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FINANCIAL RISK MANAGEMENT IN HIGH-RISK INDUSTRIAL COMPANIES: A QUALITATIVE STUDY ON THE MANUFACTURING AND ENERGY SECTORS

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ABSTRACT

The manufacturing and energy industries are major contributors to global economic growth but face complex challenges in managing financial risks due to fluctuations in raw material prices, exchange rate volatility, and regulatory changes. Although awareness of financial risk management is increasing, the implementation of risk mitigation strategies in high-risk industries still faces various obstacles, including a lack of integrated systems and low adoption of technology in risk analysis. Therefore, this study aims to explore financial risk management strategies implemented in the manufacturing and energy industries, highlighting key factors influencing the effectiveness of policy implementation. This study employs a qualitative descriptive approach through in-depth interviews with Chief Financial Officers (CFOs), Risk Management Officers, regulators from OJK/ESDM, financial analysts, and financial managers in high-risk industries. The findings indicate that the implementation of Enterprise Risk Management (ERM), hedging strategies, supplier diversification, and the adoption of technologies such as ERP and artificial intelligence (AI) effectively enhance companies' financial resilience. Furthermore, compliance with ISO 31000 and financial reporting transparency contribute to reducing uncertainty and improving financial stability. The implications of this study emphasize the importance of a technology-driven approach and regulatory compliance in enhancing the effectiveness of financial risk mitigation strategies, enabling companies to adapt to global market dynamics and sustain their operations.

Keywords: Enterprise Risk Management; Financial Risk Management; High-Risk Industries; Risk Mitigation Strategies

INTRODUCTION

The manufacturing and energy industries have a strategic role in supporting global economic growth. This sector contributes to job creation, increased investment, and strengthening the industrial structure in various countries. However, the ever-changing market dynamics pose complex challenges, especially in the financial aspect. Fluctuations in raw

material prices, changes in currency exchange rates, and regulatory uncertainty are the main factors that affect the financial stability of companies in this industry. Therefore, companies operating in this sector must have an effective financial risk management strategy in place to anticipate various possibilities that can negatively impact business operations.

In the energy industry, oil and gas prices are often highly volatile due to economic, political, and environmental factors. These fluctuations can have a direct impact on a company's financial planning, especially in terms of budgeting production costs and long-term investments. For example, the instability of world oil prices caused by geopolitical conflicts or changes in production policies by oil-producing countries can cause uncertainty in the financial projections of energy companies. This condition requires companies to implement financial risk mitigation strategies, such as hedging or diversifying energy portfolios. By doing so, companies can minimize the negative impact of price volatility on their financial balance and business sustainability.

On the other hand, the manufacturing industry also faces major challenges in the financial aspect due to changes in the global supply chain. Dependence on imported raw materials makes manufacturing companies vulnerable to changes in exchange rates and international trade policies. Additionally, disruptions in the supply chain, such as delays in delivery or scarcity of raw materials, can increase production costs and disrupt the stability of a company's cash flow. Another influential factor is trade regulations and export-import tariffs which often change in accordance with government policies. Therefore, manufacturing companies need to implement flexible financial management strategies in order to adapt to changing global economic conditions.

The importance of financial risk management in the manufacturing and energy industries cannot be ignored given that this sector is closely linked to external factors that are difficult to control. Changes in regulatory policies at the national and international levels can have a direct impact on the company's cost structure and investment strategy. In addition, the pressure from global market volatility demands that companies have a comprehensive financial monitoring system. With the right strategy, companies can maintain financial stability and increase competitiveness amid economic uncertainty. Therefore, research on financial risk management in high-risk industries is becoming increasingly relevant in helping companies develop more effective and sustainable mitigation strategies.

Although awareness of the importance of financial risk management in high-risk industries is increasing, the implementation of mitigation strategies still faces various obstacles. Many manufacturing and energy companies do not yet have an integrated and systematic system in managing financial risks, especially those related to exchange rate fluctuations and raw material price volatility. Without a structured system, financial decisions are often taken reactively, rather than based on accurate and measurable data. This makes companies more vulnerable to global economic instability that can have a direct impact on cash flows and capital structures. The absence of an effective mitigation strategy also results in companies experiencing uncertainty in long-term financial planning, which ultimately has the potential to disrupt operational sustainability.

In addition to the problem of systems that have not been integrated, dynamic regulatory changes are an additional challenge for companies in managing financial risks. Uncertainty in government policies, such as changes in tax rates, energy subsidies, as well as trade regulations, often creates instability in the cost structure of companies. This regulatory change not only affects the short-term financial aspect, but can also hinder investment decisions and business expansion in the long term. Companies that are unable to adapt to policy changes often experience a decrease in profitability due to unexpected increases in operating costs. Thus, regulatory uncertainty is an external factor that exacerbates the gap in the implementation of financial risk mitigation strategies in the manufacturing and energy sectors.

The low adoption of technology in financial risk analysis is also a factor that slows down the effectiveness of risk mitigation strategies in high-risk industrial companies. Although artificial intelligence (AI) and Big Data-based analytics technologies have been widely used in the global financial sector, there are still many manufacturing and energy companies that rely on manual systems in financial risk management. This conventional approach causes delays in monitoring and predicting risks, making it difficult for companies to make decisions quickly and accurately. In addition, the lack of investment in technology-based risk management systems shows that there is still a gap in companies' understanding of the urgency of using data in financial risk mitigation strategies. Therefore, further research is needed to explore how risk management strategies can be improved through a more integrated and technology-based approach to address the challenges that exist in the manufacturing and energy industries.

Financial risk management in high-risk industries demands an approach that is not only reactive, but also based on systematic theories and methodologies. Enterprise Risk Management (ERM) has been proposed as a framework capable of integrating various dimensions of financial risk to improve the resilience of companies to external shocks (Fraser & Simkins, 2010). This approach emphasizes the importance of risk identification, impact assessment, and formulation of data-driven mitigation strategies to minimize potential financial losses. By using ERM, companies can be more proactive in managing financial risks and improving their operational stability. However, the implementation of ERM in many companies still faces various obstacles, such as a lack of competent human resources and limited investment in risk analytics supporting technology.

In addition to ERM, the Risk-Adjusted Return on Capital (RAROC) theory provides a broader perspective in assessing the relationship between risk and the rate of return on capital in investment decisions (James, 2014). This approach emphasizes that every financial decision must consider rewards and risks in a balanced manner so that the company remains in a healthy capital structure. In the context of the manufacturing and energy industries, the implementation of RAROC can help companies determine more efficient financing strategies and mitigate potential losses due to market volatility. However, many companies have not adopted this approach thoroughly, so capital and risk management is still carried out with conventional methods that are less effective in dealing with global market dynamics. A lack of understanding of this concept leads to an imbalance between risk exposure and return rates, which can ultimately weaken a company's competitiveness in high-risk sectors.

From a regulatory perspective, the international standard ISO 31000 emphasizes that risk mitigation strategies must be data-driven and implemented across the organization (ISO, 2018). This standard underscores the importance of a structured and documented framework in the risk management process, so that companies can more effectively anticipate and respond to various uncertainties that arise. ISO 31000 also emphasizes that risk management is not only the responsibility of the finance division, but must involve all business units within the company. However, the implementation of this standard is still limited to large companies, while many small and medium-sized companies have not adopted it optimally. Barriers to implementation are generally due to a lack of understanding of the long-term benefits of implementing these standards as well as limitations in supporting infrastructure.

The ineffectiveness in the implementation of ERM, RAROC, and ISO 31000 shows that there is still a gap between theory and practice in financial risk management in the manufacturing and energy industries. While theory and regulation have emphasized the importance of a data-driven and systematic approach, the reality on the ground shows that there are still many companies that have not fully integrated this concept into their financial policies. The lack of adoption of theory-based strategies can increase a company's exposure to systemic risks, which can negatively impact financial performance in the long term. Therefore, more research is needed to explore how these concepts can be implemented more effectively in high-

risk industries. With a deeper understanding of the theories and standards that have been developed, companies are expected to optimize risk management strategies to improve the resilience and sustainability of their businesses.

Research on financial risk management in high-risk industries has increasing urgency in line with global uncertainty and changes in economic policies. Manufacturing and energy companies operate in an environment that is heavily influenced by fluctuations in raw material prices, currency exchange rates, and regulatory policies that often change in a short period of time. Without an adaptive, data-driven risk mitigation strategy, companies can experience financial instability that leads to decreased performance and even bankruptcy. Therefore, research is needed that is able to dig deeper into how risk management strategies can be optimized to improve the financial resilience of companies. With a better understanding of risks and mitigation strategies, companies can develop more resilient financial policies in the face of market volatility.

This research also has important value in identifying best practices in the implementation of financial risk management. In many cases, companies operating in the manufacturing and energy sectors face challenges in adopting Enterprise Risk Management (ERM) as well as international standards such as ISO 31000. Lack of understanding and limitations in technology are often obstacles to the implementation of effective risk mitigation strategies. With this research, stakeholders, including financial managers, regulators, and investors, can gain insights into a more optimal approach to managing financial risk. In addition, the findings of this study can be used to formulate more comprehensive policies in improving the financial resilience of companies.

In addition to providing practical benefits for companies, this research also has a significant academic contribution in the development of literature related to financial risk management. This study can fill the gap in previous research by providing evidence-based analysis of challenges and solutions in the implementation of risk mitigation strategies in high-risk industries. With an in-depth qualitative approach, this study can reveal factors that have been underpaid in quantitative studies. The results of this study can also be a reference for further research in exploring how companies can be more adaptive to global market dynamics. Thus, this research not only contributes to industry practice but also enriches academic understanding in the field of risk-based financial management.

The relevance of this research is even higher given its direct impact on financial resilience and business sustainability in the manufacturing and energy industries. The company's inability to manage financial risks can lead to large financial losses, loss of investor confidence, and imbalances in the capital structure. Therefore, this study can be a guide for decision-makers in designing more effective risk mitigation strategies. With a deeper understanding of financial risk management, companies can be better prepared to face financial crises, regulatory changes, and unexpected market disruptions. Therefore, this research has strategic value in helping companies improve their competitiveness and operational sustainability in the midst of global uncertainty.

This research has a high urgency because it can fill the gap in academic studies related to financial risk management in high-risk industries. Most previous studies have used a more quantitative approach in analyzing financial risk, while a qualitative approach that explores direct perspectives from stakeholders is still limited. In addition, previous research has focused more on specific risks such as exchange rate volatility or the impact of monetary policy, without considering a more holistic and adaptive strategy-based approach to risk management (Kaplan & Mikes, 2012). Thus, this study aims to provide a deeper understanding of how manufacturing and energy industry companies identify, manage, and mitigate financial risks in a broader context. Through this exploration, this research can enrich the academic literature and provide a new perspective in the implementation of risk management in high-risk industrial sectors.

In addition to filling research gaps, this research is also relevant to contemporary issues that are developing in the world of business and the global economy. In recent years, economic uncertainty due to the trade war, the global pandemic, and changes in energy policy have put great pressure on the manufacturing and energy sectors (Crouhy et al., 2020). The price volatility of major commodities such as oil, gas, and industrial metals is increasing, which has a direct impact on the company's financial planning. In addition, stricter regulatory changes in the energy industry related to sustainability and green energy transition also pose new challenges in financial risk mitigation strategies (ISO, 2018). Therefore, this research provides relevant insights into how companies can adapt to global changes and develop more resilient risk mitigation policies in the face of future challenges.

This research also has a significant contribution to legal policies and practices in financial risk management. Increasingly complex regulations in the manufacturing and energy industries require companies to be more proactive in formulating financial policies that are not only profit-oriented, but also comply with international standards such as ISO 31000 as well as regulations from the Financial Services Authority (OJK) and the Ministry of Energy and Mineral Resources (EMR). By identifying the key factors that affect the effectiveness of the implementation of financial risk management policies, this study can provide recommendations that can be used by regulators and policymakers in designing more adaptive regulations that support industry stability. In addition, the study also contributes to industry players understanding how best practices in financial risk mitigation can be applied to improve the competitiveness and sustainability of their businesses amid global economic uncertainty.

Based on the background and urgency of the research that has been described, there are several problem formulations that are the focus of this research. First, what are the strategies used by high-risk industrial companies in identifying, managing, and mitigating financial risks that can affect operational stability and business sustainability? This question highlights how companies understand and handle financial risks such as fluctuations in raw material prices, exchange rate volatility, changes in regulatory policies, and investment risks that can impact financial performance. Second, what are the key factors that affect the effectiveness of the implementation of financial risk management policies in the manufacturing and energy industries, and what are the best approaches that can be applied to improve the financial resilience of companies? The main focus in this question is on the obstacles, challenges, and best practices in the implementation of financial risk management, including the role of technology, regulation, and managerial capabilities in dealing with economic and financial uncertainty. By answering these questions, this research is expected to provide deeper insights and applicable recommendations in an effort to strengthen financial risk management in high-risk industries.

RESEARCH METHODS

This study uses a qualitative research design with a descriptive approach to explore financial risk management strategies in high-risk industries, especially the manufacturing and energy sectors. This approach was chosen to gain an in-depth understanding of risk mitigation practices implemented by companies in the face of financial uncertainty (Creswell, 2014). This research method allows direct exploration of the experiences and views of informants who have direct involvement in financial risk management. The data was collected through in-depth interviews with key informants consisting of the Chief Financial Officer (CFO), Risk Management Officer, regulators from the OJK/ESDM, financial analysts, and financial managers or heads of treasury sections. Each interview was analyzed using a thematic analysis

approach, which allowed the identification of key patterns in a company's financial risk management (Braun & Clarke, 2006).

The main instrument in this study is a semi-structured interview guide, which is designed to explore the perspective of informants regarding risk identification, mitigation strategies, as well as factors that affect the effectiveness of financial risk management policies. The interview guide was developed based on a literature review as well as financial risk management theories that have been put forward in previous research (Brigham & Ehrhardt, 2019). Each interview is recorded with the consent of the informant to ensure the accuracy of the transcription and analysis of the data. In addition, secondary data such as financial statements, applicable regulations, and company policy documents are also analyzed to strengthen the research findings. The validity of the data is maintained through source triangulation, where information from various informants is compared to ensure the consistency and credibility of the research results (Patton, 2002).

The research procedure begins with the identification and selection of informants based on purposive sampling criteria, which allows the selection of individuals with relevant experience and knowledge in the field of financial risk management. After the interview stage is completed, transcription is carried out and the data is systematically analyzed to identify the main themes that emerge in the study. All data were analyzed qualitatively using coding and categorization techniques, as proposed by Miles, Huberman, and Saldaña (2014). The findings that have been analyzed are then compiled in the form of a narrative to describe how financial risk management strategies are applied in high-risk industrial companies. With this approach, the study provides deeper insights into how manufacturing and energy companies are facing financial challenges amid market volatility and regulatory uncertainty.

RESULTS AND DISCUSSION

Research Results

Financial risk management in high-risk industrial companies demands a systematic and measurable strategy. Based on interviews with informants, it was found that the Enterprise Risk Management (ERM) approach has been applied in various manufacturing and energy companies to identify and manage financial risks. The main focus in managing this risk includes volatility in raw material prices, exchange rate uncertainty, and changes in regulatory policy. The mitigation strategies used include stress testing, real-time monitoring of financial data, and evaluation of possible impacts arising from external changes. According to the Chief Financial Officer (CFO) of one of the manufacturing companies, careful risk planning is able to minimize the potential for financial instability due to external factors that are difficult to control.

In the management of exchange rate risk, the company implements a hedging strategy, which is carried out through financial instruments such as futures contracts and foreign currency options. In addition, the stability of raw material prices is maintained with long-term contracts with major suppliers, as well as diversification of supply sources to reduce dependence on one supplier. The success of this strategy depends on the quality of the data as well as the accuracy of the analysis carried out by the financial risk management team. According to the Risk Management Officer, technology-based planning, such as the use of Enterprise Resource Planning (ERP) and artificial intelligence (AI)-based systems, is increasingly being adopted to improve the accuracy of calculations and the effectiveness of mitigation strategies. The implementation of this technology allows data-driven decision-making to anticipate market changes more quickly and accurately.

Regulations that continue to change are one of the external factors that affect financial risk management policies. Based on interviews with regulatory officials from the OJK and the Ministry of Energy and Mineral Resources (EMR), it was found that changes in tax rates, monetary policies, and energy tax regulations have a direct impact on the financial condition of companies in the manufacturing and energy industries. This uncertainty requires companies to be more flexible in adjusting their financial risk mitigation strategies. However, the challenges faced are not only from regulations, but also from the lack of transparency in financial reporting, which is one of the main obstacles to the implementation of effective risk management policies. Therefore, the adoption of international risk management standards such as ISO 31000 is recommended to improve compliance and effectiveness in financial risk management.

In the context of external evaluation, Financial Analysts and Risk Management Consultants identify some of the main causes of financial risk management failures in high-risk industries. One of the most influential factors is the lack of understanding of systemic risks and global markets, which causes companies to be unprepared to deal with global economic changes, such as fluctuations in commodity prices and international macroeconomic policies. In addition, limitations in the use of financial analytics technology are also still an obstacle in many companies. Companies that succeed in financial risk management tend to apply an integrated risk management approach, which involves various units in the organization to work collaboratively in identifying and managing risks.

Financial risk management in the operational aspect also plays a very important role in maintaining the sustainability of the company's business. The Finance Manager or Head of Treasury revealed that the strategies implemented in cash flow management include cash flow forecasting and maintaining a liquidity buffer. Credit risk from customers and suppliers is minimized with strict due diligence and the use of mitigation instruments such as credit insurance and factoring. To maintain long-term financial stability, the company implements an investment diversification strategy, monitors the debt-to-equity ratio, and conducts periodic evaluations of profitability levels. With this approach, companies can be better prepared to face unexpected economic challenges and avoid liquidity crises.

Based on the findings of this study, it can be concluded that the implementation of financial risk management strategies in the manufacturing and energy industries is influenced by various factors, both internal and external. Internal factors include risk management systems, human resource readiness, and the adoption of financial analytics technology, while external factors include fluctuations in commodity prices, changes in regulatory policies, and global market dynamics. To improve the effectiveness of risk management, companies are advised to adopt technology-based strategies, implement ISO 31000 standards, and build a more integrated risk monitoring system. Thus, companies can increase financial resilience and ensure long-term business sustainability.

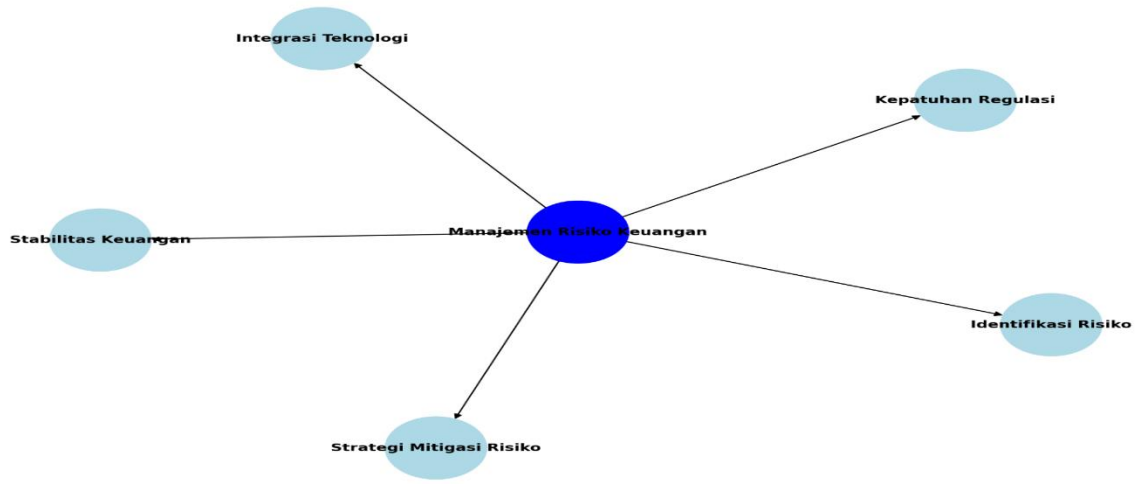
Table 1. Financial Risk Management Strategies in High-Risk Industries

Risk Factors	Mitigation Strategies	Supporting Technology	Key Challenges
Fluctuations in raw material prices	Long-term contracts with suppliers, diversification of raw material sources	ERP, AI-based forecasting	Global price uncertainty
Exchange rate volatility	Hedging through futures contracts and foreign currency options	AI-based financial software	Changes in monetary policy
Regulatory risks	Compliance with international standards (ISO 31000)	Automated financial reporting system	Government policy uncertainty
Investment risks	RAROC evaluation, sensitivity analysis	Monte Carlo Simulation	Volatile market projections
Cash flow risk	Cash flow forecasting, liquidity buffer	Data analytics for liquidity prediction	Late customer payments

The table above shows the key strategies for managing different types of financial risks, with the supporting technologies used and the challenges faced. The successful implementation of this strategy depends on the company's ability to integrate risk management systems with more sophisticated financial data analysis.

In addition, in this study, a conceptual framework for Financial Risk Management in High-Risk Industries was formed. This diagram will integrate key elements such as Risk Identification, Risk Mitigation Strategies, Financial Stability, Regulatory Compliance, and Technology Integration, according to the results of the research that has been conducted.

Chart 1. Financial Risk Management Conceptual Framework in High-Risk Industries



The conceptual framework chart above illustrates the relationship between the key elements in financial risk management in high-risk industries, particularly the manufacturing and energy sectors. Here is an explanation of each element in the conceptual framework:

1. Risk Identification
   This element includes the process of identifying and mapping financial risks that have the potential to affect the stability of the company. The main risks identified in this study include fluctuations in raw material prices, exchange rate volatility, regulatory changes, credit risk, and cash flow risk. This identification process is supported by the implementation of Enterprise Risk Management (ERM) and financial data-based analysis.
2. Risk Mitigation Strategies
   Once the risks are identified, the next step is the implementation of appropriate mitigation strategies. Based on the findings of the study, mitigation strategies include hedging to reduce the impact of exchange rate volatility, long-term contracts with suppliers for raw material price stability, and compliance with ISO 31000 standards to improve regulatory resilience. This strategy was developed based on the Risk-Adjusted Return on Capital (RAROC) approach as well as sensitivity analysis and Monte Carlo simulations to evaluate the impact of risks on the company's financial condition.
3. Financial Stability
   Financial stability is the main goal of implementing financial risk management. By implementing effective mitigation strategies, companies can ensure that existing risks do not interfere with cash flow and business profitability. Factors that affect financial stability include liquidity management, investment diversification strategies, and debt to equity ratio management. The success of financial stability depends largely on the quality of data-driven decision-making and the implementation of policies that are responsive to market changes.
4. Regulatory Compliance
   Changes in government policies and financial regulations are major challenges in the manufacturing and energy industries. Therefore, regulatory compliance is an integral part of a risk management strategy. In this study, it was found that companies that are more proactive in complying with international standards such as ISO 31000 and adopting transparent financial reporting systems have higher resilience to regulatory changes. With good compliance, companies can reduce the risk of legal sanctions and ensure the sustainability of their operations.
5. Technological Integration
   Technology plays a crucial role in supporting the effectiveness of financial risk management. Based on the results of the interviews, companies that adopt ERP (Enterprise Resource Planning), AI-based software for financial analytics, and big data-based risk monitoring systems are able to manage financial risks more effectively. This technology helps in predicting market volatility, monitoring cash flow in real-time, and analyzing risk scenarios automatically. In the long term, the integration of this technology is a key factor in creating a more adaptive and data-driven mitigation strategy.

The conceptual framework developed in this study is in line with several previous theories and research on financial risk management. Some of the relevant research includes:

1) Financial Risk Management Theory by Smith et al. (1990) which states that financial risk mitigation strategies must involve a combination approach of operational risk management, regulation, and diversified investment strategies.
2) A study by Kaplan and Mikes (2012) on Enterprise Risk Management (ERM) which emphasizes the importance of a holistic approach in financial risk management in industrial companies.

3) Research by Brigham and Ehrhardt (2019) in the book *Financial Management: Theory and Practice*, which highlights the importance of using technology in supporting data-driven financial decisions to improve the effectiveness of risk mitigation.

The conceptual framework developed in this study also reflects the latest trends in financial risk management, especially in the use of AI-based financial analytics technology and big data, which has been widely discussed in recent studies on financial risk analytics. Thus, this research not only provides new insights into financial risk management strategies in the manufacturing and energy industries, but also enriches the understanding of technology-based risk management approaches that are increasingly evolving in the digital era.

Discussion

The findings of the study relate to financial risk management in high-risk industrial firms, particularly the manufacturing and energy sectors, and how they can address previously identified gaps. One of the main gaps is the lack of an integrated system for managing financial risks, especially those related to exchange rate fluctuations and volatility in raw material prices. The findings of the study show that the implementation of Enterprise Risk Management (ERM) can be an effective solution in identifying and managing these risks holistically. ERM allows companies to integrate different types of financial and operational risks into one comprehensive framework, making it easier to make more informed and data-driven decisions. This is in line with the views of Fraser and Simkins (2010) who emphasized the importance of an integrated approach in risk management to improve the resilience of companies to external shocks.

Additionally, the study identifies that the adoption of technologies, such as Enterprise Resource Planning (ERP) systems and artificial intelligence (AI)-based analytics, can improve accuracy in monitoring and predicting financial risks. The use of this technology allows companies to conduct data analysis in real-time, so that they can respond to market changes more quickly and effectively. However, there are still many companies that have not utilized this technology optimally, resulting in delays in decision-making and increased exposure to financial risks. Ghosh (2021) emphasized that the integration of technology in risk management is a key factor in increasing the effectiveness of risk mitigation strategies in high-risk industries.

Other findings from the study suggest that regulatory uncertainty poses a significant challenge in the long-term financial planning of manufacturing and energy companies. Changes in government policies, such as tax rates and energy subsidies, often create instability in the cost structure of companies. To address this, companies are advised to comply with international standards such as ISO 31000, which provide a framework for effective risk management and be adaptive to regulatory changes. The implementation of this standard can help companies in adjusting their financial strategies in accordance with the prevailing policy dynamics, as recommended by ISO (2018).

In addition, the study found that the lack of transparency in financial reporting and non-compliance with accounting standards are obstacles to the implementation of effective risk management policies. Companies that do not have an adequate risk management system tend to be more vulnerable to failure to comply with established regulations. Kaplan and Mikes (2012) emphasized that the integration between the finance and operational divisions, as well as the adoption of financial analytics technology, can improve the effectiveness of risk mitigation strategies and ensure compliance with applicable regulations.

Finally, this study highlights the importance of collaboration between companies and financial institutions in obtaining more flexible financing schemes, such as green financing or blended finance, for sustainable projects. This approach not only helps companies manage financial risks, but also supports environmental and social sustainability initiatives. Brigham and Ehrhardt (2019) stated that diversification of funding sources and cooperation with

financial institutions can improve the financial stability of companies in the midst of global economic uncertainty.

Overall, the findings of this study make a significant contribution in addressing existing gaps in financial risk management practices in the manufacturing and energy industries. By adopting an ERM approach, leveraging advanced technology, complying with international standards, improving financial reporting transparency, and collaborating with financial institutions, companies can improve the effectiveness of their risk mitigation strategies. This will ultimately strengthen the company's financial resilience and operational sustainability amid increasingly complex market dynamics.

CONCLUSION

The study concludes that financial risk management in the manufacturing and energy industries requires a more structured, technology-based, and adaptive approach to regulatory changes. The findings show that the implementation of Enterprise Risk Management (ERM), hedging strategies, supplier diversification, and the adoption of technologies such as ERP and artificial intelligence (AI) can increase the effectiveness of financial risk mitigation. In addition, compliance with ISO 31000 and financial reporting transparency have been proven to contribute to reducing uncertainty as well as improving the financial stability of companies. External factors such as fluctuations in raw material prices, exchange rate volatility, and government policy dynamics remain challenges that must be managed with a more comprehensive strategy. Therefore, the implementation of a data-based risk management system and cooperation with financial institutions is an important step in improving the company's financial resilience in the long term.

The findings in this study provide benefits both theoretically and practically in the field of strategic and financial management. Theoretically, this study reinforces the concept that the integration of technology-based risk mitigation strategies and compliance with international regulations can improve the effectiveness of risk management in high-risk industrial sectors. In practical terms, these findings provide guidance for companies in developing more adaptive and data-driven financial risk management policies, so as to improve the competitiveness and sustainability of their businesses. However, this study has limitations, especially in the limited scope of the sample in the manufacturing and energy industries, so it does not cover other high-risk industries. In addition, the qualitative approach used provides a deep understanding, but lacks in measuring the quantitative impact of the applied strategy. Therefore, future research can expand the scope of the industry as well as use quantitative methods to measure the effectiveness of risk mitigation strategies more empirically and thoroughly.

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