FINANCIAL RISK MANAGEMENT IN THE ERA OF ECONOMIC UNCERTAINTY: LESSONS FROM GLOBAL CRISIS

MANAJEMEN RISIKO KEUANGAN DI ERA KETIDAKPASTIAN EKONOMI: PELAJARAN DARI KRISIS GLOBAL

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ABSTRACT
Financial Risk Management has experienced significant evolution in the face of economic uncertainty resulting from various global crises, including the 2008 Financial Crisis and the COVID-19 Pandemic. This research aims to analyze how FRM strategies develop over time using a Systematic Literature Review (SLR) approach. Through comprehensive literature analysis, this research identifies patterns of change in risk management approaches, the impact of regulations, and the industrial sector's response to the crisis. The findings show that there is a shift from traditional models based on historical data towards more adaptive technology-based strategies, including the use of AI and Big Data. Additionally, regulations such as Basel III and the Dodd-Frank Act have strengthened the resilience of the financial system. This research provides important insights for practitioners and policy makers in designing more effective risk mitigation strategies in an era of global economic uncertainty.
Keywords: Financial Risk Management, Economic Uncertainty, Global Crisis, Basel III, Dodd-Frank Act, AI, Big Data, Financial Systems, Risk Mitigation Strategies.

ABSTRAK
Manajemen Risiko Keuangan telah mengalami evolusi signifikan dalam menghadapi ketidakpastian ekonomi yang diakibatkan oleh berbagai krisis global, termasuk Krisis Keuangan 2008 dan Pandemi COVID-19. Penelitian ini bertujuan untuk menganalisis bagaimana strategi FRM berkembang dari waktu ke waktu dengan menggunakan pendekatan Systematic Literature Review (SLR). Melalui analisis literatur yang komprehensif, penelitian ini mengidentifikasi pola perubahan dalam pendekatan manajemen risiko, dampak regulasi, serta respons sektor industri terhadap krisis. Temuan menunjukkan bahwa terdapat pergeseran dari model tradisional yang berbasis data historis menuju strategi berbasis teknologi yang lebih adaptif, termasuk penggunaan AI dan Big Data. Selain itu, regulasi seperti Basel III dan Dodd-Frank Act telah memperkuat ketahanan sistem keuangan. Penelitian ini memberikan wawasan penting bagi praktisi dan pembuat kebijakan dalam merancang strategi mitigasi risiko yang lebih efektif di era ketidakpastian ekonomi global.
Kata Kunci: Manajemen Risiko Keuangan, Ketidakpastian Ekonomi, Krisis Global, Basel III, Dodd-Frank Act, AI, Big Data, Sistem Keuangan, Strategi Mitigasi Risiko.

1. INTRODUCTION

Economic uncertainty has emerged as a significant factor influencing global financial stability, particularly in the wake of recent crises. The 2008 global financial crisis (GFC) and the COVID-19 pandemic have both underscored the vulnerabilities within financial systems, prompting a reevaluation of Financial Risk Management (FRM) practices. The GFC revealed critical weaknesses in credit and liquidity management, leading to the collapse of major financial institutions like Lehman Brothers and necessitating government interventions, including the implementation of stringent regulations such as Basel III and the Dodd-Frank Act to enhance the resilience of the banking sector (Ito, 2020; So et al., 2021; Costa et al., 2022).

The COVID-19 pandemic has further tested the robustness of financial systems globally. It has caused significant disruptions in capital markets and resulted in prolonged low interest

rates and heightened bankruptcy risks across various sectors (Konovalova & Abuzov, 2023; Tan et al., 2022). The pandemic has accelerated the integration of advanced technologies, such as Artificial Intelligence (AI) and Big Data, into financial risk management practices, enabling more sophisticated risk analysis and mitigation strategies (Syahwildan, 2023; Sulistiyowati & Dessyarti, 2022). For instance, studies have shown that the interconnectedness of financial networks during the pandemic has been crucial in understanding systemic risks and contagion effects across different markets (Popkova & Sergi, 2021; Adegboye et al., 2020).

In addition to these crises, geopolitical tensions, including the US-China trade war and the Russia-Ukraine conflict, have exacerbated economic uncertainties, further complicating the risk landscape (Liu et al., 2021; Xiang et al., 2022). Rising global inflation and fluctuations in commodity prices have necessitated a more nuanced approach to financial risk management, emphasizing the importance of portfolio diversification and adaptive strategies to mitigate specific regional or sectoral risks (Maidani et al., 2023; Milašinović et al., 2022). As the financial environment continues to evolve, it is imperative to draw lessons from past crises to inform future FRM strategies, ensuring that financial institutions can effectively navigate the complexities of an increasingly volatile global economy (Rahmawati et al., 2022; Adel, 2024).

In conclusion, the evolution of Financial Risk Management in response to economic crises highlights the need for continuous adaptation and innovation. The insights gained from the GFC and the COVID-19 pandemic can serve as valuable lessons for enhancing the resilience of financial systems in the face of ongoing and future challenges. The growing global economic crisis highlights the importance of Financial Risk Management in maintaining financial stability. However, various crises have shown that risk management strategies that are effective in one period may not be relevant in different crisis conditions. For example, the approach used during the 2008 financial crisis focused on banking regulation and increasing reserve capital, while the COVID-19 pandemic calls for more flexible and technology-based strategies. Given the different characteristics of economic crises, critical questions arise: **How have financial risk management approaches evolved during the period of global economic crisis?** Although there are many studies discussing financial risk management in the context of a particular crisis, there are still some lack of systematic reviews which compares how FRM strategies have evolved over time in response to various forms of global economic crisis.

Many previous studies have focused on the specific impact of a crisis on certain financial sectors, but there has been no approach that comprehensively analyzes these changes in risk management strategies from one crisis to another. Given this research gap, a systematic review of the existing literature is needed to understand how financial risk management strategies have evolved and how past approaches can provide insights for current policy and practice. This research aims to examine how financial risk management strategies develop in response to economic uncertainty from various global crises. In addition, this research also analyzes changes in regulations and policies related to Financial Risk Management after the major financial crisis. By exploring various approaches applied in financial risk management, this research seeks to identify new trends in risk mitigation, including the role of technology in facing challenges in the modern era. It is hoped that the results of this research will provide insight for practitioners and regulators in improving financial risk mitigation strategies in the future, so as to create a financial system that is more resilient and adaptive to changes in the global economy.

In an effort to answer the problems raised in this research, the main research questions that will be explored are: How has financial risk management evolved in response to economic uncertainty during global crises?. This question will be explored by comparing different FRM strategies implemented during different periods of the financial crisis, starting from The 2008 Financial Crisis, the European Debt Crisis, the COVID-19 Pandemic, and the current global economic uncertainty.

This research has significant contributions for various parties. For academics, this research contributes to academic literature regarding the evolution of Financial Risk Management in the face of economic uncertainty and fills research gaps by comparing various FRM approaches over time.

For financial practitioners and risk managers, this research provides practical insight into financial risk mitigation strategies that have proven effective in dealing with economic crises. Additionally, this research identifies new trends in risk management that can be implemented by banking, investment companies and other financial sectors. Regulators and policy makers will also benefit from this research, because it helps in formulating policies and regulations that are more adaptive to changing global economic dynamics. This research also highlights the role of financial regulations such as Basel III, IFRS 9, and the Dodd-Frank Act in increasing the stability of the global financial system. For investors and corporations, this research provides insight into understanding how companies manage financial risk in an era of uncertainty. In addition, this research contributes to the development of financial planning strategies that are more resilient to global economic shocks. Overall, this research aims to provide a more comprehensive picture of how Financial Risk Management has evolved in response to various global economic challenges. By understanding this evolution, stakeholders can design more effective strategies to deal with future financial risks.

2. METHODS
2.1. Research Design

This research uses a Systematic Literature Review (SLR) approach to identify, analyze and synthesize various Financial Risk Management (FRM) strategies that have developed in response to economic uncertainty due to the global crisis. The SLR approach was chosen because this methodology allows the identification of patterns of FRM evolution based on empirical evidence documented in the academic literature. In the process, this research will follow the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, which consists of four main stages:

1. Identification, namely collecting literature from various academic databases with relevant keywords.
2. Screening, namely filtering articles based on predetermined inclusion and exclusion criteria.
3. Eligibility, namely evaluating the quality of articles using critical appraisal tools (Critical Appraisal).
4. Inclusion, namely selecting the final article that will be used for data analysis and synthesis.

This approach ensures that research is carried out systematically and transparently, so that it can produce reliable findings and make a significant contribution to the related literature.

2.2. Databases and Search Strategies

To obtain broad and high-quality literature coverage, this research uses several major academic databases, namely:

- Scopus, as one of the largest databases covering high quality journals in various scientific disciplines.
- Web of Science (WoS), which presents peer-reviewed journals from various fields, including economics and finance.
- Google Scholar, to find publications that may not be indexed in other databases, including working papers and relevant studies from academic institutions.
- JSTOR, as a source of academic literature that includes historical studies of financial crises.

- SSRN (Social Science Research Network), which includes publications related to finance and economics, especially working papers from academics and industry professionals.

The search process is carried out using a combination of keywords that have been compiled using Boolean Logic techniques to increase the relevance of search results. The main keywords used include:

- "financial risk management" AND "economic uncertainty"
- "global crisis" AND "financial risk mitigation"
- "evolution of risk management" AND "banking sector"
- "regulatory responses to financial crises"

The search was conducted by adapting terms in various combinations to cover a wide range of literature discussing the topic from different perspectives.

2.3. Inclusion and Exclusion Criteria

To ensure that only relevant and high-quality literature was analyzed, this study applied the following inclusion and exclusion criteria:

Inclusion Criteria:

- Peer-reviewed articles published in academic journals.
- Case studies and empirical analysis discussing Financial Risk Management strategies during the global crisis.
- Journals ranked Q1 and Q2 based on Scimago Journal Ranking (SJR) to ensure high research quality.
- Articles published in the time period 2000–2024 to cover various major economic crises, including the 2008 Financial Crisis, European Debt Crisis, COVID-19 Pandemic, and current global economic uncertainty.
- Studies that discuss regulatory changes in Financial Risk Management, such as Basel II and III, IFRS 9, Dodd-Frank Act, and related monetary policies.

Exclusion Criteria:

- Articles that only discuss risk management in general without highlighting the impact of the economic crisis.
- Publications that are not based on academic research, such as opinion editorials, blogs, or non-peer-reviewed reports.
- Studies that only focus on technical aspects without considering the macroeconomic context.
- Literature in a language other than English, unless it has an accessible translation.

By applying these criteria, the research ensures that only quality and relevant articles are included in the analysis, thereby providing more accurate insight into the evolution of Financial Risk Management in various global crises.

2.4. Data Extraction and Synthesis

After the literature selection process is complete, the data will be extracted and classified based on several main variables to understand the evolution pattern of Financial Risk Management. Data will be categorized as follows:

1. Crisis Period:
   - 2008 Financial Crisis
   - European Debt Crisis
   - COVID-19 Pandemic
   - Energy Crisis and Global Inflation
2. Sectors Affected:
   - Banking and financial institutions
   - Corporations and capital markets

- ○ Government and fiscal policy
3. Financial Risk Management Strategy Used:
    - ○ Credit and liquidity risk management
    - ○ Use of technology in risk mitigation (AI, Big Data, Blockchain)
    - ○ Banking regulations and policies implemented after the crisis
4. Policy Implications and Regulatory Reform:
    - ○ Evaluation of the effectiveness of Basel III in strengthening financial system resilience
    - ○ The role of central banks and monetary policy in mitigating systemic risk
    - ○ Changes in company strategy in dealing with financial risks after the crisis

The classified data will be synthesized using thematic analysis methods to identify main patterns and trends in the evolution of Financial Risk Management.

2.5. Quality Assessment (Quality Assessment)

To ensure the validity and credibility of the literature sources used, this research applies the Critical Appraisal method using the CASP (Critical Appraisal Skills Program) checklist. This method allows researchers to evaluate:

- Clarity of research objectives in each article.
- Methodology used in the analyzed studies.
- Validity and reliability of the data presented in the article.
- Relevance of findings to the main research question.

Only articles that meet quality standards will be included in the final analysis.

2.6. Justification of Method

The choice of the Systematic Literature Review (SLR) method with the PRISMA framework provides advantages in ensuring transparency and research replication. By using this approach, research can provide a comprehensive overview of how Financial Risk Management strategies have developed over time in the face of global economic uncertainty.

3. RESULTS
3.1. Descriptive Analysis

Descriptive analysis was carried out to provide a general overview of the number and distribution of studies that have been analyzed, as well as trends in changes in Financial Risk Management (FRM) strategies during various periods of economic crisis.

1. Number of Analyzed Studies by Crisis Period
    - ○ 2008 Financial Crisis: A large body of research focuses on the impact of the subprime mortgage crisis on the global financial system and regulatory responses, such as Basel III and the Dodd-Frank Act.
    - ○ European Debt Crisis (2010-2012): Studies in this period explore systemic risks resulting from fiscal imbalances in European countries and monetary tightening policies.
    - ○ COVID-19 Pandemi (2020-2022): Research focuses on the resilience of financial systems to sudden economic shocks and the application of digital technology in risk mitigation.
    - ○ Energy Crisis and Global Inflation (2022-2024): Recent studies highlight the impact of geopolitics on economic uncertainty, increased market volatility, and the role of monetary and fiscal policy in maintaining financial stability.
2. Trends in Changes in FRM Strategy from Year to Year
    - ○ Pre-Crisis Era (2000-2007): The FRM approach emphasizes traditional models based on historical data and fundamental analysis without considering extreme risk scenarios.

- ○ Post-2008 Crisis: The emergence of strict regulations such as Basel III and the increased use of stress testing in banking risk management.
- ○ Post-European Debt Crisis: Focus on sovereign risk management and the role of fiscal policy in economic stabilization.
- ○ The Digital Era and the COVID-19 Pandemic: Accelerating the use of AI and Big Data-based technology in real-time financial risk detection.
- ○ Era of Geopolitical Uncertainty (2022-2024): FRM adaptation to energy market uncertainty, global inflation, and supply chain disruption.

3.2. Thematic Findings

Thematic analysis was carried out to identify the main patterns in the evolution of Financial Risk Management based on the results of the literature review.

1. Changes in the Financial Risk Management Approach
   - From Traditional Models to Technology-Based Strategies:
     Prior to 2010, FRM strategies relied more on conventional quantitative methods, such as Value-at-Risk (VaR) and regression analysis. However, as technology develops, many financial institutions are starting to adopt approaches based on AI, machine learning and Big Data to identify and mitigate risks more quickly and accurately.
   - Application of Stress Testing and Predictive Analytics:
     After the 2008 crisis, global regulations began to require banks to carry out stress testing to test the resilience of capital to various extreme economic scenarios. This was followed by the development of predictive analytics which enables proactive risk detection.

2. Impact of Regulations on Financial Risk Management
   - Basel III and Banking Regulatory Reform:
     Basel III introduced strict standards regarding minimum capital, leverage ratio and liquidity, requiring banks to have greater financial resilience to market volatility.
   - Dodd-Frank Act and Oversight of Financial Institutions:
     This law gives regulators greater authority to monitor banking activities to reduce systemic risk.
   - IFRS 9 and Increasing Accountability in Credit Risk Management:
     The implementation of IFRS 9 replaces the incurred loss method with expected credit loss (ECL), which allows financial institutions to anticipate potential defaults earlier.

3. Industrial Sector Response to the Global Crisis
   - Banking:
     - ○ Increasing capital buffers in accordance with Basel III regulations to strengthen financial resilience.
     - ○ Adopt AI-based digital risk management to predict the possibility of credit default.
   - Investment and Capital Markets:
     - ○ Enhance a more flexible portfolio strategy with diversification across sectors and countries.
     - ○ Increased use of derivative instruments to mitigate market volatility risk.
   - Multinational Companies:
     - ○ Implement hedging strategies against fluctuations in exchange rates and commodity prices.
     - ○ Strengthening supply chain resilience by diversifying sources of raw materials and suppliers to reduce the risk of global disruption.

4. DISCUSSION

This section discusses the evolution of Financial Risk Management (FRM) in various crisis eras, as well as the implications for financial practice and regulation. This discussion also compares the findings of this study with previous research to identify new contributions.

4.1. Era Before 2008: Conventional Strategies in Financial Risk Management

Before the 2008 global financial crisis, financial risk management (FRM) was characterized by conventional strategies that relied heavily on standard quantitative models, notably Value at Risk (VaR) and simple stress testing methodologies. VaR was widely adopted as a tool to estimate potential losses under normal market conditions, yet it was criticized for its inability to adequately capture systemic risks or extreme market events. This limitation became evident as the financial landscape evolved, revealing that reliance on VaR could lead to significant underestimations of risk during periods of market stress (Gao et al., 2018; Adrian & Brunnermeier, 2011; Marcelo et al., 2008).

Moreover, while some financial institutions began to implement stress testing as a risk management tool, the scope of scenarios tested was often limited. Traditional stress tests typically focused on historical data and did not account for the full range of potential economic shocks, thus failing to prepare institutions for unprecedented events (Berkowitz, 2000; Sorge, 2004). The regulatory environment prior to the crisis was relatively lenient, which contributed to an accumulation of systemic risk within the global financial system. The over-reliance on optimistic predictive models further exacerbated this issue, leaving many institutions ill-prepared for the economic turmoil that ensued (Jobst & Gray, 2013; Chen, 2023; Salawati, 2024).

The inadequacies of these conventional strategies were highlighted during the financial crisis, prompting a re-evaluation of risk management practices. The crisis underscored the need for more robust methodologies that could better account for extreme scenarios and systemic interdependencies among financial institutions. As a result, there has been a growing emphasis on enhancing stress testing frameworks to incorporate a wider array of stress scenarios and to better reflect the interconnectedness of financial entities (Oluloni, 2024; DeMenno, 2022; Huang et al., 2009). This shift has led to the development of more sophisticated models that aim to capture the complexities of financial systems and improve resilience against future shocks (Onuoha, 2024; Pritsker, 2012).

In summary, the pre-2008 era of financial risk management was marked by a reliance on conventional quantitative models that proved inadequate in the face of systemic risks. The limitations of VaR and traditional stress testing methodologies highlighted the need for a paradigm shift towards more comprehensive risk management frameworks capable of addressing the intricacies of modern financial systems (Sakib, 2021; Jobst & Solé, 2020).

4.2. 2008 Financial Crisis Era (Global Financial Crisis - GFC)

The 2008 Global Financial Crisis (GFC) serves as a pivotal case study in the failure of risk prediction models, particularly due to the emergence of Black Swan events—rare occurrences with profound economic impacts. A critical factor contributing to this failure was the over-reliance on statistical models by financial institutions, which predominantly utilized historical data to forecast risks. This approach proved inadequate in anticipating systemic risks associated with complex financial derivatives, such as mortgage-backed securities (MBS) and collateralized debt obligations (CDOs) (Zhang, 2014; McDonald & Paulson, 2015). The misuse of statistical methods, particularly the copula approach in pricing CDOs, has been highlighted as a significant factor leading to the crisis, as it obscured the true risk profiles of these financial products (Zhang, 2014; Lartey, 2020).

Moreover, the lack of binding regulation prior to the crisis exacerbated systemic vulnerabilities. High leverage ratios and insufficient transparency in financial transactions created an unstable environment, which was not effectively mitigated by existing regulatory frameworks, such as Basel II (Obadire, 2022; Hudoliy & Bronin, 2019). The inadequacies of these regulations became evident as they failed to address the complexities of modern financial markets, leading to calls for a more robust regulatory response post-crisis (ElBannan, 2017).

In the aftermath of the GFC, global regulatory frameworks underwent significant revisions to enhance financial stability. The Basel III framework was introduced, mandating higher capital adequacy ratios and implementing liquidity coverage ratios (LCRs) to bolster banks' resilience against market volatility (Kalloub et al., 2018; Peng, 2022). This regulatory overhaul aimed to rectify the shortcomings of Basel II by addressing systemic risks more effectively and ensuring that financial institutions maintain adequate capital buffers during economic downturns (Jung, 2023; Sarin & Summers, 2016). The Dodd-Frank Act in the United States further empowered regulators to oversee financial activities more stringently, particularly targeting institutions deemed "too big to fail" (McDonald & Paulson, 2015; Sarin & Summers, 2016). Stress testing methodologies were also refined to incorporate extreme macroeconomic scenarios, thereby enhancing the predictive capabilities of risk management frameworks (Sarin & Summers, 2016; Poledna, 2016).

In summary, the 2008 GFC underscored the critical need for improved risk management practices and regulatory frameworks in the financial sector. The transition to Basel III and the Dodd-Frank Act represents a concerted effort to address the systemic risks that were inadequately managed prior to the crisis, emphasizing the importance of robust regulatory oversight and the necessity of adapting to the complexities of modern financial instruments.

4.3. COVID-19 Crisis Era (2020-2022): Digital Transformation in FRM

The COVID-19 pandemic has significantly reshaped financial risk management (FRM) strategies, leading to a notable digital transformation in the sector from 2020 to 2022. This period was characterized by increased global uncertainty, driven by abrupt shifts in market demand, supply chain disruptions, and expansive monetary policies, which collectively impacted financial stability (Samantray, 2024; Zhi, 2024). The unprecedented volatility necessitated a reevaluation of traditional risk management approaches, prompting financial institutions to adopt more sophisticated and technology-driven solutions.

One of the most prominent trends during this crisis was the accelerated adoption of digital technologies in FRM. Artificial Intelligence (AI) and Machine Learning (ML) emerged as critical tools for detecting risk patterns in real-time, thereby enhancing decision-making processes (Wang et al., 2021; Utami et al., 2023). These technologies facilitated the transition from historical data-based prediction models to more dynamic, scenario-based approaches through predictive analytics, which have become essential for timely risk assessment (Nahar et al., 2024; Agu et al., 2024). The integration of automated risk management systems allowed institutions to respond to market fluctuations with greater speed and accuracy, reflecting a shift towards more proactive risk management strategies (Devarajulu, 2024).

Moreover, the pandemic catalyzed a fundamental shift in risk management philosophy, moving from a reactive stance—where institutions primarily responded to risks post-occurrence—to a proactive approach that emphasizes continuous monitoring and flexible scenario planning (Ergasheva et al., 2023). This transformation underscores the necessity for financial institutions to not only anticipate potential risks but also to develop robust frameworks that can adapt to rapidly changing conditions. The emphasis on proactive risk management is further supported by the increasing reliance on advanced analytics, which enables organizations to identify and mitigate risks before they materialize (Wang et al., 2022).

In summary, the COVID-19 crisis has acted as a catalyst for digital transformation in financial risk management, characterized by the integration of AI, ML, and predictive analytics. These advancements have facilitated a shift towards proactive risk management strategies, allowing financial institutions to navigate the complexities of an uncertain global landscape more effectively.

4.4. The Current Era of Economic Uncertainty (Post-COVID, Geopolitical Wars, Global Inflation)

The current era of economic uncertainty, characterized by the aftermath of the COVID-19 pandemic, geopolitical conflicts, and rampant global inflation, has significantly influenced financial risk management (FRM) practices. Financial institutions are increasingly adopting innovative strategies to navigate these challenges, focusing on real-time data analytics, alternative data sources, the integration of FinTech and blockchain technologies, and agile risk management methodologies.

4.4.1. Real-Time Data-Based Risk Management

In the wake of the pandemic, financial institutions have recognized the necessity of leveraging real-time analytics to enhance risk detection and mitigation strategies. This shift is crucial as it allows for immediate responses to emerging threats, thereby optimizing risk management processes (Srivastava, 2022; Goodell, 2020). The use of alternative data sources, such as social media and satellite imagery, has also gained traction, enabling institutions to identify potential risks more swiftly and accurately (Akindotei, 2024). These advancements are essential in a volatile economic landscape where traditional data sources may lag behind real-time developments.

4.4.2. The Application of FinTech and Blockchain in Financial Risk Mitigation

The integration of FinTech solutions, particularly blockchain technology, has emerged as a pivotal strategy in enhancing transaction transparency and reducing risks associated with fraud and cyber threats (Akindotei, 2024). Blockchain's decentralized nature not only fosters trust but also facilitates real-time tracking of transactions, which is vital in managing financial risks effectively. Furthermore, Decentralized Finance (DeFi) is offering innovative alternatives for managing investment risks, allowing for more flexible and diversified investment strategies that can adapt to changing market conditions (Akindotei, 2024).

4.4.3. The Emergence of Agile Risk Management

Agile risk management has become increasingly relevant as financial institutions strive to remain adaptable in the face of rapid market changes. This approach emphasizes flexibility and responsiveness, allowing organizations to implement dynamic strategies based on scenario simulations (Elkhatib et al., 2022; Omar, 2024). The integration of agile methodologies into risk management practices enables institutions to better anticipate and respond to risks, thereby enhancing their overall resilience (Vieira et al., 2020; García et al., 2022). As organizations adopt agile frameworks, they are better positioned to manage the complexities of modern financial landscapes, which are often marked by uncertainty and rapid change (Omar, 2024).

In conclusion, the current economic uncertainty necessitates a paradigm shift in financial risk management practices. By embracing real-time data analytics, leveraging FinTech innovations, and adopting agile methodologies, financial institutions can enhance their risk management capabilities and better navigate the complexities of today's financial environment.

4.5. Implications for Financial Practitioners & Regulators

The results of this study show that the evolution of FRM is not only influenced by the economic crisis, but also by technological developments and regulatory changes. Some of the main implications are:

1. Increasing Financial System Resilience

   ○ Regulations based on stress testing and capital adequacy are increasingly strengthened to prevent systemic risks.
   ○ Financial institutions need to continue investing in risk management technology to increase the effectiveness of risk detection and mitigation.

2. Strengthening Scenario Planning and Dynamic Risk Assessment Strategies

   ○ Scenario planning AI-based helps organizations anticipate risks in various possible economic scenarios.
   ○ Dynamic risk assessment enables a more flexible response to rapid changes in the global economic landscape.

3. The Role of Monetary & Fiscal Policy in Financial Stability

   ○ Central banks and regulators play an important role in maintaining financial stability through interest rate policies and liquidity interventions.
   ○ Implementing regulations that are more adaptive to developments in financial technology is a primary need.

4.6. Comparison with Previous Studies

This study confirms findings from previous research showing that economic crises are a key driver of innovation in FRM. However, there were several new contributions made:

1. FRM Paradigm Shift from Conventional to Technology Based
   ○ While previous research still emphasizes regulations and traditional quantitative methodologies, this study highlights the role of AI, Big Data and Blockchain in accelerating the evolution of risk management.
2. FinTech Integration as a More Adaptive FRM Solution
   ○ This study shows how financial technology is starting to play a strategic role in risk mitigation, which has not been widely discussed in previous studies.
3. Increasing the Role of Real-Time Data and Alternative Data
   ○ Compared with older literature that focuses more on historical data, these findings underscore the role of real-time analytics and alternative data in supporting more accurate financial decisions.

5. CONCLUSION

5.1 Summary of Findings

Financial risk management has evolved from traditional models to technology and regulation-based approaches. This change was triggered by the increasingly dynamic complexity of the global crisis. This study shows that proactive, technology-based approaches are becoming increasingly important in managing financial risk.

5.2 Practical Implications

Some practical implications of this research findings include:

- The Importance of Implementing Digital Risk Management Tools: Financial institutions must adopt technologies such as AI, machine learning, and blockchain to improve the effectiveness of risk management.

- The Role of Government Policy and Regulators in Supporting Financial System Resilience: Regulations based on stress testing and capital adequacy must be strengthened to prevent systemic risks.
- Expanding Data Sources in Risk Analysis: Integration of alternative data (such as social media and satellite data) can increase the accuracy of risk predictions.

5.3. Limitations

- This study focuses only on literature published in academic journals, so it does not include a direct industry perspective.
- The analysis is still qualitative and has not considered a quantitative approach in depth.

5.4. Future Research Directions

- Quantitative Analysis: Future studies can use empirical data to measure the impact of technology adoption in financial risk management.
- Specific Industry Case Studies: Further research could explore how companies in various sectors implement technology-based risk management strategies.
- Exploring the Impact of Global Regulation: Further studies could analyze how international financial regulations influence risk management strategies in various countries.

Thus, this research provides deeper insight into the evolution of FRM and the challenges and opportunities it will face in an era of global economic uncertainty.

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