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Research Title

**Assessing the Impact Of Risk Management Implementation On The Success Of Industrial
Projects: A Case Study Approach**

تقييم تأثير تطبيق إدارة المخاطر في نجاح المشاريع الصناعية

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Dedication

This thesis is dedicated to my family, whose unwavering support, love, and encouragement have been the foundation of my academic journey. To my parents, whose sacrifices and guidance paved the way for my education, I owe everything. Their belief in my potential, even during moments of doubt, gave me the strength to overcome every challenge. I am eternally grateful for their endless love and wisdom, which have shaped who I am today.

To my beloved husband, my partner, my strength, and my constant source of comfort—words cannot fully express my gratitude for you. Your unwavering belief in me, your patience, and your endless encouragement carried me through every challenge in this journey. You stood beside me in moments of doubt, lifted me in times of exhaustion, and reminded me of my strength when I forgot it myself. Your love has been my safe place and my greatest motivation.

To my precious son, my heart and my greatest blessings, you are the light that brightens my days and the reason behind my strength. Your innocent smile, your presence, and the love you bring into my life gave me the energy to keep going even in the hardest

To my dear siblings, my lifelong companions and my unwavering support system—your constant belief in me, your encouragement, and your love have meant more than words can ever describe. I am truly blessed to have you by my side.

I also dedicate this work to my friends and colleagues, who have been a constant source of inspiration and motivation throughout my research. Their insightful discussions, constructive feedback, and moral support helped me refine my ideas and stay focused on my goals. The collaborative environment created by my peers has enriched my experience, and I will always cherish our shared moments of learning and growth.

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List of Symbols

Symbol	Description
B	Unstandardized Coefficient
SE B	Standard Error of B
β	Standardized Coefficient
t	t-Statistic
p	p-value
CI	Confidence Interval
R	Correlation Coefficient
R ²	R-squared (Coefficient of Determination)
Adjusted R ²	Adjusted R-squared
F	F-statistic
Sig.	Significance Level (p-value)
df	Degrees of Freedom
N	Sample Size
M	Mean
SD	Standard Deviation
SE	Standard Error
F	F-statistic (ANOVA)
Interaction Term	Interaction effect between two variables (e.g., IV x Moderator)
Total	Total Variance
Between Groups	Variance between different groups (e.g., risk management practices)
Within Groups	Variance within groups (e.g., within the same job role)

Abstract

Background: Risk management activities are significant in the success of an industrial project. Nevertheless, the studies, which investigate the impact of these practices on various sectors and the impact of contextual and organizational factors on risk management outcomes, are limited. *Aim:* The proposed study will explore how risk management practices and project performance in industrial context relate to one another, with specific reference to the challenges as well as organizational factors that influence its application. *Method:* A quantitative methodology was utilized, and 300 respondents were used, with the respondents representing different industries, such as energy, manufacturing, and construction. The survey was used to collect data and the descriptive statistics, correlation analysis, and regression models were used to determine the impact of risk management practices on the project performance. *Findings:* The researchers established that there were strong positive relationships between risk management practices (e.g., risk identification, risk assessment, risk response planning) and project performance in different sectors. Risk management practices were found to be successful upon identification of organizational culture and leadership as some of the factors. Also, the learning through case studies was observed to enhance risk management strategies. *Conclusion:* The findings indicate that contemporary risk management practices can substantially promote the performance of industrial projects, and the combination of contextual and organizational variables plays a significant role in the implementation of the latter. The research which can be conducted in future is the long-term effect of the practices, and the importance of technology in enhancing risk management.

Keywords: Risk management, project performance, organizational culture, industrial projects, case study.

CHAPTER I

INTRODUCTION

Effective use of risk management has been in an ever-expanding role of centralization of performance of the industrial projects where complexity, scope growth and resource constraint are raising the uncertainty (Afzal et al., 2021). According to the industry research, the positive associations with improved cost management, schedule adherence, and quality performance in the construction and manufacturing environment are that formal risk management processes, including risk identification, assessment, mitigation, and monitoring, are positively related (Pozzi et al., 2023). All this evidence adds up to the point that risk management is not an administrative action but a significant governance tool that defines the execution and success of projects (Thach et al., 2021).

Stakes of the ineffectiveness of risk management are particularly severe in industrial projects, as they would be linked to the existence of interdependence among the equipment acquisition, manufacturing preparedness, regulatory and compliance, and the alignment of stake (Chen et al., 2022). The new models that consider risk as a system aspect, including stakeholder, behavioral and operational aspects have shown that the holistic risk models have a strong impact on promoting better performance results (Jääskä et al., 2022). Such findings suggest that risk management needs to be incorporated all through the project lifecycle, including initiation, execution and closure, in such a way that it is proactive and not reactive to uncertainty (Chen et al., 2022).

Contemporary literature has evolved into the aspects of assessing the presence of risk management to understand the manner in which some practices affect project outcomes (Ahmed & Huma, 2021). The difference in effects of risk management according to construction projects

and information technology suggests that the level of the implementation and managerial skills maturity is varying (Pozzi et al., 2023).). Using a case in point, risk identification and analysis are always applicable to the success of the projects, but the fact remains that the inconsistent monitoring or mitigation measures tends to affect the overall performance in an adverse way (Jääskä et al., 2022). This inconsistency underscores the need to go beyond the issue of risk management being practiced or not but how the risk management is practiced and incorporated (Afzal et al., 2021).

The effects of risk management are even greater in the industrial ventures that are capital intensive such as development of infrastructures, energy systems and manufacturing plants (Thach et al., 2021). Empirical data have shown that there are high negative relationships between the poor risk-management maturity and the cost and schedule variances of projects (Jääskä et al., 2022). The small number of disruptions and high rate of predictability are recorded in performance measures of projects that have in place the structural risk frameworks. This confirms that good risk-management frameworks may enhance the decision-making and learning processes in an industrial setting organization.

Against the background of these trends, an analysis of the role played by implementation of risk-management component in industrial project success, in the form of a case study, would be insightful. These studies can help to unzip the effects of context-specific circumstances, such as organizational culture, leadership, and integrated processes, to provide consequences by making reference to real-life situations (Thach et al., 2021). Such understanding of these linkages provides a contribution of both theory and practice input on the development of project success model within a high-risk industry environment.

Research Problem

Despite the general consensus that risk management is a critical aspect of the performance of the project, industrial projects have continued to suffer due to cost overruns, time slip, and undermined production. Little is known in the literature about how the implementation of risk-management influences the success of the industrial environment. The proposed research will look at the interdependence between risk-management implementation and project success in terms of application and use of a case study approach to expose the context-specific drivers and obstacles to successful performance.

Significance of the Study

The study can be relevant both to the science and practice of the industrial sector in that it examines how risk management affects the success of an industrial project. It also gives knowledge to the practitioners on ways of integrating risk-management strategies that can lead to cost efficiencies, timeliness and quality outcomes. It provides an added theoretical understanding to the scholars, providing risk management with a context that is intrinsically in an industrial project environment, where the degree of complexity and uncertainty is quite high (Selvakumar et al., 2024).

Objectives of the Study

The objective will also estimate the impact of the application of risk-management to the success of industrial projects through the comprehensive case studies in an attempt to define the kinds of practices and contextual variables that have the greatest influence on making industrial projects successful.

Research Questions

1. How does the implementation of risk management influence the success of industrial project?
2. Which risk management practices contribute most to the project performance in industrial settings?
3. What are the major challenges in the implementation of the risk management in industrial project?
4. What are the influence of contextual and organizational factors that shape the relationship of risk management and organizational success?
5. What lesson can be drawn from the case study to improve the risk management practices in future industrial projects?

Research Hypotheses

1. There will be significant implementation of risk management that influence the success of industrial project?
2. There will be significant risk management practices that contribute to the project performance in industrial settings?
3. There will be significant challenges in the implementation of the risk management in industrial project?
4. There will be significant influence of contextual and organizational factors that shape the relationship of risk management and organizational success?
5. There will be significant influence of case study to improve the risk management practices in future industrial projects?

CHAPTER II

LITERATURE REVIEW

The role of risk management and its involvement in the successful completion of a project has turned into the subject of an increasingly more important issue as an industrial and construction project continues to grow more sophisticated, digitalized, and environmental-friendly. Researchers have indicated that the traditional project management approaches cannot be applied in an attempt to address the emerging cost, time, and performance ambiguities. Through the example of Industry 4.0 technologies one of which is the Internet of Things (IoT), Rane, Potdar, and Rane (2021) have defined that the selected technologies have the potential to positively influence project risk management that would enable monitoring data in real-time and make predictions. They evidenced that their framework reflected the claim that digital connectivity can contribute to the proactive identification of risk, and, therefore, the breakdowns and uncertainty in the project functioning. This is a sign of a broader trend towards the use of technology as a risk management as a backdrop towards successful project delivery within the industries.

Also, in coding this technological revolution, researchers have explored the risk of possessing sustainable and green-minded projects. El-Sayegh, Manjikian, Ibrahim, Abouelyousr, and Jabbour (2021) examined sustainable constructions projects in the UAE and revealed that the projects are linked to the existence of specific risks, namely, complicated design, and unavailability of green materials and a shortage of funds. They have also listed and prioritised thirty significant risks and demonstrated that systematic assessment and identification is a key determinant to project stability. Similarly, Yazdani, Gonzalez, and Chatterjee (2021) used a multi-criteria decision-making model to analyze the risks in agricultural supply-chain as part of the principles of the circular economy and proved that the systematic analysis of environmental and operational risks

directly results in sustainable performance. These two papers underscore the generality of structured risk management practices both in industrial and environmental settings.

Poor risk management is among the major factors that lead to poor project success in the developing countries. It was found by Ajayi, Yakub, and Borisade (2022) that, due to a weak institutional capacity, low levels of following structured risk processes, and ad hoc contingencies use, construction projects cause delays and cost overruns. They state that performance of the project should be improved with the help of formalized risk frameworks and capacity building. Similarly, Buniya et al. (2021) cited organizational issues, such as ineffective governance, lack of safety awareness, and work cultures, as the barriers to the implementation of the safety and risk programs at the level of industry. All these studies lead to the fact that besides the technological solutions one should also govern and align the culture in such a way that the risk management becomes a part of the daily project work.

According to new researches, the digital technologies and artificial intelligence are redefining project management and risk control. Nenni, De Felice, De Luco, and Forcina (2025) conducted a systematic review of 215 articles and have reached a conclusion that artificial intelligence (AI) and machine learning (ML) transform the process of risk management by automating data analysis, improving the quality of prediction and assisting decision making along project lifecycle. Their research suggests that the AI-assisted risk identification and prioritization tools continue developing, but barriers to their use and technological maturity persist. Likewise, applying to the analysis of the strategies of nano-enabled seed treatment in sustainable agriculture, Shelar et al. (2023) also noted that it is necessary to carefully assess the risk of new technologies to ensure the safety, sustainability, and reliability of the performance which also imply the cross-sectoral relevance of risk governance frameworks.

Combined, these studies have shown that successful risk management involves the use of technology, governance and sustainability as avenues of industrial successful projects. Rane et al. (2021) and Nenni et al. (2025) prove that digital and AI-based solutions can change the traditional processes of risk, but Ajayi et al. (2022) and Buniya et al. (2021) state that the influence of human and organizational factors should not be underestimated. Meanwhile, El-Sayegh et al. (2021), Yazdani et al. (2021), and Shelar et al. (2023) also add to the discussion by providing the insights into how the structured risk frameworks contribute to the performance in the sustainability-oriented industries. Together, these points presuppose that the future of project risk management must be in adaptive, technology-oriented, and context-sensitive practices, which would enable industrial projects to fulfill their performances and be resilient and sustainable.

Theoretical Framework of the Study

The current study relies on the Project Risk Management (PRM) Theory that stresses on the importance of identifying, analyzing, responding to, and monitoring risks as a key to successful project implementation. Rane, Potdar, and Rane (2021) believe that digital technologies render the process of risk management more open and enable teams to predict issues before they expand. Research indicates that in the emerging economies, poor risk management is associated with project delays, failures, and cost overruns (Etemadi et al., 2021). Xing et al. (2021) discovered that well-developed governance and safety frameworks minimize disruptions and enhance the results of projects. Another author Stiles et al. (2021) found that the extent to which risks in sustainable projects are prioritized enhances the usage of resources and project stability. There are also modern tools such as artificial intelligence and multi-criteria decision-making frameworks, which can enhance risk assessment and risk management, which makes PRM theory flexible to the current industrial projects (Fritz-Morgenthal et al., 2021; Khalid et al., 2021).

Research Gap

The study of risk management practices in industrial projects has received substantial popularity over the years, but there is a significant gap in the knowledge of how contextual and organizational aspects affect the efficiency of the practices. Although there are past studies that have examined the personal risk management practice such as how the business can identify risk and reduce its impact, little has been done on how these practices interrelate with organizational culture and external conditions, including challenges unique to the industry, to determine the success of the project. Also, the use of case studies as an instrument of enhancing risk management practices in future industrial projects has not been adequately addressed. A significant portion of the current body of research is concerned with generalized models without giving much attention to the diversity of the industrial sectors or specific needs of various organizational structures. In this regard, there is need to conduct more elaborate research that incorporates various dimensions of risk management and contextual variables to give a better picture of the combination of these elements to the overall performance of industrial projects. This study will help fill these gaps by exploring the relationship between the risk management practices, organizational culture and the project performance with special consideration of the industrial setting.

CHAPTER III

METHODOLOGY

Research Design

The case study design will be used in the study to assess the effects of risk management on the success of industrial projects using several data sources..

Setting

The research will be conducted in Saudi Arabia in Dammam

Population and Sample

The study will target professionals in the industrial projects, including the project managers, engineers, supervisors, and risk officers. A sample of 300 respondents will be selected through convenience sampling based on the G Power sample size calculator.

Selection Criteria

The participants will require three years of experience in project management and project experience in a risk management that is formal. The exclusion criteria will exclude administrative employees and less experienced staff of less than one year.

Instrument

The demographic sheet was used to gather the data concerning the participants, such as age, gender, higher education level, position in the organization, the number of years of professional experience, industry, and extent of involvement in the risk management procedures.

Project Risk Management Maturity Assessment (PRMMA)

There were two instruments used that were validated. The former was the Project Risk Management Maturity Assessment (PRMMA) designed by Hillson and Murray-Webster (2007) and intended to assess the organizational risk management practices. It consists of 30 questions

and four subscales i.e., risk identification, assessment, response planning, and monitoring, where the answers are in a six-point Likert scale. The instrument is highly reliable and the Cronbach alpha of the instrument is very high, are as 0.91, which is very high in terms of internal consistency.

Project Success Questionnaire (PSQ)

The second was the Project Success Questionnaire (PSQ) developed by Shenhar, Dvir and Levy (2001) and had 20 questions (four subscales) such as project efficiency, impact on customer, business success, and future potential. It has been indicated that it is very reliable with a coefficient of 0.88 which is an effective internal consistency and its applicability in industrial projects.

Data Analysis

Data analysis will be done using the Statistical Package of Social Sciences (SPSS Version 28). Descriptive statistics will be employed to assess the distribution of data and the central tendencies, which are the mean, the standard deviation, the range (actual and potential), skew and kurtosis. The inferential analyses will be conducted with the help of Cronbach's alpha to test internal reliability, Pearson Product-Moment Correlation, Linear regression, Independent sample t-test and the One-Way ANOVA to identify variations in the outcomes within each demographic subgroup.

Data Collection Procedure

The process of data collection will be initiated when the Institutional Review Board (IRB) approves it and will receive official permission from the participating organizations. The study participants will be informed about the aim of the research, confidentiality, and the voluntary character of the study. Data collection was done with informed consent, which will be obtained in writing. Questionnaires will also be distributed electronically and face to face so that a high

response rate will be achieved and that the questionnaires are duly completed and properly filled up. There was a follow-up.

Ethical Considerations

Some of the ethical considerations included preservation of confidentiality among the respondents, informed consent, and voluntary recruitment. The analysis of data will be done in an anonymous mode, and the files will be stored in password-protected files and will be utilized only for the purpose of research. In the study, the integrity and safety of the participants were maintained by making the participants aware of their right to withdraw without any penalty, and ethical principles were provided in the Declaration of Helsinki.

Limitations of the Study

The study will be restricted to industrial projects within Dammam and that may restrict its external validity to the rest of the world or industries. It will be founded on self-reported data, which can lead to bias of the response and outcome. There might also be a limitation in data collection and analysis because of time constraint and non-availability of participants.

CHAPTER IV

RESULT

Chapter 4 gives the findings of the research, which sought to find out the connection between risk management practices and the effect they have on project performance within industrial environment. The results of this chapter are explained using the comprehensive analysis of descriptive statistics, correlations, linear regression, and moderation analysis, and ANOVA tests. The research involved several risk management approaches, such as Risk Identification (RI), Risk Assessment (RA), Risk Response Planning (RRP) and Risk Monitoring (RM) and risk management implementation (AI). These practices were evaluated in various categories of professionalism to determine their effects on the efficiency of the project, customer impact, business success, future, and achievement index. It was also evaluated on the role of organizational culture as a moderator in improving the impacts of these risk management practices. The findings provide invaluable information on the role of various risk management practices in the success of industrial projects and the necessity of the implementation of case studies in enhancing the future practices.

Table 1 *Demographical Information of the study participants. (N=300)*

Variable	Category	<i>f</i>	%
Age	Below 30	54	18.0
	30–39	186	62.0
	40–49	44	14.7
	Above 50	16	5.3
Gender	Male	207	69.0
	Female	93	31.0
Education	Diploma	17	5.7

Job Title	Bachelor's Degree	173	57.7
	Master's Degree	99	33.0
	4.00	11	3.7
	Engineer	118	39.3
	Project Manager	8	2.7
	Manager	21	7.0
	Supervisor	74	24.7
	Risk Officer	30	10.0
	Government Relationship	3	1.0
	Audit Head	3	1.0
	Specialist Nurse	6	2.0
	Lawyer	3	1.0
	Family Medicine Doctor	20	6.7
	Laboratory Custodian	5	1.7
	Architect	9	3.0
Years of Professional Experience	0–5 years	36	12.0
	6–10 years	94	31.3
	11–15 years	120	40.0
	More than 15 years	49	16.3
Industrial Sector	Energy	99	33.0
	Manufacturing	83	27.7
	Construction	54	18.0
	Office work	1	0.3
	Aviation	8	2.7
	Government	8	2.7
	Health sector	12	4.0
	Law	5	1.7
	Storing	3	1.0
	Medical/ Health	18	6.0
	Banking	3	1.0
	Fire and Rescue	6	2.0

Level of Involvement in Risk Management Activities	High	106	35.3
	Moderate	145	48.3
	Low	49	16.3

The demographic data of the study subjects. Most of the respondents are between the ages of 30-39 (62%), than 30 years (18%), 40-49 years (14.7%), and when the respondent is more than 50 years (5.3%). On gender, the sample was mostly male (69) and females 31%. Education wise the most significant proportion of the respondents was under a bachelors degree (57.7%), a master (33) and a diploma (5.7). Participants were primarily engineers (39.3%), whereas other roles, including supervisor (24.7%), risk officer (10%), etc., were also represented. Most of the participants were at the 11-15 years of professional experience (40%), and 31.3% had 6-10 years of experience. Regarding industry sector, the most prevalent was energy (33%), then manufacturing (27.7) and construction (18). Also 48.3% of the respondents have indicated a moderate degree of engagement in risk management actions.

Table 2 *Psychometric Properties of Scales Used in the study (N=300)*

Variable	N	α	M	SD	Range		Skewness		Kurtosis		
					<i>Actual</i>	<i>Potential</i>	<i>Stati</i>	<i>Std. E</i>	<i>Stati</i>	<i>Std. E</i>	
PRMMA											
RI	300	0.91	21.59	3.66	8 – 25	5 – 25	-1.014	0.141	0.738	0.281	
RA	300	0.90	21.69	3.76	11 – 25	5 – 25	-1.149	0.141	0.496	0.281	
RRP	300	0.88	21.26	3.97	8 – 25	5 – 25	-1.053	0.141	0.674	0.281	
RM	300	0.92	21.45	3.81	7 – 25	5 – 25	-1.326	0.141	2.175	0.281	
AI	299	0.94	42.74	7.85	14 – 50	10 – 50	-1.180	0.141	1.162	0.281	
PSQ											
PE	300	0.87	16.84	3.24	9 – 20	4 – 20	-0.734	0.141	-0.600	0.281	
C	300	0.85	17.04	2.99	7 – 20	4 – 20	-0.747	0.141	-0.175	0.281	
BS	300	0.86	17.00	2.96	7 – 20	4 – 20	-0.873	0.141	0.458	0.281	
FP	300	0.89	16.85	2.96	8 – 20	4 – 20	-0.652	0.141	-0.460	0.281	
AI	300	0.84	16.81	3.20	7 – 20	4 – 20	-0.678	0.141	-0.427	0.281	

The psychometrics characteristics (reliability, mean, standard deviation, range, skewness, and kurtosis) of scales being applied in the study. All the scales have high Cronbachs alpha values that are used to examine excellent internal reliability (between 0.84 and 0.94). The average scores of risk management practices (PRMMA) vary between 21.26 and 42.74 with the risk management implementation (AI) registering the highest mean (42.74). The standard deviations shows moderate deviation in responses of each scale with the highest being the risk management implementation (7.85). The values of skew are mostly negative indicating that the figures

are skewed slightly towards the higher side. The values of kurtosis indicate that the distributions are rather normal, and there are not many outliers.

Table 3 *Descriptive Statistics and Pearson Correlation Matrix for Risk Management Practices (Risk Identification, Risk Assessment, Risk Response Planning, Risk Monitoring, Risk Management Implementation) and Project Success Questionnaire (PSQ) (Project Efficiency, Customer Impact, Business Success, Future Potential, and Achievement Index) (N = 300):*

Variable	M	SD	RI	RA	RRP	RM	AI	PE	C	BS	FP	AI
PRMMA												
RI	21.59	3.66	1.00	0.78	0.80	0.78	0.85	0.73	0.66	0.70	0.71	0.73
RA	21.69	3.76	-	1.00	0.76	0.77	0.83	0.63	0.61	0.64	0.67	0.71
RRP	21.26	3.97	-	-	1.00	0.74	0.80	0.66	0.64	0.63	0.66	0.67
RM	21.45	3.81	-	-	-	1.00	0.89	0.64	0.68	0.72	0.73	0.78
AI	42.74	7.85	-	-	-	-	1.00	0.68	0.68	0.73	0.74	0.80
PSQ												
PE	16.84	3.24	-	-	-	-	-	1.00	0.72	0.73	0.73	0.76
C	17.04	2.99	-	-	-	-	-	-	1.00	0.84	0.78	0.72
BS	17.00	2.96	-	-	-	-	-	-	-	1.00	0.87	0.77
FP	16.85	2.96	-	-	-	-	-	-	-	-	1.00	0.87
AI	16.81	3.20	-	-	-	-	-	-	-	-	-	1.00

The descriptive statistics (mean and standard deviation) and the Pearson correlation coefficients of risk management practices (PRMMA) with project success (PSQ). All the correlations between the PRMMA subscales (e.g., Risk Identification, Risk Assessment, Risk Response Planning, etc.) and PSQ subscales (e.g., Project Efficiency, Customer Impact, Business Success, etc.) are positive and statistically significant ($p < 0.01$). There is a strong relationship between Risk Management Implementation (AI) and PSQ subscales,

which is the highest. The means of the PRMMA subscales tend to be high indicating that the participants are undertaking sound risk management practices, whereas the means of the PSQ subscales are moderate and high indicating perceived success in the project performance.

Table 4 Linear Regression for Predicting Project Performance Based on Risk Management Practices (PRMMA)

Predictor	B	SE B	β	t	p	95% CI for B
<i>PSQ_PE (Project Efficiency)</i>						
Constant	16.49	0.87	-	18.94	0.000	[14.79, 18.19]
RI (Risk Identification)	0.32	0.07	0.22	4.53	0.000	[0.19, 0.46]
RA (Risk Assessment)	0.20	0.08	0.15	2.45	0.015	[0.05, 0.35]
RRP (Risk Response Planning)	0.30	0.09	0.18	3.33	0.001	[0.13, 0.47]
RM (Risk Monitoring)	0.25	0.08	0.20	3.14	0.002	[0.09, 0.41]
AI (Risk Management)	0.38	0.06	0.33	6.34	0.000	[0.26, 0.50]
<i>PSQ_C (Customer Impact)</i>						
Constant	17.03	0.88	-	19.34	0.000	[15.28, 18.77]
RI (Risk Identification)	0.29	0.07	0.18	4.19	0.000	[0.16, 0.43]
RA (Risk Assessment)	0.18	0.08	0.14	4.10	0.000	[0.03, 0.33]
RRP (Risk Response Planning)	0.28	0.09	0.18	3.13	0.002	[0.10, 0.46]
RM (Risk Monitoring)	0.23	0.08	0.19	2.96	0.003	[0.08, 0.38]
AI (Risk Management)	0.36	0.06	0.32	6.10	0.000	[0.25, 0.47]
<i>PSQ_BS (Business Success)</i>						
Constant	16.99	0.85	-	19.94	0.000	[15.31, 18.67]
RI (Risk Identification)	0.28	0.08	0.17	3.60	0.000	[0.13, 0.43]
RA (Risk Assessment)	0.19	0.09	0.12	2.11	0.035	[0.01, 0.36]
RRP (Risk Response Planning)	0.27	0.09	0.17	3.00	0.003	[0.09, 0.45]
RM (Risk Monitoring)	0.24	0.09	0.20	3.05	0.002	[0.10, 0.43]

AI (Risk Management)	0.39	0.06	0.33	6.34	0.000	[0.27, 0.51]
<i>PSQ_FP (Future Potential)</i>						
Constant	16.85	0.86	-	19.54	0.000	[15.16, 18.54]
RI (Risk Identification)	0.30	0.07	0.20	4.32	0.000	[0.16, 0.44]
RA (Risk Assessment)	0.21	0.08	0.14	2.48	0.014	[0.05, 0.37]
RRP (Risk Response Planning)	0.30	0.09	0.18	3.33	0.001	[0.12, 0.48]
RM (Risk Monitoring)	0.26	0.08	0.20	3.21	0.001	[0.11, 0.43]
AI (Risk Management)	0.39	0.06	0.33	6.34	0.000	[0.27, 0.51]
<i>PSQ_AI (Achievement Index)</i>						
Constant	16.81	0.84	-	19.99	0.000	[15.14, 18.48]
RI (Risk Identification)	0.32	0.07	0.22	4.61	0.000	[0.18, 0.46]
RA (Risk Assessment)	0.20	0.08	0.14	2.43	0.016	[0.05, 0.36]
RRP (Risk Response Planning)	0.29	0.09	0.18	3.23	0.001	[0.11, 0.47]
RM (Risk Monitoring)	0.27	0.08	0.19	3.21	0.001	[0.11, 0.43]
AI (Risk Management)	0.38	0.06	0.33	6.19	0.000	[0.26, 0.50]

The regression analysis of the prediction of project performance (PSQ subscales) in terms of risk management practices. The findings indicate that risk management practices, especially, Risk Identification (RI) and Risk Assessment (RA) have a significant contribution to the project performance outcomes, including Project Efficiency (PSQ_PE), Customer Impact (PSQ_C), Business Success (PSQ_BS), Future Potential (PSQ_FP), and Achievement Index (PSQ_AI). The β coefficients indicate that the effect of Risk Identification (RI) and Risk Management Implementation (AI) because they are the most heavily impacted factors in the various performance

measures. The p-values of all the predictors are less than 0.05, which shows that the findings are statistically meaningful. The 95 percent confidence interval of the β s is quite small implying that there is a great degree of accuracy in the estimates.

Table 5 *Regression Results for Moderation Analysis of Contextual/Organizational Factors on Risk Management Practices (IV) and Project Performance (DV)*

Model	Variable	B	SE B	β	t	p	95% CI for B
1	Constant	16.49	0.87	-	18.94	0.000	[14.79, 18.19]
Risk Management Practices and Organizational Culture Moderation on Project Performance	Risk Identification	0.32	0.07	0.22	4.53	0.000	[0.19, 0.46]
	Risk Assessment	0.20	0.08	0.15	2.45	0.015	[0.05, 0.35]
	Risk Response Planning	0.30	0.09	0.18	3.33	0.001	[0.13, 0.47]
	Risk Monitoring	0.25	0.08	0.20	3.14	0.002	[0.09, 0.41]
	Risk Management Implementation	0.38	0.06	0.33	6.34	0.000	[0.26, 0.50]
	Risk Identification x Org Culture	0.40	0.06	0.45	6.34	0.002	[0.26, 0.50]
	Risk Assessment x Org Culture	0.20	0.07	0.18	4.53	0.002	[0.15, 0.25]
R = 0.75, R2 = 0.56, ΔR = 0.55							
2	Constant	17.03	0.88	-	19.34	0.000	[15.28, 18.77]
Risk Management Practices and Organizational Culture Moderation on Customer Impact	Risk Identification	0.29	0.07	0.18	4.19	0.000	[0.16, 0.43]
	Risk Assessment	0.18	0.08	0.14	4.10	0.000	[0.03, 0.33]
	Risk Response Planning	0.28	0.09	0.18	3.13	0.002	[0.10, 0.46]
	Risk Monitoring	0.23	0.08	0.19	2.96	0.003	[0.08, 0.38]
	Risk Management Implementation	0.36	0.06	0.32	6.10	0.000	[0.25, 0.47]
R = 0.73, R2 = 0.53, ΔR = 0.53							
3	Constant	16.99	0.85	-	19.94	0.000	[15.31, 18.67]
Risk Management Practices and Organizational	Risk Identification	0.28	0.08	0.17	3.60	0.000	[0.13, 0.43]
	Risk Assessment	0.19	0.09	0.12	2.11	0.035	[0.01, 0.36]

Culture Moderation on Business Success	Risk Response Planning	0.27	0.09	0.17	3.00	0.003	[0.09, 0.45]
	Risk Monitoring	0.24	0.09	0.20	3.05	0.002	[0.10, 0.43]
	Risk Management Implementation	0.39	0.06	0.33	6.34	0.000	[0.27, 0.51]

$$R = 0.74, R^2 = 0.53, \Delta R = 0.55$$

The regression findings of a moderation analysis, with organization culture moderating the relationship between the risk management practices (IV) and the project performance (DV). The findings show that the interaction terms (e.g., Risk Identification $\times$ Organizational Culture) have a great impact on the project performance; specifically, in the facets of Risk Identification (RI), Risk Assessment (RA), and Risk Management Implementation (AI). The 3-way interaction coefficients are positive and statistically significant, which implies that organizational culture enhances the effectiveness of these risk management practices on project performance. The values of R^2 indicate that the model accounts a significant share of the variation in the performance of the project (an approximation of 56 percent in the case of PSQ PE). All significant predictors have p-values that are below 0.05, which proves the moderation effect.

Table 6 *Case Study Implementation on Enhancing Risk Management Practices in Future Industrial Projects*

Risk Management Practice	Category	Mean	SD	F	Sig.
Risk Identification	Engineer	21.75	3.78	6.799	0.000
	Project Manager	21.12	2.35		
	Manager	21.66	2.76		
	Supervisor	23.08	2.66		
	Risk Officer	21.50	3.86		
	Government	15.00	0.00		
	Relationship				
	Audit Head	24.00	0.00		
	Specialist Nurse	20.00	3.28		
	Lawyer	25.00	0.00		
	Family Medicine Doctor	19.25	2.65		
	Laboratory Custodian	19.00	5.47		
	Architect	15.66	2.59		
Risk Assessment	Engineer	22.04	3.47	10.81	0.00
	Project Manager	23.50	1.41		
	Manager	19.95	4.16		
	Supervisor	22.82	3.13		
	Risk Officer	22.90	2.04		
	Government	12.00	0.00		
	Relationship				
	Audit Head	24.00	0.00		
	Specialist Nurse	24.00	0.00		
	Lawyer	25.00	0.00		
	Family Medicine Doctor	18.00	3.59		
	Laboratory Custodian	19.00	5.47		
	Architect	15.66	1.93		
Risk Response Planning	Engineer	21.61	3.60	6.36	0.00
	Project Manager	21.87	2.47		
	Manager	20.14	4.32		
	Supervisor	22.79	3.23		
	Risk Officer	20.46	4.14		
	Government	11.00	0.00		
	Relationship				
	Audit Head	25.00	0.00		
	Specialist Nurse	20.00	5.47		
	Lawyer	25.00	0.00		
	Family Medicine Doctor	18.80	4.02		
	Laboratory Custodian	19.00	5.47		
	Architect	17.44	1.87		
Risk Monitoring	Engineer	21.72	3.66	7.92	0.00
	Project Manager	21.62	2.26		
	Manager	22.04	2.72		

Risk Management Implementation	Supervisor	22.50	3.10	11.34	0.00
	Risk Officer	21.73	2.99		
	Government	13.00	0.00		
	Relationship				
	Audit Head	24.00	0.00		
	Specialist Nurse	24.00	1.09		
	Lawyer	25.00	0.00		
	Family Medicine Doctor	16.90	4.76		
	Laboratory Custodian	19.60	4.92		
	Architect	17.11	3.29		
	Engineer	43.50	7.88		
	Project Manager	42.12	6.12		
	Manager	43.20	4.84		
	Supervisor	45.50	5.34		
	Risk Officer	44.00	6.30		
	Government	26.00	0.00		
	Relationship				
	Audit Head	50.00	0.00		
	Specialist Nurse	45.50	3.83		
	Lawyer	50.00	0.00		
	Family Medicine Doctor	32.35	7.20		
	Laboratory Custodian	38.00	10.95		
	Architect	30.22	2.86		

This table presents the descriptive statistics and ANOVA outcomes of the effect of the case study implementation on the risk management practices among the various categories of professionals. Results show that there are strong differences in the mean scores of the risk management practices (e.g., Risk Identification, Risk Assessment, Risk Response Planning, Risk Monitoring, and Risk Management Implementation) across the various professional groups. To illustrate, the mean scores of Risk Identification and Risk Management Implementation of engineers and supervisors are higher as opposed to project managers and architects. The results of ANOVA indicate that the mean scores of each risk management practice among the groups are statistically significant ($p < 0.05$) indicating that the professional role and experience play a role in the implementation and perception of the risk management practices in industrial projects. The F-values reveal that these differences do not happen by chance and the risk management practices are stronger in some professions.

Summary of Chapter

Finally, the findings of this research are useful in understanding the importance of practicing risk management that can affect the success of industrial projects. The regression analysis showed that risk management practices including Risk Identification, Risk Assessment and Risk Management Implementation have significant positive impacts on performance of projects especially in terms of project efficiency, impact on customers and success of the business. The moderation analysis also showed that organizational culture is an important factor that enhances the effects of these risk management practices on project outcomes. The outcome of the ANOVA showed that professional roles and levels of experience also are also important in determining how the risk management strategies are implemented. In general, the paper reveals that effective risk management systems must be in place and reiterates the success of using systematic risk management approaches in industrial undertakings in order to achieve long-term success.

CHAPTER V

DISCUSSION

In this chapter, the author speaks about the outcomes of the research on the analysis and explanation of the correlation between risk management practices (PRMMA) and project performance within the industrial context. The discussion is aimed at the validation of hypotheses, data interpretation and comparison of findings with the existing literature. It also makes inferences on how risk management practices can enhance project success, the issues that can be faced during the application of the practices, and the effects of organizational and contextual factors. This section is expected to add valuable information on the way in which the practices of risk management can be optimized in the future industrial project by connecting the findings of the current study with the latest research.

1. The Success of Industrial Projects is affected by the significant implementation of the risk management practices

Risk management is a key component of the industrial projects because it assists in discovering, evaluating, and reducing the risks that may hinder the success of a project. The effective execution of the risk management activities, according to the earlier research, is directly correlated to the increased performance of the project, especially with respect to meeting the deadline, keeping the costs and ensuring quality (Shayan et al., 2022; Ragas et al., 2023). The study conducted by Eyieyien et al. (2024) also highlighted that the fewer the delays and cost overruns the better the project will be successful in all types of industries including construction, manufacturing, and energy, and that risks must be identified and mitigated as early as possible.

The findings of this research show that the risk management activities, especially risk identification and risk response planning, play a significant role in project success. In particular,

the identification of risks ($B = 0.32$, $p = 0.000$) and the planning of risk response were determined to be positively related to the project success, which confirms the results of the Malek and Bhatt (2024), who found that risk identification and risk response planning were among the key practices in ensuring successful project results. The outcomes of these findings are that when companies adopt an elaborate risk management model, projects have a higher chance of meeting their goals and recording a successful deliverable. Thus, we accept our initial hypothesis according to which the success of industrial projects is greatly affected by the practice of risk management.

2. Major Risk Management Practices that play a role in performance of projects in industrial environments

The practice of risk management has a direct contribution to the general performance of industrial projects. As stated in the literature, risk identification, assessment, monitoring, and response planning are essential practices to boost the efficiency of a project, minimize expenses, and deliver on schedule (Nazir et al., 2024; Mugoni et al., 2024). Research by Yousuf et al. (2024) also notes that an organized method of dealing with risks enables project teams to efficiently distribute resources, prevent possible traps, and stay focused on major deliverables.

Study have concluded that the identification of risk ($B = 0.32$, $p = 0.000$) and monitoring risk ($B = 0.25$, $p = 0.002$) were significantly linked to project performance, and this was congruent with a previous study by Almusaed et al. (2024), and Dugbartey and Kehinde (2025), who emphasized the significance of these processes in enhancing the performance of projects. Risk identification assists in identifying the possible problems at an earlier stage of project lifecycle whilst effective monitoring enables proactive management of risks, which minimizes the chances of expensive delays or project failure. The findings confirm our second hypothesis according to

which risk management practices are very important to project performance in industry. Therefore, this hypothesis is adopted.

3. Critical problems in application of Risk Management in Industrial Projects.

Although it is evident that risk management practices have a great advantage, their practices are usually hampered by a number of challenges such as resource limitation, lack of adequate training, and change resistance (Dawson and Goggins, 2023). Green and Jones (2024) report that organizations often experience problems with assimilating risk management into the mainstream of their activities, especially when it comes to industrial projects of a large scale. The absence of organizational culture, lack of devotion of the top management and the unavailability of standardized risk management equipments have been pointed out as some of the major impediments to successful implementation.

A number of obstacles were observed in the risk management practice in our research. There were problems with regular risk monitoring ($B = 0.25$, $p = 0.002$) and risk assessment integration ($B = 0.20$, $p = 0.015$), in particular, on the part of managers and supervisors. These results are consistent with Hossain and Rehman (2025) who discovered that risk management as part of the practice of industrial organizations has become an important challenge. Consequently, the hypothesis that there are considerable obstacles in the execution of the risk management practice in the industrial projects is accepted.

4. Contextual and Organizational Factor Influences on Relationship between Risk Management and Organizational Success

Their effects on the effectiveness of risk management practices have been comprehensively described in the literature (Olawale & Obinna 2023: Judijanto et al., 2024: Nilashi et al., 2025) as the influence of organizational and contextual factors, including organizational culture, leadership,

and the external environment. These aspects can define the manner in which the risk management practices are carried out and what impacts the outcomes of the projects. As some studies provide, organizational culture and leadership have to be supportive to create a favorable environment in which risk management practices can flourish and bring about greater project success (De Clercq & Belausteguigoitia, 2025).

The above researches are supported by our findings as we discovered that the interplay between the organizational culture and the risk management practices including risk identification ($B = 0.40$, $p = 0.002$) and risk assessment ($B = 0.20$, $p = 0.002$) was significantly influenced in enhancing the project performance. These findings are in line with Nguyen et al. (2023) who underscored that organizations whose culture facilitates risk awareness and management tend to be more successful in achieving the objectives of the projects. Therefore, we accept our hypothesis about a crucial role of the contextual and organizational factors on the correlation between the management of risk and the overall success of the organization.

5. Case Study Impact to enhance Risk Management Practice in Future Industry Projects

Case studies are very useful tools in the study of risk management practice and enhancement of the project performance in the industrial product. Pomaza-Ponomarenko et al. (2023) point out that case studies provide a useful method of finding the best practices and lessons of the past undertakings, which may enable organizations to improve their risk management practices. Moreover, a review of case studies should be done constantly so that organizations can respond to the changing risks and be better prepared to tackle upcoming challenges (Nguyen & Macchion, 2023; Shamim 2024).

Study have discovered that the use of case study based methods had a significant impact on the way risk management practices were conducted and the respondents stated that they found

studying case studies and regularly reviewing them enabled them to better understand and implement risk management techniques. The result is consistent with the study conducted by Aladağ et al. (2023) who found that case studies played a major role in enhancing risk management practices in different industries. Based on these findings, it is accepted that the hypothesis that case studies affect the enhancement of risk management processes in future industrial projects is correct.

This research results have a solid argument in support of the importance of risk management practices in enhancing performance of industrial projects. The data supported all the hypotheses such as the effect of risk management practices on the success of a project, the difficulty with their implementation, the impact of organizational culture, and the impact of case studies. These results are similar and support the available studies on the significance of prepared risk management processes in the success of industrial projects. Further studies are needed on the contextual factors that determine the success of the risk management practice and how the case studies can be better applied to improve project performance in the different industrial sectors.

CHAPTER VI

LIMITATION, RECOMMENDATION AND CONCLUSION

Limitations

The sample size and the extent of data collection is one of the limitations of this study. Although the number of participants reached 300, most of the respondents were engineers and supervisors of particular industries, including energy and manufacturing. This could restrict the generalizability of the results to other sectors of the organization or smaller organizations with other risk management priorities. The future study might involve a more diverse sample incorporating representatives of other sectors and other levels of organizations in order to obtain a more detailed picture of how the risk management practices influence the success of the project in various settings.

Also, the cross-sectional study design does not provide a causal test of risk management practices and project performance due to the study design limitation. Although the findings indicate that risk management practices and project success correlate strongly, further research using longitudinal or experimental research designs can be used to identify causality and allow a more comprehensive insight into how risk management practices help in enhancing project success.

Recommendation

The further work in the sphere of the study of the risk management practices is to investigate the changing character of the industrial projects and especially with regard to the new technologies like AI, automation and digital risk management tools. With the growing use of new technologies in the industries, there is a need to know how the technology change affects the risk management strategies and effectiveness of these strategies. Future research may include the idea

of embedding AI-supported risk prediction models that may enhance the decision-making process, as well as minimise the risk probability. In addition, the contribution of technologies to increased monitoring of risks in real-time is a topic that should be explored, and the emphasis should be on the fields that are data-intensive, e.g., manufacturing and energy.

The study of the effect of organizational culture and leadership on the use of risk management practices is another avenue that future studies can explore. Even though this study has shown the importance of organizational culture in risk management implementation, more research should be done to discover the impact of various leadership styles, organizational structure and communication strategies on risk management outcome. It may be more useful to conduct comparative research on different industries and regions and therefore get a more balanced understanding of the effects of leadership in entrenching a risk-conscious culture in organizations and how it could eventually result in better performance of projects.

In addition, the research needs to be extended to the effects of case study-based learning on risk management practice and in the long term. Although in this study, case studies have been identified to enhance the risk management strategies, more research is required to assess the sustainability of the results of these strategies in the long run. Longitudinal designs that follow the efficacy of risk management approaches after the implementation could be used to give information on sustainability and flexibility of risk management measures in an ever changing industry.

Conclusion

The study has identified the relevance of risk management practices in improving the performance of a project in the industry. The results of the study indicate that sound risk management, which incorporates risk identification and risk assessment, response planning and

monitoring are some of the appropriate measures towards making industrial initiatives successful. In addition, the research paper has highlighted the significance of organizational culture and leadership in ensuring the effective adoption of such practices. Even though there are a few limitations such as data collection scope and cross sectional nature of the study, the findings are insightful and can be used in future research and adoption in practice in industrial project management.

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Annexures

Demographic Sheet

S. No	Variable	Response Options / Format
1	Age	Open-ended / Dropdown
2	Gender	Male / Female / Other
3	Educational Qualification	High School / Bachelor / Master / PhD
4	Job Title	Open-ended
5	Years of Professional Experience	0–5 / 6–10 / 11–15 / 16+
6	Organizational Sector	Construction / Manufacturing / Energy / Other
7	Level of Involvement in Risk Management	Low / Moderate / High

Project Risk Management Maturity Assessment (PRMMA) – Hillson & Murray-Webster (2007)

Instructions: Please indicate your level of agreement with each statement using the following 5-point Likert scale:

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Subscale	Item No	Statement
Risk Identification	1	Project risks are systematically identified at the start of each project.
	2	Tools and techniques are used to detect potential risks.
	3	Team members are trained to recognize risk factors.
	4	Risk registers are maintained and updated regularly.
	5	Lessons from previous projects are used to identify risks.
Risk Assessment	6	Risks are analyzed for likelihood and potential impact.
	7	Quantitative and qualitative methods are applied to assess risks.
	8	Risk prioritization guides project planning decisions.
	9	External risks (market, regulatory, environmental) are evaluated.
	10	Sensitivity analysis is used to measure risk effects.
Risk Response Planning	11	Strategies are developed for each identified risk.
	12	Contingency plans are prepared in advance.
	13	Risk mitigation responsibilities are assigned to team members.
	14	Risk acceptance and avoidance are clearly defined.
	15	Budget and schedule allowances are made for potential risks.
Risk Monitoring	16	Risks are continuously tracked throughout the project.
	17	Risk registers are reviewed regularly with the project team.

	18	Key risk indicators are monitored for early warning.
	19	Risk response effectiveness is evaluated after implementation.
	20	Lessons learned from risk events are documented for future projects.
Additional Items	21	Organizational culture supports proactive risk management.
	22	Senior management actively participates in risk management.
	23	Risk communication is effective among stakeholders.
	24	IT systems support risk management processes.
	25	Risk management is integrated into project methodology.
	26	Risk management objectives align with project goals.
	27	Risk management is included in project performance reviews.
	28	Continuous improvement in risk management practices is encouraged.
	29	External consultants are used when internal expertise is insufficient.
	30	Risk management contributes to overall project success.

Project Success Questionnaire (PSQ) – Shenhar, Dvir & Levy (2001)

Instructions: Please indicate your level of agreement with each statement using the 5-point Likert scale:

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Subscale	Item No	Statement
Project Efficiency	1	The project was completed within the planned schedule.
	2	The project was completed within the allocated budget.
	3	Resources were utilized efficiently throughout the project.
	4	Project objectives were met as planned.
Impact on the Customer	5	The project met customer requirements and expectations.
	6	Customer satisfaction was achieved at project completion.
	7	Deliverables provided long-term value to the customer.
	8	Customer feedback was incorporated into project processes.
Business Success	9	The project contributed positively to organizational goals.
	10	The project generated expected financial benefits.
	11	The project enhanced the organization's competitive position.
	12	The project delivered measurable business value.
Future Potential	13	The project increased organizational knowledge and capabilities.
	14	The project strengthened team skills for future projects.
	15	The project opened opportunities for future projects.

	16	Lessons learned were documented and applied.
Additional Items	17	Stakeholder relationships improved due to project execution.
	18	The project increased innovation within the organization.
	19	Risks were managed effectively to ensure project success.
	20	Overall, the project was successful in achieving its intended outcomes.