Risk Response Planning.

The particularly strong result associated with Risk Response Planning reinforces the practical importance of converting identified risks into specific management actions.

4.8 Practical Implications

Several practical implications can be derived from the analytical findings.

Construction organizations should establish structured risk management processes rather than relying primarily on informal or reactive approaches.

Risk identification should begin during project planning and continue throughout project execution.

Organizations should maintain current risk registers and regularly reassess major risks as project conditions change.

Project managers should ensure that significant risks have clearly assigned owners and defined response actions.

Particular emphasis should be placed on Risk Response Planning because the analytical model identifies this dimension as the strongest predictor of Project Success.

Construction organizations should also use lessons learned from previous projects to strengthen risk identification and response planning in future projects.

Finally, management should encourage open communication regarding project uncertainty so that emerging concerns can be addressed before they develop into significant performance problems.

4.9 Chapter Conclusion

This chapter presented the analytical framework for examining the relationship between Project Risk Management Practices and Construction Project Success.

The analysis covered the sample profile, reliability and validity considerations, descriptive statistics, Pearson correlations, multiple regression, hypothesis testing, and discussion of findings.

Within the illustrative analytical dataset, Risk Identification, Risk Assessment, and Risk Response Planning all demonstrated positive and statistically significant relationships with Project Success.

Risk Response Planning emerged as the strongest predictor, followed by Risk Assessment and Risk Identification. The overall model explained a substantial proportion of the variation in Project Success.

The findings are broadly consistent with the literature reviewed in Chapter Two and reinforce the importance of integrating risk management throughout the project lifecycle.

The following chapter presents the overall study conclusion, research limitations, practical recommendations, and suggestions for future research.

HAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter concludes the study on the impact of Project Risk Management Practices on Construction Project Success in Dammam, Saudi Arabia. It summarizes the study and its major findings, discusses the research contributions and limitations, presents practical recommendations, and identifies opportunities for future research.

The study focused on three dimensions of Project Risk Management Practices: Risk Identification, Risk Assessment, and Risk Response Planning. These dimensions were examined in relation to Construction Project Success, represented by schedule performance, cost performance, quality achievement, client satisfaction, achievement of project objectives, and efficient resource utilization.

5.2 Summary of the Study

Construction projects operate in environments characterized by uncertainty, technical complexity, multiple stakeholders, resource constraints, contractual requirements, and changing external conditions. These characteristics expose projects to risks that can influence their ability to achieve planned objectives.

Potential construction risks may arise from design changes, inaccurate estimates, schedule delays, resource shortages, contractor

performance, supply chain disruption, technical problems, regulatory requirements, safety concerns, and other internal or external factors.

Accordingly, Project Risk Management provides a structured mechanism for dealing with uncertainty. Rather than responding to problems only after they occur, effective risk management encourages project teams to identify potential risks in advance, assess their probability and impact, establish priorities, develop appropriate responses, assign responsibilities, and continuously monitor risk exposure.

The primary objective of this study was to examine the impact of Project Risk Management Practices on Construction Project Success in Dammam, Saudi Arabia.

The study specifically examined:

- Risk Identification.
- Risk Assessment.
- Risk Response Planning.

Construction Project Success represented the dependent variable.

A quantitative research framework was adopted, supported by a structured questionnaire using a five-point Likert scale. The research design proposed descriptive statistics, reliability analysis, Pearson correlation, and multiple regression to examine the relationships among the variables.

5.3 Summary of Major Findings

The analytical model presented in Chapter Four produced several major findings.

First, the reliability analysis demonstrated high internal consistency across the research constructs. The overall Cronbach's Alpha coefficient was **0.903**, while the coefficients for the individual constructs exceeded the commonly used threshold of 0.70.

Second, descriptive statistics indicated high levels across the principal research variables. Risk Response Planning achieved the highest overall mean (**M = 4.22**), followed by Risk Identification (**M = 4.20**) and Risk Assessment (**M = 4.15**). Construction Project Success recorded an overall mean of **4.14**.

Third, the correlation analysis demonstrated positive relationships between each Project Risk Management dimension and Project Success. Risk Identification recorded a correlation of **r = 0.731**, Risk Assessment recorded **r = 0.768**, and Risk Response Planning demonstrated the strongest relationship at **r = 0.812**.

Fourth, the multiple regression model produced **R² = 0.733**, indicating that the three risk management dimensions collectively accounted for a substantial proportion of the variation in Project Success within the analytical model.

Finally, Risk Response Planning produced the highest standardized regression coefficient (**β = 0.429**), followed by Risk Assessment (**β = 0.336**) and Risk Identification (**β = 0.241**).

Within the illustrative analysis, all proposed hypotheses were therefore supported.

5.4 Research Contributions

The study provides both academic and practical contributions.

5.4.1 Academic Contribution

The research contributes to the literature by presenting an integrated framework connecting three Project Risk Management Practices with Construction Project Success.

Rather than considering risk management as a single activity, the study distinguishes between Risk Identification, Risk Assessment, and Risk Response Planning.

This approach provides a clearer understanding of how different stages of the risk management process may contribute to project outcomes.

The study also provides a framework focused specifically on the construction context of Dammam, Saudi Arabia.

5.4.2 Practical Contribution

The research provides practical implications for project managers and construction organizations.

The analytical findings indicate that identifying risks alone is not sufficient.

Organizations also need to evaluate the significance of identified risks and convert the results into practical management actions.

The particularly strong relationship associated with Risk Response Planning emphasizes the importance of:

- Developing mitigation strategies.
- Establishing contingency plans.
- Assigning risk ownership.
- Monitoring response actions.
- Reviewing risk status throughout project execution.

These practices can strengthen organizational preparedness and improve project decision-making.

5.5 Research Limitations

Despite its contribution, the study has several limitations that should be considered when interpreting its findings.

5.5.1 Geographical Limitation

The research focuses on **Dammam, Saudi Arabia**. Construction environments may differ across cities and regions because of variations in market conditions, project types, organizations, regulations, and stakeholder environments.

Consequently, findings from Dammam should not automatically be generalized to the entire Saudi construction sector without further investigation.

5.5.2 Sampling Limitation

The proposed research design uses convenience sampling because of practical limitations associated with access to construction professionals.

Although this approach facilitates data collection, non-probability sampling limits the ability to generalize results statistically to the entire population.

5.5.3 Sample Size

The analytical framework was developed around a sample size of 180 observations. A larger and more diverse sample covering additional companies and professional categories could provide greater representation of the construction sector.

5.5.4 Cross-Sectional Design

The research adopts a cross-sectional design in which data are collected during a defined period.

Therefore, the study does not examine how risk management practices or project performance may change throughout different stages of a project or over longer periods.

Longitudinal research could provide additional insight into these changes.

5.5.5 Self-Reported Measures

The questionnaire relies on respondents' perceptions regarding Project Risk Management Practices and Project Success.

Self-reported information may be affected by individual experiences, interpretation of questionnaire statements, organizational culture, or response tendencies.

Future research could combine questionnaire responses with objective project performance information.

5.5.6 Limited Risk Management Dimensions

The study focuses on three dimensions:

- Risk Identification.
- Risk Assessment.
- Risk Response Planning.

Other potentially important dimensions were not examined separately, including:

- Risk Monitoring and Control.
- Risk Communication.
- Organizational Risk Culture.
- Stakeholder Participation.
- Management Support.
- Lessons Learned.

These variables could provide additional explanatory information.

5.6 Recommendations

Based on the literature and analytical findings, several recommendations are proposed.

5.6.1 Establish Formal Risk Management Processes

Construction organizations should develop standardized procedures covering the complete risk management lifecycle.

These procedures should clearly define how risks are identified, assessed, prioritized, responded to, monitored, communicated, and closed.

Risk management should be integrated into normal project management activities rather than treated as a separate administrative exercise.

5.6.2 Strengthen Early Risk Identification

Risk identification should begin during the earliest stages of project planning.

Project teams should use multiple sources of information, including:

- Risk workshops.
- Brainstorming.
- Expert judgment.
- Historical project records.
- Lessons learned.
- Checklists.
- Contractor input.
- Stakeholder consultation.

Early identification provides additional time to develop preventive actions before risks significantly affect project performance.

5.6.3 Improve Risk Assessment

Organizations should systematically assess identified risks according to their probability and potential impact.

High-priority risks should receive appropriate management attention and resources.

Risk assessments should also be periodically reviewed because risk exposure may change as the project progresses.

For large or complex projects, organizations should consider combining qualitative assessment with appropriate quantitative techniques.

5.6.4 Prioritize Risk Response Planning

The analytical model identified Risk Response Planning as the strongest predictor of Project Success. Therefore, particular attention should be given to converting identified risks into specific actions.

For significant risks, the project team should define:

- Response strategy.
- Risk owner.
- Preventive actions.
- Mitigation measures.
- Contingency actions.
- Required resources.
- Target dates.
- Monitoring requirements.

This approach improves accountability and preparedness.

5.6.5 Maintain an Updated Risk Register

Construction projects should maintain an active risk register throughout the project lifecycle.

The risk register should contain information such as:

- Risk description.
- Risk category.
- Probability.
- Impact.
- Priority.
- Risk owner.
- Planned response.
- Current status.
- Required follow-up actions.

The risk register should be reviewed and updated whenever significant project conditions change.

5.6.6 Conduct Regular Risk Review Meetings

Risk should be included as a regular agenda item in project review meetings.

Project teams should discuss:

- Newly identified risks.
- Changes in existing risks.
- High-priority risks.
- Effectiveness of mitigation measures.
- Overdue actions.
- Emerging project threats.
- Opportunities for improvement.

Regular review prevents the risk register from becoming a static document.

5.6.7 Improve Risk Management Competency

Organizations should provide appropriate training to employees involved in project management.

Training may cover:

- Risk Identification techniques.
- Qualitative Risk Assessment.
- Quantitative Risk Assessment.
- Risk Response Planning.
- Contingency planning.
- Risk communication.
- Decision-making under uncertainty.
- Lessons-learned processes.

Developing employee competency can improve the quality of risk-related decisions.

5.6.8 Promote a Proactive Risk Culture

Management should encourage project personnel to report risks and emerging concerns early.

Employees should understand that reporting potential problems is an important part of effective project management.

A proactive culture can enable organizations to address issues before they develop into major disruptions.

5.6.9 Improve Lessons-Learned Processes

Lessons from previous projects should be systematically documented and made available to future project teams.

Examples include:

- Causes of schedule delays.
- Sources of cost overruns.
- Contractor performance problems.
- Design-related risks.
- Procurement delays.
- Effective mitigation strategies.
- Successful contingency actions.

Organizational learning can improve future Risk Identification and Response Planning.

5.6.10 Integrate Risk Management with Project Controls

Risk information should be connected with other project management systems, including:

- Schedule management.
- Cost control.
- Quality management.
- Procurement.
- Resource management.
- Safety management.
- Change management.

Integration helps project managers understand how a single risk may influence several project objectives simultaneously.

5.7 Recommendations for Future Research

Future researchers can expand the present study in several ways.

First, similar research could be conducted in other Saudi cities and regions. Comparative studies involving Dammam, Riyadh, Jeddah, Jubail, and other construction markets could provide a broader understanding of Project Risk Management Practices within Saudi Arabia.

Second, future research could employ probability sampling and larger samples to improve the generalizability of findings.

Third, longitudinal research could examine risk management practices throughout different stages of the project lifecycle.

Fourth, future studies could incorporate additional independent or moderating variables, including:

- Risk Monitoring and Control.
- Risk Communication.
- Organizational Risk Culture.
- Leadership Support.
- Project Complexity.
- Contractor Capability.
- Stakeholder Management.
- Supply Chain Risk Management.
- Digital Project Management Technologies.

Finally, mixed-method research could combine questionnaires with interviews involving project managers, engineers, contractors, and other professionals. Qualitative evidence could provide deeper insight into why particular risk management practices succeed or fail within actual construction environments.

5.8 Conclusion

The purpose of this study was to examine the impact of Project Risk Management Practices on Construction Project Success in Dammam, Saudi Arabia.

The study focused on three principal dimensions: Risk Identification, Risk Assessment, and Risk Response Planning.

The literature reviewed throughout the study indicates that effective management of uncertainty is an important component of successful project management. Construction projects are particularly exposed to uncertainty because of their technical complexity, multiple stakeholders, financial requirements, resource constraints, and changing project environments.

Within the analytical model presented in Chapter Four, all three Project Risk Management dimensions demonstrated positive relationships with Construction Project Success.

Risk Response Planning emerged as the strongest predictor, emphasizing the importance of translating identified and assessed risks into practical actions. Risk Assessment was the second strongest predictor, demonstrating the value of evaluating probability and impact and prioritizing significant threats. Risk Identification also demonstrated an important positive relationship with Project Success and provides the foundation for subsequent risk management activities.

Overall, the study supports an integrated approach to Project Risk Management. Construction organizations should identify risks early, assess them systematically, establish appropriate responses, assign clear ownership, continuously review risk exposure, and integrate risk information into project decision-making.

For construction organizations operating in Saudi Arabia's developing project environment, strengthening these capabilities can support more predictable project delivery and improve the management of schedule, cost, quality, resources, and stakeholder expectations.

Project Risk Management should therefore be regarded not simply as a compliance activity but as an important managerial capability that can contribute to sustainable project performance and organizational effectiveness.

5.9 Chapter Summary

This chapter summarized the research and presented its major conclusions, contributions, limitations, recommendations, and suggestions for future research. The study concludes that systematic Project Risk Management Practices can contribute to improved Construction Project Success. Particular emphasis should be placed on Risk Response Planning while maintaining strong Risk Identification and Risk Assessment processes.

Future research can expand the geographical scope, use larger samples, incorporate additional risk management dimensions, and combine quantitative and qualitative methodologies.

The recommendations presented in this chapter provide practical directions for construction organizations seeking to strengthen their ability to manage uncertainty and improve project outcomes.

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RESEARCH QUESTIONNAIRE

The Impact of Project Risk Management Practices on Construction Project Success in Dammam, Saudi Arabia

Dear Participant,

I am conducting an academic research study entitled “**The Impact of Project Risk Management Practices on Construction Project Success in Dammam, Saudi Arabia.**”

The purpose of this questionnaire is to examine the relationship between Project Risk Management Practices and Construction Project Success.

Your participation is voluntary, and all information provided will be treated confidentially and used solely for academic purposes. The questionnaire does not require personally identifying information.

Please select the response that best represents your opinion.

Thank you for your valuable participation.

Section A: Demographic Information

1. Gender

- ☐ Male
☐ Female

2. Age

- ☐ Under 30 years
☐ 30–39 years
☐ 40–49 years
☐ 50 years and above

3. Educational Qualification

- ☐ Diploma
☐ Bachelor's Degree
☐ Master's Degree
☐ Doctorate

4. Years of Professional Experience

- ☐ Less than 5 years
☐ 5–10 years
☐ 11–15 years
☐ More than 15 years

5. Job Position

- ☐ Project Manager
☐ Project Engineer
☐ Site Engineer
☐ Construction Supervisor
☐ Planning Engineer
☐ Quality Engineer
☐ Safety Officer
☐ Project Coordinator
☐ Other: _____

Section B: Project Risk Management Practices

Please indicate your level of agreement with each statement using the following scale:

∞

Scale	Response
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

Part I: Risk Identification

✖

Code	Statement	1	2	3	4	5
RI1	Project risks are identified before project execution begins.	☐	☐	☐	☐	☐
RI2	The project risk register is regularly updated.	☐	☐	☐	☐	☐
RI3	Project team members participate in identifying potential risks.	☐	☐	☐	☐	☐
RI4	Experience and lessons learned from previous projects are considered when identifying risks.	☐	☐	☐	☐	☐
RI5	Potential project risks are systematically documented.	☐	☐	☐	☐	☐

Part II: Risk Assessment

✖

Code	Statement	1	2	3	4	5
RA1	Identified risks are evaluated according to their probability of occurrence.	☐	☐	☐	☐	☐
RA2	Identified risks are evaluated according to their potential impact on project objectives.	☐	☐	☐	☐	☐
RA3	Project risks are appropriately prioritized.	☐	☐	☐	☐	☐
RA4	Risk assessments are reviewed periodically throughout the project.	☐	☐	☐	☐	☐
RA5	Management regularly reviews major project risks.	☐	☐	☐	☐	☐

Part III: Risk Response Planning

✖

Code	Statement	1	2	3	4	5
RR1	Appropriate response plans are prepared for major project risks.				☐	☐

		☐	☐	☐		
RR2	Responsibilities for managing significant risks are clearly assigned.	☐	☐	☐	☐	☐
RR3	Contingency plans are established for significant project risks.	☐	☐	☐	☐	☐
RR4	Risk mitigation strategies are implemented when required.	☐	☐	☐	☐	☐
RR5	Risk responses are continuously monitored and reviewed.	☐	☐	☐	☐	☐

Section C: Construction Project Success

✖

Cod e	Statement	1	2	3	4	5
PS1	Projects achieve their planned schedule objectives.	☐	☐	☐	☐	☐
PS2	Projects achieve their approved cost objectives.	☐	☐	☐	☐	☐
PS3	Projects achieve the required quality standards.	☐	☐	☐	☐	☐
PS4	Project outcomes meet client expectations.	☐	☐	☐	☐	☐
PS5	Overall project objectives are successfully achieved.	☐	☐	☐	☐	☐
PS6	Project resources are utilized efficiently.	☐	☐	☐	☐	☐

END OF QUESTIONNAIRE

Thank you for your participation and valuable contribution to this research.