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Integration of Risk Assessment and Risk Prioritization in Organizations: A Systematic Literature

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ABSTRACT

Risk management is a strategic aspect that supports an organization's sustainability amid increasing complexity, uncertainty, and the dynamics of the business environment. As various risk management approaches evolve, risk evaluation and risk prioritization have become two complementary stages in developing effective mitigation decisions. However, various studies indicate that these two processes are still often examined separately, thus failing to produce a comprehensive risk management framework. This study aims to identify research developments, the dominant methods used, research trends, the strengths and limitations of existing approaches, as well as research gaps related to the integration of risk evaluation and risk prioritization. The study employed a Systematic Literature Review (SLR) method in accordance with the PRISMA guidelines. The literature search was conducted using the Google Scholar, Scopus, and IEEE Xplore databases to identify articles published between 2015 and 2025. After undergoing the processes of identification, screening, eligibility assessment, and selection based on inclusion criteria, 25 articles were identified and analyzed in depth using a thematic analysis approach.

The study's findings indicate that the integration of risk evaluation and prioritization methods is increasingly evolving through the use of hybrid models—such as FMEA–AHP, FMEA–TOPSIS, FMEA–ANP, and the House of Risk—and is supported by the application of Artificial Intelligence, Machine Learning, Big Data Analytics, and Enterprise Risk Management. This integration has proven capable of enhancing the objectivity of assessments, the effectiveness of resource allocation, and the quality of decision-making in risk management. Nevertheless, existing research still faces several limitations, including a focus predominantly on large industrial sectors, a lack of empirical validation, limited attention to human behavioral factors, and the underutilization of dynamic models in small and medium-sized organizations. Therefore, future research needs to develop risk evaluation and prioritization models that are more adaptive, integrated, and empirically validated to address the challenges of an increasingly complex organizational environment..

INTRODUCTION

In the context of the modern business and organizational world, characterized by complexity, volatility, and global uncertainty, risk management has become a fundamental element in achieving organizational sustainability (Wibowo et al., 2023) Risk is no longer viewed merely as a threat, but as an inherent factor that must be systematically managed to create added value while maintaining the organization's operational stability (Dahlan et al., 2021; Rabbani et al., 2021) . Risk management is a set of policies and procedures implemented by an organization to identify, manage, monitor, and control the likelihood of various risks occurring (Deny et al., 2023) Every strategic decision—whether financial, operational, or technological—always carries risk consequences that could potentially affect the achievement of the organization's objectives(Kusnandar, 2024). Therefore, the primary objective of risk management is to manage uncertainty so that the organization can maintain business continuity while optimizing the opportunities arising from those risks (Rabbani et al., 2021). Thus, the existence of an effective, integrated, and adaptive risk management system is a critical prerequisite for organizations in navigating the ever-evolving dynamics of the business environment (Dahlan et al., 2021; Pramuditya & Karningsih, 2024).

Risk evaluation is one of the most important stages in the risk management process because it serves to assess the level of risk based on the probability of occurrence and the magnitude of the resulting impact (Dahlan et al., 2021; Firdaus & Widianti, 2021). In the ISO 31000 standard, risk evaluation is part of the risk management framework that begins with risk identification, followed by risk analysis, and concludes with risk evaluation as the basis for decision-making (Dahlan et al., 2021). The results of this evaluation serve as the foundation for management to determine the most appropriate and proportionate mitigation strategies relative to the level of risk faced(Fathimahhayati & Witriyan, 2023; Sumantika et al., 2021). However, in practice, many organizations still stop at the risk identification and analysis stages without proceeding to *the risk prioritization* process(Kusnandar, 2024). This situation often results in organizational resources not being utilized optimally due to the lack of a clear priority order regarding which risks must be addressed immediately(Biarto et al., 2023; Sumantika et al., 2021). Consequently, the mitigation policies implemented become less effective and have the potential to increase organizational losses.

The integration of risk assessment and risk prioritization is a strategic step in building a comprehensive and holistic risk management system (Pramuditya & Karningsih, 2024; Wibowo et al., 2023). This approach enables organizations not only to assess risk levels based on probability and impact but also to determine the order of priority for addressing risks according to their level of importance and influence on the achievement of the organization's strategic objectives (Fathimahhayati & , 2023; Firdaus & Widianti, 2021). Prioritization can be conducted through various quantitative approaches, such as calculating the *Risk Priority Number* (RPN)—derived by multiplying the *severity*, *occurrence*, and *detection* values (Sumantika et al., 2021) —or through weighting techniques using various decision-support methods (Firdaus & Widianti, 2021). Through this approach, organizations can allocate resources more effectively and focus their mitigation strategies on the most critical risks (Biarto et al., 2023; Deny et al., 2023). In addition to improving decision-making effectiveness, this integration also fosters the development of a data-driven, adaptive, and responsive risk management system that can adapt to changes in the business environment.

With advances in science and technology, various quantitative and qualitative methods have been developed to support the process of risk assessment and prioritization. Some of the most widely used methods include *Failure Mode and Effect Analysis* (FMEA), *the Analytic Hierarchy Process* (AHP), and *the Technique for Order of Preference by Similarity to Ideal Solution* (TOPSIS) (Wibowo et al., 2023). FMEA is a structured approach to identifying various potential failures and determining the priority level of their handling through RPN calculations so that the most critical failure modes can be systematically identified (Sumantika et al., 2021; Wibowo et al., 2023). Over time, FMEA has been widely integrated with other methods. The integration of FMEA and TOPSIS has been applied to occupational safety and health (OSH) risk mitigation in machining activities(Fathimahhayati & Witriyan, 2023) as well as in the risk analysis of plywood production processes (Deny et al., 2023). Meanwhile, the integration of FMEA with AHP is utilized in risk management for food industry development (Wibowo et al., 2023), while the combination of FMEA and *the Analytic Network Process* (ANP) is used in risk assessment for equipment testing (Firdaus & Widianti, 2021). In addition, the *Fuzzy FMEA* approach was developed to address the limitations of conventional FMEA, which assumes that the three main parameters—*severity* (S), *occurrence* (O), and *detection* (D)—have the same level of importance, whereas in practice the weights of each parameter may differ (Kusnandar, 2024) . The *House of Risk* (HOR) method, which is an extension of FMEA through integration with *the House of Quality* (HOQ), has also been widely applied in *supply chain* risk management (Pramuditya & Karningsih, 2024). These various methods can help organizations measure risk levels more systematically while setting priorities for risk management more objectively (Biarto et al., 2023; Dahlan et al., 2021). Recent studies also indicate a trend toward integrating conventional risk management methods with modern technologies, such as *Artificial Intelligence* (AI) and *Machine Learning* (ML), which enable the automatic and *real-time* analysis of large volumes of risk data. However, the implementation of these approaches still faces various challenges, particularly regarding model complexity, data availability and quality, and the readiness of human resources to operate such technologies.

Based on the above discussion, a systematic review is needed to identify developments in research on the integration of risk assessment and risk prioritization. Using a *Systematic Literature Review* (SLR) approach, this study aims to identify, analyze, and synthesize various previous studies to gain a comprehensive understanding of research trends, the most commonly used methods, the strengths and limitations of each approach, and the remaining *research gaps*. The results of this study are expected not only to contribute theoretically to the development of risk management science but also to generate practical recommendations for organizations in designing and implementing risk assessment and prioritization systems that are more effective, efficient, and adaptive to the dynamics of the business environment.

METHODOLOGY

This study employs the *Systematic Literature Review* (SLR) method to review, evaluate, and synthesize the results of previous research relevant to the topic of integrating risk *evaluation* and *risk prioritization* within organizations. The SLR approach was chosen because it produces a systematic, transparent, measurable, and replicable literature review, thereby minimizing potential researcher bias in the processes of collecting, selecting, and analyzing the literature. According to Kitchenham and Charters (2007), a systematic literature review (SLR) is a scientific procedure designed to identify, evaluate, and interpret all available scientific evidence related to a research topic in a systematic, objective, and replicable manner.

This approach is considered appropriate because research on the integration of risk assessment and risk prioritization remains scattered across various disciplines, such as management, industrial engineering, information technology, and operations management. Various studies have implemented the integration of risk assessment and prioritization methods in diverse contexts, ranging from the manufacturing industry (Dahlan et al., 2021; Deny et al., 2023) , to occupational safety and health (Biarto et al., 2023; Fathimahhayati & Witriyan, 2023) , supply chain management(Pramuditya & Karningsih, 2024; Sumantika et al., 2021) , and information system security (Kusnandar, 2024) . Therefore, the SLR method is considered the most appropriate for mapping knowledge development, identifying *research gaps*, and formulating directions for the development of conceptual and theoretical models in the field of risk management.

Literature Search Strategy

The initial stage of the research involved designing a systematic literature search strategy to obtain relevant, high-quality, and reliable sources of information, as described in the following section. The search strategy began by defining a clear research objective: to identify studies that examine the integration of risk evaluation and risk prioritization across various organizational contexts. This objective served as the foundation for developing the search protocol, including the selection of appropriate databases, search keywords, and inclusion and exclusion criteria, thereby ensuring a comprehensive and systematic identification of relevant literature. The search was conducted using three major scientific databases with extensive coverage of international publications: Google Scholar, Scopus, and IEEE Xplore. These three databases were selected based on their reputation, the comprehensiveness of their collections, and their ability to provide peer-reviewed scientific articles.

The search keywords were formulated based on the combination of terms most relevant to the research topic, namely *"risk evaluation*," *"risk prioritization*," *"integrated risk management*," and *"systematic literature review."* To improve the accuracy of the search results, Boolean operators such as AND, OR, and quotation marks ("...") were used to limit the search to specific phrases. For example, keyword combinations such as *"risk evaluation AND prioritization"* or *"risk management integration AND SLR"* were used to identify articles that specifically address the integration of risk evaluation and prioritization.

The literature search focused on publications released during the 2015–2025 period so that the study's findings would reflect the latest developments in risk management practice and research. This time frame was selected based on the emergence of various studies that explore the integration of the FMEA method with decision-support techniques, such as TOPSIS (Deny et al., 2023); Fathimahhayati & Witriyan, 2023); AHP (Wibowo et al., 2023); and ANP (Firdaus & Widianti, 2021). In addition to considering the year of publication, this study included only articles that had undergone a *peer-review* process and were published in reputable scientific journals. All search results were then saved in bibliographic format using reference management software to facilitate the data screening and management process in the subsequent stages.

Literature Selection Process

After all search results were collected, a literature selection process was conducted to ensure that the articles used met the criteria for relevance and scientific quality. The selection process follows the PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) guidelines, which include four main stages: *identification*, *screening*, *eligibility* assessment, and *inclusion*.

During the identification phase, approximately 240 articles matching the search keywords were identified. These were then screened based on the relevance of their titles and abstracts, resulting in 80 articles deemed relevant for further review. The next step was *a full-text review* to assess the appropriateness of the methodology, the quality of the research findings, and the scientific contribution of each article. Based on this process, 25 articles met all inclusion criteria and were deemed suitable for in-depth analysis.

The inclusion criteria used in this study were as follows: (1) articles published between 2015 and 2025; (2) articles focusing on the integration of risk assessment and risk prioritization within organizations; (3) articles that clearly and systematically describe their research methodology; and (4) articles available in Indonesian or English. Conversely, articles excluded from the selection process included non-scientific publications, conference proceedings that had not undergone *peer review*, and articles that did not adequately describe the research methodology.

This selection process is consistent with various previous studies that applied strict inclusion and exclusion criteria in identifying risks and their management methods (Sumantika et al., 2021; Wibowo et al., 2023). All articles that passed the selection process were then assigned identification codes, such as L1 through L25, to facilitate the process of thematic grouping, data extraction, and analysis in subsequent stages. All selection stages were conducted meticulously to ensure consistency between the research objectives and the analyzed literature.

Data Analysis Method

The final stage of the research is data analysis, which aims to identify patterns, trends, relationships among themes, and research gaps that emerge from the literature review. The analysis was conducted using a thematic analysis approach, which allows data from various studies to be organized into main themes based on their characteristics and focus. Each article was analyzed to identify key aspects, such as the research objectives, methods used, research findings, and their contributions to the development of risk management theory and practice.

The analysis process was conducted in several stages. The first stage was *initial coding*, which involved assigning codes to keywords, concepts, and key statements related to the integration of risk assessment and risk prioritization. The second stage involves grouping the coded results into categories based on shared characteristics, such as *methodological approaches*, *technology applications*, *implementation challenges*, and *research development directions*. The third stage involves creating *a thematic map* to identify relationships between themes and patterns of research development in this field.

For example, the topic *of methodological approaches* covers various forms of method integration, such as FMEA–TOPSIS applied to occupational safety and health risk mitigation in machining activities (Fathimahhayati & Witriyan, 2023) as well as risk analysis of the plywood production process (Deny et al., 2023), FMEA–AHP in food industry risk management (Wibowo et al., 2023), FMEA–ANP in equipment testing risk assessment (Firdaus & Widianti, 2021), FMEA–FTA in identifying operational risks in production processes (Dahlan et al., 2021), *House of Risk* in *supply chain* risk management(Pramuditya & Karningsih, 2024), and *Fuzzy FMEA* in information system security evaluation (Kusnandar, 2024) .

In addition to using a thematic approach, the analysis also combines quantitative and qualitative perspectives. Quantitative analysis was conducted to identify the frequency of use of various risk evaluation and prioritization methods, such as FMEA, AHP, and TOPSIS. The results of the review indicate that FMEA is the most widely used method across various research contexts

(Biarto et al., 2023; Dahlan et al., 2021; Deny et al., 2023) . Meanwhile, qualitative analysis was used to understand the characteristics of the method's application, the effectiveness of its implementation, the main findings, and the various limitations reported in each study.

To enhance the validity of the synthesis results, a *cross-validation* process was conducted by comparing findings from various sources and research approaches. For example, the effectiveness of the FMEA–TOPSIS integration (Deny et al., 2023; Fathimahhayati & Witriyan, 2023) was compared with the FMEA–AHP approach (Wibowo et al., 2023) and the FMEA–ANP approach (Firdaus & Widianti, 2021) in the context of risk prioritization. This step aims to ensure that the synthesis results not only represent findings from a specific approach but also illustrate general trends in research on the integration of risk assessment and prioritization. Thus, the analysis results are expected to serve as a strong foundation for research discussions and make a significant contribution to the development of theory and practice in organizational risk management systems.

Table 1 Literature Selection Flowchart (PRISMA)

PRISMA Stages	Description of Activities	Number of Articles
Identification	Articles were obtained from the Google Scholar and IEEE Xplore databases using the keywords "risk evaluation," "risk prioritization," "integrated risk management," and "systematic literature review" for the period 2015–2025	240
Screening	Articles were screened based on the relevance of their titles and abstracts, and duplicate articles were removed.	80
Eligibility	Full-text review to assess topic relevance, methodological clarity, and publication quality according to inclusion and exclusion criteria	40
Included	Articles that met all criteria and were analyzed in depth in the study	25

RESULTS AND DISCUSSION

Description of the Research Findings

The results of the literature review indicate that the integration of *risk evaluation* and *risk prioritization* has emerged as an increasingly important issue in modern organizational management(Olulon, 2024; Sharma et al.,2021). All of the analyzed articles generally confirm that traditional risk management approaches, which focus solely on risk identification without accompanying prioritization mechanisms, are no longer adequate to address the complexity, dynamics, and uncertainty of today's business environment (Godmanis, 2020; et al., 2023). Therefore, most studies advocate for the adoption of a more comprehensive approach through the integration of qualitative and quantitative methods to produce a risk evaluation system that is more objective, adaptive, and data-driven (Duan et al., 2022; Zhang et al., 2023).

One of the most widely used approaches is the integration of *Failure Mode and Effect Analysis* (FMEA) with *the Analytic Hierarchy Process* (AHP). The combination of these two methods enables

organizations to identify risks based on severity, likelihood of occurrence, and detectability, and then determine the order of mitigation priorities in a more systematic and measurable manner (Firdaus & Widianti, 2021; Wibowo et al., 2023). In addition, various recent studies have begun to introduce the use of technologies such as *Artificial Intelligence* (AI), *Machine Learning* (ML), and *Big Data Analytics* to support the process of identifying, evaluating, and prioritizing risks automatically, quickly, and more accurately (Duan et al., 2022; Mathieu & Turovlin, 2023).

Specifically, Duan et al. (Duan et al., 2024) developed a modified FMEA model for smart manufacturing systems by integrating *machine learning*. In this model, *Grey Relation Analysis* (GRA) is used to determine risk priorities for each failure mode, while the *k-means* algorithm—an *unsupervised machine learning* approach—is employed to cluster failure modes into priority classes. The findings indicate that the application of smart technology can improve the accuracy of the risk evaluation process compared to conventional approaches. Overall, these various research findings reinforce the view that future risk management development will increasingly rely on the integration of human analysis and digital algorithms capable of adapting to dynamic changes in the business environment (Duan et al., 2022; Olulon, 2024).

Current Research Trends

The results of the literature review indicate that research on risk assessment and prioritization has developed quite rapidly over the past decade, in terms of methodology, analytical approaches, and scope of application. In general, these developments can be grouped into three main trends.

First, the increasing use of hybrid *models* that combine two or more risk analysis methods. Approaches such as FMEA–AHP (Wibowo et al., 2023) and FMEA–TOPSIS (Deny et al., 2023; Fathimahhayati & Witriyan, 2023) are increasingly being applied because they can reduce the level of subjectivity typically found in the use of single methods. In addition, the integration of FMEA with *the Analytic Network Process* (ANP) has been applied in equipment testing risk assessments to produce a more objective *Weighted Risk Priority Number* (WRPN) (Firdaus & Widianti, 2021) . In a different context, the *House of Risk* (HOR) approach, which integrates FMEA with *the House of Quality* (HOQ), is used in *supply chain* risk management(Pramuditya & Karningsih, 2024) . On the other hand, Zhang et al. (Zhang et al., 2023) developed a *Quality Function Deployment* (QFD)-based approach combined with *the Balanced Scorecard* and *the Stratified-Z-numbers-Full Consistency Method* (SZFUCOM) as a basis for decision-making in risk response for project portfolios. These various hybrid models demonstrate that combining multiple methods can yield a more comprehensive risk assessment through a blend of human judgment and mathematical approaches(Godmanis, 2020; Zhang et al., 2023).

Second, the increasing digitalization and automation of risk management systems. A number of studies have utilized AI, ML, and *neural networks* to identify risk patterns based on organizational operational data (Duan et al., 2022; Mathieu & Turovlin, 2023). The study by Duan et al. (2024) shows that the integration of FMEA with *machine learning* is able to capture *the coupling relationships* between failure modes more accurately than conventional FMEA. Meanwhile, Mathieu and Turovlin (2023) applied the *Classification and Regression Trees* (CART) method to prioritize cybersecurity vulnerabilities in *Enterprise Resource Planning* (ERP) systems. The results of this study show that *a machine learning*-based approach can produce risk priorities that cannot be obtained through conventional classification methods. The main advantage of this digital approach lies in its ability to process large amounts of data and predict potential failures that are difficult to identify using traditional approaches (Duan et al., 2022).

Third, there is a growing focus on cross-functional and cross-sectoral risk integration through the implementation *of Enterprise Risk Management* (ERM). In this paradigm, risk is no longer viewed as the responsibility of a single work unit, but rather as a strategic issue that must be managed in an integrated manner across the entire organization (Olulon, 2024; Sharma et al., 2021). Sharma et al. (2021) emphasize that ERM views the organization as a holistic system so that all risk priorities can be aligned to achieve organizational objectives effectively and efficiently, including in the areas of public health, environmental management, and organizational integrity. In line with this, Olulon (2024) demonstrates that the proactive and structured implementation of ERM plays a crucial role in preserving corporate value amid economic uncertainty. Consequently, current research trends are focused on developing a risk management framework that integrates the processes of risk assessment, measurement, and prioritization into a single strategic management system (Godmanis, 2020; Olulon, 2024; Sharma et al., 2021).

Strengths and Limitations of the Analyzed Studies

The results of the review indicate that the primary strength of the various studies analyzed lies in their ability to develop integrative methods and models for the risk evaluation and prioritization processes. Most studies demonstrate that integrating these two processes can improve the effectiveness of resource allocation, accelerate decision-making, and enhance an organization's preparedness to deal with various forms of uncertainty (Duan et al., 2024; Olulon, 2024; Zhang et al., 2023). Furthermore, the development of mathematical models and digital technologies provides a higher level of accuracy in the risk analysis process (Duan et al., 2024; Mathieu & Turovlin, 2023).

Godmanis (Godmanis, 2020), for example, demonstrates that the application of multidimensional risk assessment based on the ISO 31000:2018 standard in a pharmaceutical manufacturing company was able to identify and prioritize 64 different types of risks through an evaluation involving the two highest levels of management. The results of this evaluation yielded *the top 10 risks*, which served as the basis for developing the company's mitigation strategy. Additionally, the use of simulation-based approaches, such as *Monte Carlo simulation*, is considered capable of producing more realistic risk estimates because they account for various possible scenarios of uncertainty.

Nevertheless, the synthesis also identified several limitations that still characterize previous studies. Most studies still employ conceptual approaches or single-case studies, resulting in a relatively limited level of generalizability of the research findings (Godmanis, 2020; Nguembi et al., 2023). Godmanis (2020) himself states that his research findings are specific to the pharmaceutical industry, where regulatory risk is the primary risk compared to financial risk. This indicates that risk characteristics are heavily influenced by the context of the industry under study.

In addition, the implementation of advanced technologies such as AI and ML is still dominated by large-scale organizations that possess adequate data infrastructure and technological capacity (Duan et al., 2024; Mathieu & Turovlin, 2023). In contrast, small and medium-sized organizations still face various challenges, such as budget constraints, low technological literacy, and limited human resources. Another limitation is the scarcity of research that empirically examines the relationship between the effectiveness of integrating risk assessment and risk prioritization and improvements in organizational performance (Olulon, 2024). Most studies continue to focus on model development without conducting direct implementation testing (Duan et al., 2024; Zhang et al., 2023).

Comparison of Analyzed Study Results

A comparison across studies reveals significant variations in both methodology and results. Studies that integrate FMEA with AHP tend to produce more consistent and objective risk assessments because they are supported by a systematic weighting mechanism (Firdaus & Widianti, 2021; Wibowo et al., 2023) . Conversely, the FMEA–TOPSIS approach is considered more flexible because it can adapt the evaluation criteria to the characteristics of various industrial sectors (Deny et al., 2023; Fathimahhayati & Witriyan, 2023).

Firdaus and Widianti (Firdaus & Widianti, 2021) demonstrated that the integration of ANP and FMEA yields a *Weighted Risk Priority Number* (WRPN) capable of providing a more accurate risk ranking than the conventional *Risk Priority Number* (RPN). On the other hand, Fathimahhayati and Witriyan (Fathimahhayati & Witriyan, 2023) demonstrated that the integration of FMEA and TOPSIS is effective in prioritizing recommendations for improvements regarding occupational safety and health risks in machining activities. Meanwhile, approaches based on *Bayesian Networks* and *Monte Carlo Simulation* have the advantage of modeling uncertainty and interdependencies among risks, making them more suitable for application in complex systems, such as the manufacturing and energy industries (Zhang et al., 2023).

AI- and ML-based research offers greater capabilities in processing large datasets and dynamically updating risk priorities (Duan et al., 2024; Mathieu & Turovlin, 2023). Duan et al. (2024) demonstrate that the developed method is capable of identifying relationships among failure modes more accurately than conventional FMEA. These findings indicate that risks related to system security, production quality, and information integration fall into the high-risk category, requiring greater mitigation priority. However, these advantages are accompanied by implementation challenges, including the need for technological infrastructure, high-quality data, and relatively high technical expertise (Duan et al., 2024; Mathieu & Turovlin, 2023).

Overall, the results of the comparison show that no single method is capable of meeting all risk assessment and prioritization needs in every organizational context (Godmanis, 2020; Zhang et al., 2023). Therefore, the selection of a method must be tailored to the organization's characteristics, the complexity of the risks, and the risk management objectives to be achieved (Olulon, 2024; Sharma et al., 2021).

Identification of Research Gaps

Based on the results of the literature synthesis, this study identifies several *research gaps* that still require attention in future research.

First, most research still focuses on large-scale organizations and the manufacturing sector (Godmanis, 2020; Nguembi et al., 2023), while research on the public sector, education, and small and medium-sized enterprises (SMEs) remains relatively limited. In fact, these sectors have distinct risk characteristics and require more specific risk management approaches (Sharma et al., 2021).

Second, most studies have not yet integrated social and human behavioral aspects into risk management systems. Factors such as organizational culture, decision-maker behavior , risk perception, and individual readiness are still rarely included in risk assessment models, even though these factors have a significant impact on the successful implementation of risk management systems(Godmanis, 2020; Mukasa et al., 2025). Mukasa et al. (2025) demonstrated significant differences in perception between supervisors and training participants regarding the effectiveness of risk management skill transfer. These findings indicate that human factors play a crucial role in

the effectiveness of risk management system implementation. Godmanis (Godmanis, 2020) also found differences in risk perceptions between the board of directors and senior line managers, particularly regarding operational risk, investment risk, and technological innovation risk.

Third, there is a need to develop risk assessment models that are more dynamic and adaptive to changes in the external environment (Oladoyinbo et al., 2023; Zhang et al., 2023). Static models are no longer adequate for addressing rapidly evolving risks, particularly those related to technology, cybersecurity, and geopolitics (Mathieu & Turovlin, 2023; Oladoyinbo et al., 2023). Oladoyinbo et al. (2023) emphasize that organizations must continuously evaluate and adapt their security strategies to keep pace with the ever-evolving dynamics of digital threats.

Fourth, empirical validation of the various models developed remains a major weakness in the available literature. Most studies still stop at the stage of conceptual model development without conducting comprehensive testing using real organizational data, so the effectiveness and reliability of the models cannot yet be fully demonstrated (Duan et al., 2024; Zhang et al., 2023). Therefore, future research is expected to combine theoretical model development with empirical field testing to produce risk management models that are more valid, applicable, and aligned with organizational needs (Godmanis, 2020; Olulon, 2024).

CONCLUSION

The results *of a systematic literature review* indicate that the integration of risk assessment and risk prioritization has been the primary direction of risk management research over the past decade. Various studies have demonstrated that the use of an integrative approach can result in a more systematic and objective process for identifying, assessing, and prioritizing risks, and can support more effective decision-making compared to the use of a single method. Methodological developments also show a shift from conventional approaches toward hybrid models that combine various analytical techniques, such as FMEA, AHP, TOPSIS, ANP, and *the House of Risk*, as well as the use of digital technologies based on *artificial intelligence* and *machine learning*. These findings indicate that modern risk management is increasingly moving toward data-driven, adaptive systems capable of responding quickly to changes in the organizational environment.

Nevertheless, the results of this synthesis also identify a number of research gaps that still require attention. Most studies remain concentrated on the large industrial sector and have not yet extensively tested the models' effectiveness empirically across various types of organizations. Furthermore, aspects of human behavior, organizational culture, and external environmental dynamics remain relatively underrepresented in risk assessment and prioritization models. Therefore, future research is expected to develop a more comprehensive risk management model by combining quantitative approaches, digital technology, and organizational behavioral factors, as well as conducting empirical validation across various sectors to produce a risk management system that is more practical, adaptive, and sustainable.

REFERENCES

Biarto, M. R., Ismiyah, E., & Rizqi, A. W. (2023). Analisis Potensi Bahaya Dengan Metode Hazard Identification and Risk Assesment Dan Failure Mode Effect Analysis Pada PT.XYZ. Jurnal Serambi Engineering, 8(4), 7214–7223. https://doi.org/10.32672/jse.v8i4.6800

Dahlan, A., Leksono, E. B., & Fathoni, M. Z. (2021). Identifikasi Dan Analisis Risiko Operasional Pada Divisi Produksi Perusahaan Vulkanisir Ban Menggunakan Metode Risk Management Dengan Pendekatan Fmea Dan Fta. Justi (Jurnal Sistem Dan Teknik Industri), 2(1), 44. https://doi.org/10.30587/justicb.v2i1.3183

Deny, A., Profita, A., & Gunawan, S. (2023). Analisis Dan Pengembangan Strategi Mitigasi Risiko Pada Proses Produksi Kayu Lapis (Plywood) (Studi Kasus: PT. SLJ Global Tbk). Jurnal Teknik

Industri Jurnal Hasil Penelitian Dan Karya Ilmiah Dalam Bidang Teknik Industri, 9(1), 114–124. https://doi.org/10.24014/jti.v9i1.21461

Duan, W. H., Asif, M., Mahmood, N. H. N., & Zakaria, W. N. W. (2022). Emotional Intelligence and High-Performance Leadership of Women Leaders: The Mediating Role of Organization Culture. Management Research Review, 46(1), 100–115. https://doi.org/10.1108/mrr-06-2021-0419

Fathimahhayati, L. D., & Witriyan, F. D. (2023). Integration of FMEA and TOPSIS for OHS Risk Mitigation Strategy in Lathe Machining Activities: Case Study in PT. SPPA. Operations Excellence Journal of Applied Industrial Engineering, 15(1), 77. https://doi.org/10.22441/oe.2023.v15.i1.074

Firdaus, H., & Widianti, T. (2021). Penilaian Risiko Dalam Pengujian Mesin Cuci Berdasarkan Standar Sni Iec 60335-2-7:2010. Pertemuan Dan Presentasi Ilmiah Standardisasi, 2020, 173–186. https://doi.org/10.31153/ppis.2020.74

Godmanis, I. (2020). Risk Assessment and Quantification in Manufacturing Enterprise. Scientific Conference on Economics and Entrepreneurship Proceedings, 24–30. https://doi.org/10.7250/scee.2019.004

Kitchenham, B. and Charters, S. (2007) Guidelines for Performing Systematic Literature Reviews in Software Engineering, Technical Report EBSE 2007-001, Keele University and Durham University Joint Report.

Kusnandar, A. (2024). Evaluasi Keamanan Sistem Informasi Menggunakan Fuzzy FMEA Berbasis Framework ISO/IEC 27001:2013 Untuk Meningkatkan Keamanan Informasi. Jurnal Sistem Informasi Bisnis, 14(2), 181–190. https://doi.org/10.21456/vol14iss2pp181-190

Mathieu, R. G., & Turovlin, A. E. (2023). Lost in the Middle – A Pragmatic Approach for ERP Managers to Prioritize Known Vulnerabilities by Applying Classification and Regression Trees (CART). Information and Computer Security, 31(5), 655–674. https://doi.org/10.1108/ics-02-2023-0027

Mukasa, P. M., Miiro, R., Obaa, B., Mutebi, H., Kizza, J., & Kiwanuka, J. (2025). Exploring Perception Disparities in Agricultural Risk Management Process Training: An Analysis of Skill Transfer Perspectives Between Supervisors and Trainees. International Journal of Training and Development, 29(2), 231–242. https://doi.org/10.1111/ijtd.12357

Nguembi, I. P., Li, Y., & Appiah, V. S. (2023). Safety and Risk Management of Chinese Enterprises in Gabon's Mining Industry. Heliyon, 9(10), e20721. https://doi.org/10.1016/j.heliyon.2023.e20721

Oladoyinbo, T. O., Adebiyi, O. O., Olaniyi, O. O., & Okunleye, O. J. (2023). Evaluating and Establishing Baseline Security Requirements in Cloud Computing: An Enterprise Risk Management Approach. Asian Journal of Economics Business and Accounting, 23(21), 222–231. https://doi.org/10.9734/ajeba/2023/v23i211129

Olulon, T. M. (2024). The Impact of Enterprise Risk Management (ERM) on Firm Value in Times of Economic Crisis. International Journal of Research Publication and Reviews, 5(10), 242–255. https://doi.org/10.55248/gengpi.5.1024.2711

Pramuditya, A. Y., & Karningsih, P. D. (2024). Manajemen Risiko Supply Chain Koperasi Kopi Wonosalam Jombang Dengan Metode House of Risk (HOR). Jurnal Teknik ITS, 13(1). https://doi.org/10.12962/j23373539.v13i1.128038

Rabbani, K. J., Kameswara, S., Sitohang, F. A. F., Maghdalena, N. F., Profita, A., & Kuncoro, D. K. R. (2021). Analisis Risiko Dan Mitigasi Risiko Pada Mebel Abi Rodim Dengan Menggunakan Metode FMEA Dan TOPSIS. Performa Media Ilmiah Teknik Industri, 20(2), 109. https://doi.org/10.20961/performa.20.2.51129

Sharma, U., Chapman, T. T., & Garrison, S. (2021). Addressing Risks Across the Organization: Enterprise Risk Management. American Water Works Association, 113(5), 54–62. https://doi.org/10.1002/awwa.1727

Sumantika, A., Guritno, A. D., & Khuriyati, N. (2021). Mitigasi Risiko Pada Industri Pengalengan Gudeg. Jurnal Agritech, 41(2), 107. https://doi.org/10.22146/agritech.35704

Wibowo, Y., Herlina, H., Soekarno, S., Wiyono, A. E., & Prihani, S. T. (2023). Manajemen Risiko Pengembangan Industri Mocaf (Modified Cassava Flour) Di Kabupaten Jember. Jurnal Teknologi Industri Pertanian, 33(3), 239–253. https://doi.org/10.24961/j.tek.ind.pert.2023.33.3.239

Zhang, X., Goh, M., Bai, S., & Wang, Z. (2023). Risk Response Decisions for Projects in Project Portfolios Considering Objective Adjustments and Project Interdependencies. Kybernetes, 53(7), 2217–2246. https://doi.org/10.1108/k-09-2022-1344