

The effect of Artificial Intelligence on the Relationship Between Risk Management Factors and Management Objectives

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Abstracts

This study used a literature review approach to investigate the role of artificial intelligence on the relationship between risk management and obtaining the management Objectives, suggested prospects and recommendations for successful artificial intelligence and implementation in the risk management, artificial intelligence place positive role in identification analyzing and prioritizing the risk, the study explored how people respond to different types of risk management advice received from artificial intelligence, AI can easily analyze extensive financial data, pinpointing anomalies and potentially fraudulent issues and offering an accurate avenue for advancements in the risk management, This study delves into the multifaceted applications of artificial intelligence in detecting, analyzing , and prioritizing risk activities within the companies.

1. Introduction

Artificial Intelligence has emerged as an increasingly important technology in contemporary organizations because of its ability to process large volumes of data, identify patterns, support prediction, automate analytical activities, and provide decision-making assistance. The rapid development of machine learning, big data analytics, and data science has created opportunities for organizations to improve the way they identify, analyses, and respond to risks. Aziz and Dowling (2018) explain that AI and machine learning can contribute to risk management by supporting organizations in processing large quantities of information and improving their understanding and control of financial risks. Similarly, O'Halloran and Nowaczyk (2019) demonstrate that artificial intelligence can support scenario testing and the analysis of systemic risks, thereby providing opportunities for regulators and industry participants to make more informed decisions. These developments indicate that AI is increasingly moving beyond simple automation and becoming an

important analytical capability for organizational risk management.

Risk is generally associated with the possibility of loss, an undesirable outcome, or an event that may negatively affect the achievement of organizational objectives. Risk management therefore involves systematic processes through which organizations identify potential risks, analyses their likelihood and consequences, priorities the risks according to their importance, and develop appropriate responses. Effective risk management is particularly important because organizations operate in environments characterized by financial uncertainty, technological disruption, cyber threats, market changes, regulatory requirements, and operational challenges. The integration of AI into risk management can enhance these activities by enabling organizations to analyses large datasets and identify potential risk patterns more efficiently (Milojević & Redzepagic, 2021).

The increasing availability of organizational and external data has created new opportunities for improving risk management activities through

Artificial Intelligence. AI systems can process extensive datasets much more rapidly than traditional manual approaches and can identify patterns, anomalies, and relationships that may not be easily detected through conventional analytical techniques. Rahmani et al. (2023) demonstrate that AI applications have expanded across economic activities, including stock trading, market analysis, risk assessment, and risk identification. Their review further demonstrates the growing accessibility and application of AI technologies across different economic and financial contexts.

The relevance of AI to risk management can also be observed in project and financial environments. Afzal et al. (2021) explain that AI-based risk assessment methods can be used to capture complex risk interdependencies under conditions of uncertainty, particularly in construction projects. Their work demonstrates how hybrid AI approaches can support cost-risk management by capturing relationships between different sources of project complexity and uncertainty. Similarly, Žigienė et al. (2019) explain that AI-based risk management frameworks can assist small and medium-sized enterprises in managing commercial and financial risks, particularly where traditional analytical methods may struggle to process large quantities of business information.

Despite these developments, the adoption of AI in risk management is not without challenges. Ethical concerns, model interpretability, data quality, algorithmic bias, cybersecurity, and transparency remain important issues that organizations must address. Žigienė et al. (2019) emphasize the importance of transparency and ethical considerations in AI-based risk assessment, while Jakka et al. (2022) demonstrate the potential contribution of AI to cyber-risk management and the detection of malware and other cyber threats. Consequently, effective AI implementation requires not only technological capability but also appropriate governance, reliable data, human oversight, and organizational readiness.

The present study therefore focuses on the relationship between specific risk management factors and management objectives while considering the role of Artificial Intelligence as an important technological capability. The study specifically examines risk identification, risk analysis, and risk prioritization as the principal risk

management factors. The conceptual framework presented in the original study links these three factors with management objectives and incorporates Artificial Intelligence within the proposed relationship. The purpose is to determine whether organizations can improve the achievement of their management objectives by strengthening risk management practices and utilising AI capabilities to enhance these processes.

2. Literature Review

2.1 Artificial Intelligence and Risk Management

Artificial Intelligence refers broadly to technological systems capable of performing activities that traditionally require aspects of human intelligence, including learning, prediction, pattern recognition, classification, and decision support. Within risk management, AI can provide organizations with the ability to analyse large and complex datasets and identify potential risks more efficiently. Aziz and Dowling (2018) emphasize the potential of machine learning and AI for financial risk management, particularly through their ability to process information and identify patterns associated with potential risks.

AI can also support iterative scenario analysis and decision-making. O'Halloran and Nowaczyk (2019) demonstrate that AI approaches can provide opportunities for regulators and industry participants to undertake scenario testing and improve understanding of systemic risks. This capability is particularly important in environments where risks are interconnected and where changes in one part of the organization or market may produce consequences elsewhere.

Rahmani et al. (2023) further demonstrate that AI applications have expanded into different economic areas, including stock trading, market analysis, risk assessment, and risk identification. The increasing accessibility of AI technologies suggests that organizations are becoming increasingly capable of incorporating AI into their existing management processes. The authors' review specifically identifies risk management as an important area of AI application and highlights the continuing evolution of AI technologies across economic activities.

2.2 Risk Identification

Risk identification represents the first major stage of the risk management process because organizations

cannot effectively manage risks that they have not recognized. Risk identification involves systematically identifying potential events, conditions, threats, or opportunities that may influence organizational performance. Traditional risk identification may depend heavily on managerial experience, historical records, interviews, checklists, and manual assessment.

The application of AI provides an opportunity to improve this process by analyzing large amounts of internal and external data. Machine learning algorithms can identify patterns and anomalies that may indicate emerging risks. AI can therefore assist managers in identifying risks at an earlier stage and provide a more comprehensive understanding of potential risk events (Aziz & Dowling, 2018; Rahmani et al., 2023).

The increasing use of large-scale organizational and external datasets has created opportunities for more advanced risk prevention. However, the effectiveness of AI-based risk identification remains dependent on the quality, relevance, completeness, and timeliness of the data used by the system. Žigienė et al. (2019) emphasize that organizations may obtain substantial benefits from AI-based risk management, but successful implementation depends on appropriate data and analytical capabilities.

2.3 Risk Analysis

Risk analysis involves examining identified risks to understand their likelihood, potential consequences, causes, and relationships with other risks. Effective risk analysis enables managers to determine the potential significance of different risks and develop appropriate responses.

AI can improve risk analysis by processing large datasets and identifying complex relationships between variables. In construction risk management, Afzal et al. (2021) discuss AI-based approaches capable of capturing complexity and risk interdependencies under conditions of uncertainty. These approaches demonstrate how AI can support organizations in moving beyond simple risk identification toward more sophisticated analysis of the causes and potential consequences of risks.

AI-based risk analysis can also be applied to financial and commercial risks. Traditional analytical techniques may face limitations when

organizations need to process extensive datasets. AI can potentially overcome some of these limitations by rapidly analyzing large amounts of information and identifying relationships that may not be easily detected through conventional methods (Milojević & Redzepagic, 2021).

2.4 Risk Prioritization

Risk prioritization involves ranking identified and analyzed risks according to their relative importance, likelihood, potential consequences, and urgency. Because organizations normally have limited resources, they cannot respond to every risk with the same level of attention. Risk prioritization therefore enables managers to focus their resources on the risks that have the greatest potential effect on organizational objectives.

Artificial Intelligence can contribute to risk prioritization by processing multiple risk indicators simultaneously and supporting managers in determining which risks require immediate attention. AI systems may evaluate historical patterns, financial information, operational indicators, market developments, and other relevant information to assist in ranking risks. The analytical and modelling capabilities of AI can therefore support organizations in converting complex data into information that can be used for managerial decision-making (Milojević & Redzepagic, 2021).

The use of AI in risk prioritization is particularly relevant where organizations face large numbers of interconnected risks. By processing information continuously, AI may enable organizations to identify changing risk priorities and respond more quickly to emerging threats. Afzal et al. (2021) similarly demonstrate the importance of recognizing complex risk interdependencies when assessing and managing project risks.

2.5 Artificial Intelligence and Management Objectives

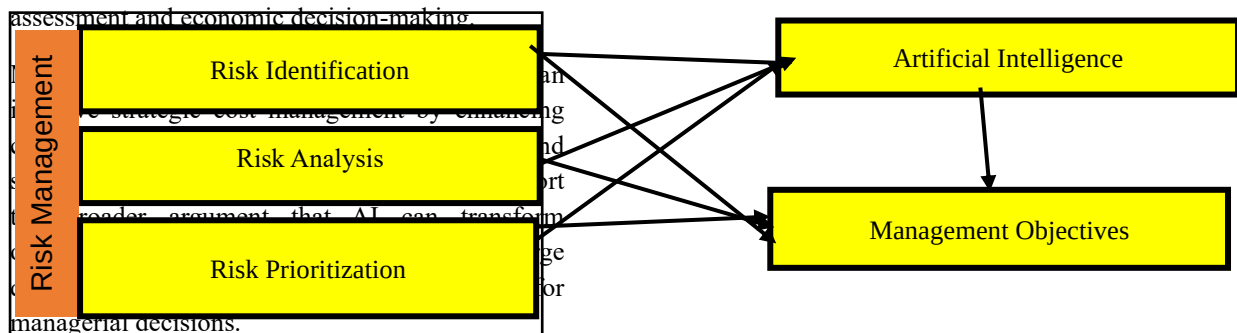
Management objectives represent the desired outcomes that organizations seek to achieve through their strategies, resources, and operational activities. These objectives may include financial performance, operational efficiency, competitiveness, business continuity, effective resource utilization, and improved organizational decision-making. Effective risk management

contributes to these objectives by reducing the probability and impact of adverse events.

When risks are properly identified, analyzed, and prioritized, managers are better positioned to allocate resources and make informed decisions. Artificial Intelligence can strengthen this relationship by improving the speed, accuracy, and comprehensiveness of risk-related information. Aziz and Dowling (2018) argue that AI and machine learning have important applications in risk management, while Rahmani et al. (2023) demonstrate the broader potential of AI for risk

consequences of risks. Third, effective risk prioritization is expected to contribute positively to management objectives because prioritization enables organizations to focus their limited resources on the most significant risks.

Artificial Intelligence is expected to strengthen these relationships by providing advanced analytical capabilities, including automated data processing, pattern recognition, anomaly detection, predictive analysis, and decision support (O'Halloran & Nowaczyk, 2019; Rahmani et al., 2023).



3. Conceptual Framework

The conceptual framework of this study assumes that effective risk management contributes positively to the achievement of management objectives and that Artificial Intelligence strengthens these relationships. The framework consists of three independent variables, namely Risk Identification, Risk Analysis, and Risk Prioritization, while Management Objectives represent the dependent variable. Artificial Intelligence is incorporated as a moderating variable because the study seeks to determine whether organizations with stronger AI capabilities can obtain greater benefits from their risk management practices. The original paper similarly identifies risk identification, risk analysis, risk prioritization, management objectives, and Artificial Intelligence as the core elements of the conceptual framework.

The proposed framework is structured around three direct relationships. First, effective risk identification is expected to contribute positively to management objectives because organizations that identify risks at an early stage are better positioned to prevent or minimize their negative effects. Second, effective risk analysis is expected to contribute positively to management objectives because systematic analysis enables managers to understand the likelihood and potential

4. Research Hypotheses

Based on the preceding literature and conceptual framework, the following hypotheses are proposed:

H1: Risk identification has a significant positive effect on management objectives.

H2: Risk analysis has a significant positive effect on management objectives.

H3: Risk prioritization has a significant positive effect on management objectives.

H4: Artificial Intelligence positively moderates the relationship between risk identification and management objectives.

H5: Artificial Intelligence positively moderates the relationship between risk analysis and management objectives.

H6: Artificial Intelligence positively moderates the relationship between risk prioritization and management objectives.

5. Methodology

5.1 Research Design

This study adopts a **quantitative research approach** to examine the effect of risk management factors on management objectives and to investigate the moderating role of Artificial Intelligence. A quantitative approach is appropriate because the study seeks to measure the proposed constructs using structured questionnaire items and statistically test the hypothesized relationships among the variables. The study employs a cross-sectional survey design in which primary data will be collected from employees and managers working in organizations in Malaysia. Although the original paper described the study using a mixed-method and literature-review approach, the revised methodology is structured consistently as an empirical quantitative study so that the conceptual framework, hypotheses, questionnaire, and PLS-SEM analysis are aligned. The original paper identifies Malaysia as the geographical context and refers to organizations of different sizes and business profiles.

The study adopts a positivist research philosophy because it aims to objectively examine relationships among measurable variables. A structured questionnaire will be used as the main data collection instrument, and the collected data will be analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM). PLS-SEM is appropriate because the proposed model contains several latent variables and interaction effects associated with the moderating role of Artificial Intelligence.

5.2 Population and Sample Selection

The target population will consist of managers and employees working in organizations operating in Malaysia who have sufficient knowledge or experience of risk management and organizational decision-making. The study will include organizations from different business sectors to provide a broader representation of management experiences and risk management practices. The original study similarly considered organizations of different sizes, including large, medium-sized, and smaller firms, to capture diverse management experiences concerning organizational objectives.

A purposive sampling approach will be used to ensure that respondents possess relevant experience in organizational risk management and management decision-making. The study will target approximately 400 valid respondents, providing an

adequate basis for the proposed PLS-SEM analysis and moderation testing.

5.3 Data Collection

Primary data will be collected using a structured online questionnaire. The questionnaire will contain sections measuring demographic characteristics and the major constructs of the study. Risk identification, risk analysis, and risk prioritization will be measured using multiple items reflecting respondents' perceptions of the effectiveness of their organizations' risk management practices. Artificial Intelligence will be measured according to the extent to which AI technologies are used to support risk identification, analysis, prioritization, prediction, and decision-making. Management objectives will be measured according to the extent to which organizations achieve their intended operational and managerial outcomes.

A five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree will be employed. Before the main survey, the questionnaire will be reviewed by experts to establish content validity. A pilot study involving approximately 30 respondents will then be conducted to identify unclear questions and assess the preliminary reliability of the measurement instrument. The original study also used a preliminary questionnaire evaluation before the full survey and employed Cronbach's alpha to assess internal consistency.

5.4 Data Analysis

The collected data will be analyzed using **SmartPLS through PLS-SEM**. The analysis will consist of descriptive analysis, measurement model assessment, structural model assessment, and moderation analysis. Descriptive statistics will first be used to summarize the demographic characteristics of respondents and the general distribution of the study variables. Means and standard deviations will also be examined to provide an initial understanding of respondents' perceptions.

The measurement model will subsequently be assessed to determine indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Outer loadings will be examined for indicator reliability, while Cronbach's alpha and Composite Reliability will be used to assess internal consistency. Average Variance Extracted will be used to assess convergent validity,

and the Heterotrait-Monotrait ratio will be used to evaluate discriminant validity.

After establishing the adequacy of the measurement model, the structural model will be assessed. The analysis will examine collinearity, path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and the statistical significance of the hypothesized relationships. Bootstrapping will be applied to determine the significance of the direct and interaction effects.

5.5 Moderating Effect of Artificial Intelligence

The moderating role of Artificial Intelligence will be examined by creating interaction terms between Artificial Intelligence and each of the three risk management factors. Specifically, the study will test the interaction between risk identification and AI, risk analysis and AI, and risk prioritization and AI. A significant positive interaction effect will indicate that Artificial Intelligence strengthens the relationship between the relevant risk management factor and management objectives.

For example, if the interaction between risk identification and AI is significant and positive, this would indicate that organizations with higher AI capabilities obtain greater benefits from effective risk identification than organizations with lower AI capabilities. This approach provides greater insight than simply examining the direct effect of AI because it considers AI as a technological capability that may improve the effectiveness of existing risk management practices. The use of AI for risk identification, analysis, and decision support is supported by previous research on AI-based risk management (Aziz & Dowling, 2018; Afzal et al., 2021; Rahmani et al., 2023).

5.6 Validity and Reliability

The validity and reliability of the questionnaire will be established through expert review, pilot testing, and statistical assessment using PLS-SEM. Expert review will be conducted before the main survey to determine whether the questionnaire items adequately represent risk identification, risk analysis, risk prioritization, Artificial Intelligence, and management objectives.

A pilot study involving approximately 30 respondents will be conducted to assess the clarity and consistency of the questionnaire. Cronbach's alpha will initially be examined as an indicator of

internal consistency. Tavakol and Dennick (2011) explain that Cronbach's alpha is widely used to assess the internal consistency of measurement scales, although its interpretation should consider the number and characteristics of items. In the main study, Composite Reliability, Average Variance Extracted, and discriminant validity will also be examined to establish the quality of the measurement model.

5.7 Ethical Considerations

The study will follow appropriate ethical principles throughout the research process. Participation will be voluntary, and respondents will be informed about the purpose of the study before completing the questionnaire. No unnecessary personal or confidential organizational information will be requested. Respondents' identities will remain confidential, and the collected information will be used only for academic purposes. Participants will also have the right to discontinue their participation before submitting their responses.

6. Expected Results and Discussion

As the revised study is structured as an empirical research proposal, actual statistical results should not be fabricated before data collection. However, the study is expected to demonstrate that risk identification, risk analysis, and risk prioritization have positive relationships with management objectives. Effective risk identification is expected to enable organizations to recognize potential threats at an early stage, while effective risk analysis should allow managers to understand the probability and potential consequences of identified risks. Risk prioritization is expected to help organizations allocate limited resources toward risks that have the greatest potential effect on organizational performance.

The study also expects Artificial Intelligence to strengthen these relationships. AI provides organizations with the ability to process large volumes of information, identify patterns, detect anomalies, support prediction, and provide decision-making assistance. Aziz and Dowling (2018) and Rahmani et al. (2023) demonstrate the importance of AI-based analytical capabilities for risk management and related decision-making. Therefore, organizations with higher levels of AI capability may be better positioned to transform risk

management information into useful managerial decisions.

The expected findings would also be consistent with research indicating that AI can be used in different areas of risk management. Rahmani et al. (2023) identify applications of AI in areas including market analysis and risk assessment, while Afzal et al. (2021) demonstrate its potential in analysing complex risk interdependencies. In addition, AI-based approaches may assist organisations in addressing cyber risks, where large volumes of technical information must be continuously analysed to detect potential threats. Jakka et al. (2022) highlight the role of AI in cyber-risk management and the detection of malware and other cybersecurity threats.

Nevertheless, the expected discussion should recognise that AI does not eliminate risk. The original paper identifies limitations associated with AI, particularly the possibility that AI may fail to accurately identify risks when the underlying data are incomplete or inappropriate. Žigienė et al. (2019) similarly emphasise the importance of ethical considerations, model interpretability, bias, and transparency in AI-supported risk assessment. Consequently, human judgement, data quality, model transparency, ethical considerations, and appropriate governance remain important components of AI-supported risk management.

7. Conclusion

This study examines the relationship between risk management factors and management objectives while considering the moderating role of Artificial Intelligence. The study focuses on risk identification, risk analysis, and risk prioritization because these activities represent important stages in the risk management process. The conceptual framework proposes that effective risk management contributes positively to management objectives and that AI can strengthen these relationships by providing advanced analytical and decision-support capabilities.

Artificial Intelligence has the potential to transform risk management because it can analyse large datasets, recognize patterns, identify anomalies, support predictive analysis, and provide information that enables managers to make faster and more informed decisions (O'Halloran & Nowaczyk, 2019; Rahmani et al., 2023). The original paper similarly

concludes that AI can play a positive role in the identification, analysis, and prioritization of risks and consequently support the achievement of management objectives. However, successful implementation requires organizations to address data quality, ethical issues, model interpretability, bias, cybersecurity, and human oversight.

Overall, the study is expected to demonstrate that AI should not be viewed simply as an independent technological tool. Instead, it can function as an organizational capability that enhances the effectiveness of established risk management processes. By integrating AI with risk identification, risk analysis, and risk prioritization, organizations may improve their ability to manage uncertainty and achieve their management objectives.

8. Implications

The study has several potential theoretical and practical implications. Theoretically, it contributes to the literature by connecting traditional risk management processes with Artificial Intelligence and by examining AI as a moderating capability rather than simply as a direct predictor of organizational performance. This perspective provides a more detailed understanding of how technology can influence the effectiveness of established management practices. Previous studies have demonstrated the growing importance of AI for risk management, financial decision-making, and organizational analysis (Aziz & Dowling, 2018; Milojević & Redzepagic, 2021; Rahmani et al., 2023).

From a managerial perspective, organizations should consider integrating AI into their risk management systems rather than treating AI as an isolated technological investment. Managers should develop systems that allow AI to support risk identification, analysis, and prioritization while maintaining appropriate human oversight. AI can assist managers in processing large quantities of information, but final decisions should consider organizational context, managerial experience, ethical considerations, and the reliability of the available data.

The study also has implications for risk management professionals because it highlights the importance of combining technological capability with conventional risk management expertise. Organizations should invest in employee training,

data governance, AI literacy, cybersecurity, and appropriate controls to ensure that AI-supported risk management produces reliable and useful information. Milojević and Redzepagic (2021) similarly emphasize the potential of AI and machine learning in banking risk management while highlighting the importance of appropriate implementation.

9. Future Research

Future research could extend this study by examining AI adoption across different industries in Malaysia, including banking, manufacturing, construction, healthcare, logistics, and SMEs. Comparative studies could determine whether the influence of AI on risk management differs according to organizational size, industry characteristics, technological maturity, and regulatory environment.

Future researchers could also investigate individual AI technologies, such as machine learning, natural language processing, predictive analytics, generative AI, and intelligent automation, to determine whether different technologies have different effects on risk management outcomes. Longitudinal research could further examine how the relationship between AI and risk management develops as organizations increase their level of digital maturity.

Future studies may also introduce additional variables such as organizational readiness, employee AI competency, data quality, organizational culture, AI governance, cybersecurity capability, and managerial support. These variables could provide a more comprehensive explanation of the conditions under which AI successfully improves risk management and organizational performance.

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