

MidOcean University

College of Management

Department / Specialization: MBA



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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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?

Previous Studies

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).

Methodology and Research Methods

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.

References

- Afzal, F., Yunfei, S., Nazir, M., & Bhatti, S. M. (2021). A review of artificial intelligence based risk assessment methods for capturing complexity-risk interdependencies: Cost overrun in construction projects. *International Journal of Managing Projects in Business*, 14(2), 300-328.
- Ahmed, W., & Huma, S. (2021). Impact of lean and agile strategies on supply chain risk management. *Total Quality Management & Business Excellence*, 32(1-2), 33-56.
- Ajayi, O. O., Yakub, B. A., & Borisade, T. (2022). Relevance of risk management in the delivery of construction projects in developing countries. *Lautech Journal of Civil and Environmental Studies*, 8(2), 70-82.
- Buniya, M. K., Othman, I., Sunindijo, R. Y., Kineber, A. F., Mussi, E., & Ahmad, H. (2021). Barriers to safety program implementation in the construction industry. *Ain Shams Engineering Journal*, 12(1), 65-72.
- Chen, X., Chang-Richards, A. Y., Pelosi, A., Jia, Y., Shen, X., Siddiqui, M. K., & Yang, N. (2022). Implementation of technologies in the construction industry: a systematic review. *Engineering, Construction and Architectural Management*, 29(8), 3181-3209.
- El-Sayegh, S. M., Manjikian, S., Ibrahim, A., Abouelyousr, A., & Jabbour, R. (2021). Risk identification and assessment in sustainable construction projects in the UAE. *International Journal of Construction Management*, 21(4), 327-336.
- Etemadi, N., Borbon-Galvez, Y., Strozzi, F., & Etemadi, T. (2021). Supply chain disruption risk management with blockchain: A dynamic literature review. *Information*, 12(2), 70.
- Fritz-Morgenthal, S., Hein, B., & Papenbrock, J. (2022). Financial risk management and explainable, trustworthy, responsible AI. *Frontiers in artificial intelligence*, 5, 779799.
- Jääskä, E., Lehtinen, J., Kujala, J., & Kauppila, O. (2022). Game-based learning and students' motivation in project management education. *Project Leadership and Society*, 3, 100055.
- Khalid, U., Sagoo, A., & Benachir, M. (2021). Safety Management System (SMS) framework development–Mitigating the critical safety factors affecting Health and Safety performance in construction projects. *Safety science*, 143, 105402.
- Nenni, M. E., De Felice, F., De Luca, C., & Forcina, A. (2025). How artificial intelligence will transform project management in the age of digitization: a systematic literature review. *Management Review Quarterly*, 75(2), 1669-1716.
- Pozzi, R., Rossi, T., & Secchi, R. (2023). Industry 4.0 technologies: critical success factors for implementation and improvements in manufacturing companies. *Production Planning & Control*, 34(2), 139-158.

Rane, S. B., Potdar, P. R., & Rane, S. (2021). Development of project risk management framework based on industry 4.0 technologies. *Benchmarking: An International Journal*, 28(5), 1451-1481.

Shelar, A., Nile, S. H., Singh, A. V., Rothenstein, D., Bill, J., Xiao, J., ... & Patil, R. (2023). Recent advances in nano-enabled seed treatment strategies for sustainable agriculture: challenges, risk assessment, and future perspectives. *Nano-Micro Letters*, 15(1), 54.

Stiles, S., Golightly, D., & Ryan, B. (2021). Impact of COVID-19 on health and safety in the construction sector. *Human factors and ergonomics in manufacturing & service industries*, 31(4), 425-437.

Thach, N. N., Hanh, H. T., Huy, D. T. N., Nga, L. T. V., Huong, L. T. T., & Vu, Q. N. (2021). technology quality management of the industry 4.0 and cybersecurity risk management on current banking activities in emerging markets-the case in Vietnam. *International Journal for Quality Research*, 15(3), 845.

Xing, W., Hao, J. L., Qian, L., Tam, V. W., & Sikora, K. S. (2021). Implementing lean construction techniques and management methods in Chinese projects: A case study in Suzhou, China. *Journal of cleaner production*, 286, 124944.

Yazdani, M., Gonzalez, E. D., & Chatterjee, P. (2021). A multi-criteria decision-making framework for agriculture supply chain risk management under a circular economy context. *Management Decision*, 59(8), 1801-1826.

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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	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.