

The Risk Assessment Tools as Technology in Accounting and Economics Decision Making

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Abstract: Advances in accounting technology and economic decision-making have resulted in many important risk assessment tools that support the decision making process. In the past, risk assessment depended on personal opinions and manual analysis, which often resulted in inaccurate estimates and delays in decision-making. However, with these risk assessment tools, we can now identify, analyze, and mitigate various risks that can affect financial and economic outcomes in a more accurate and efficient manner. This study aims to discuss technology in the form of risk assessment tools as an aid in decision-making and identify trending topics related to the use of risk assessment tools from 2020-2025, particularly in Indonesia. This study uses a qualitative approach and collects data from the scopus database of 1.827 articles selected from 2020 to 2025. In understanding research from the scopus database, bibliometric analysis was used in this study and using analysis tools such as R Studio and Vos Viewer. The results of the study show a significant increase in publications related to risk assessment tools with a growing trend toward international collaboration. The dominant themes that emerged include decision making, artificial intelligence, climate change, health risks, and financial markets. In addition, the increasing number of publications with international collaboration trends shows that the use of risk assessment tools has become a global standard that Indonesia needs to adapt. The government can use these findings as a basis for formulating policies that are more adaptive to technological developments.

Keywords: Accounting; Decision Making; Economics; Risk Assessment Tools; Technology

1. Introduction

Risk assessment tools are increasingly utilized as technological solutions in accounting and economic decision-making contexts. Risk assessment is a key element that is inseparable from the decision-making process in various sectors, ranging from finance, and health to cybersecurity. In the world of finance, this practice plays a vital role as it serves as the basis for managing investment portfolios, assessing creditworthiness, and identifying potential fraud or deception. Through the application of appropriate risk analysis, financial institutions can maintain operational stability and sustainability even in the face of uncertain market dynamics. In addition, a systematic approach to risk management also helps organizations formulate preventive strategies, reduce potential losses, and increase stakeholder confidence in the institution's performance (Beckley, 2025).

The increase in the volume of transactions taking place on a massive scale and the growing complexity of financial crimes, traditional approaches are beginning to show their limitations. Conventional models, which are generally based on historical data and are static in nature, are often less adaptive to changes in behavior patterns and the emergence of new threats (Jennifer Muhindo et al., 2024). Therefore, a more dynamic, technology-based approach is needed, one that is capable of providing real-time detection to anticipate risks and prevent greater losses in the future. Innovations in risk modeling and the application of artificial intelligence, for example, are strategic steps in improving the effectiveness of financial security systems. The use of innovation in risk modeling and the integration of

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artificial intelligence are strategic steps to improve the effectiveness of security systems, both in the financial and accounting sectors, as well as in broader economic decision-making.

In addition, risk management is now seen as one of the most crucial strategic issues in the management of the cloud accounting services industry. Within this framework, risk assessment occupies a central position because it forms the basis of the entire risk management process carried out by service providers. However, to date, there has been limited attention from researchers regarding the development of models and the application of risk assessment, particularly in the cloud services sector. This condition is even more apparent when it comes to cloud accounting services, where the complexity of financial data, regulations, and the need for system security and reliability require a more specific and in-depth risk assessment approach. This research gap indicates the need for further study to find a risk assessment framework that can help organizations identify potential threats, measure vulnerability levels, and design mitigation strategies that are tailored to the unique characteristics of the accounting cloud industry (Wu et al., 2023).

Furthermore, risk analysis essentially utilizes scientific knowledge to explain, assess, and manage various risks that can affect human health, ecosystems, natural and artificial environments, and other systems directly related to public welfare. In practice, risk analysis is closely related to economics and decision-making analysis, particularly in assessing the effectiveness of risk management approaches and providing relevant input for public policy formulation. Almost all types of risk can indeed be mitigated, but such efforts generally result in the loss of other more productive opportunities or even give rise to new, opposing risks. In addition, the magnitude of risk, which includes probability and consequences, always involves uncertainty, as do the costs and impacts of each alternative mitigation strategy. Therefore, assessing the balance between reducing a particular risk and the opportunity cost of the intervention is an economic issue whose solution is greatly influenced by the preferences of the affected parties. In conditions of complete uncertainty, decision analysis plays an important role in helping to evaluate the available options. Furthermore, the integration of risk analysis, economics, and decision theory enables the formulation of mitigation strategies that are more rational, transparent, and oriented towards long-term sustainability (Hammitt & Robinson, 2021).

The application of big data algorithms integrated with refined clustering methods has also been proven to provide a more comprehensive analysis of risks in corporate accounting management. Through this approach, the accuracy rate of risk recognition can reach more than 85%, thereby improving the reliability of the analysis results. In addition, this integration also serves as an important foundation in providing relevant and accurate data support for corporate operational decision-making (Li, 2024). Business economic risk assessment can be comprehensively classified into two main groups, namely statistical analysis-based methods and alternative approaches such as System-Theoretic Accident Model and Processes (STAMP/STAR), Hazard and Operability Study (HAZOP), and Failure Modes and Effects Analysis (FMEA). The study also offers an algorithm that helps researchers and practitioners determine the most appropriate risk assessment method based on the availability and quality of existing information (Lyukevich et al., 2020). With this classification framework, organizations can be more systematic in selecting the right risk evaluation techniques, resulting in more accurate, efficient, and relevant analysis results for the actual conditions faced by the company. In addition, the application of the method selection algorithm also encourages consistency in the process.

Risk management models applied in economics, marketing, finance, and accounting involve various analytical approaches, including Value-at-Risk (VaR), scenario analysis, and Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. The researchers emphasized the importance of adding specific stages to the risk assessment process in order to enrich the quality of the model to use and increase its effectiveness in real business environments. With these additional stages, the risk management process is not only able to provide a more accurate picture of potential threats and opportunities, but also strengthen the basis for strategic decision-making within the company (Kosova et al., 2021).

A number of previous bibliometric studies, particularly those focusing on financial risk management, show an upward trend in the number of publications over time (Liu et al., 2025). This increase is closely related to the uncertain global economic conditions and increasingly complex external dynamics. This phenomenon reflects the high level of attention paid by academics and practitioners to the issue of financial risk management, given its increasingly vital role in maintaining business stability and corporate sustainability. In addition, the increase in publications also indicates a drive to continue developing more up-to-date conceptual frameworks, methodologies, and risk analysis instruments in order to respond to new challenges arising in an era of market volatility and rapid regulatory change.

The purpose of this review is to identify the latest trends in the use of risk assessment tools from 2020 to 2025. Information sources were obtained through a systematic search in a single database, Scopus, to find articles discussing barriers to the use of these assessment tools until 2025. In addition, manual searches and reference checks were also conducted to complete the data. This study aims to identify trending topics related to the use of risk assessment tools in recent years, particularly in Indonesia.

2. Literature Review

Risk assessment is a key element that is inseparable from the decision-making process in various sectors, ranging from finance, and health to cybersecurity. In the world of finance, this practice plays a vital role as it serves as the basis for managing investment portfolios, assessing creditworthiness, and identifying potential fraud or deception. Through the application of appropriate risk analysis, financial institutions can maintain operational stability and sustainability even in the face of uncertain market dynamics. In addition, a systematic approach to risk management also helps organizations formulate preventive strategies, reduce potential losses, and increase stakeholder confidence in the institution's performance (Beckley, 2025).

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Various instruments are used in the CIS industry to assist in determining investor risk profiles. These instruments are commonly known as risk profile questionnaires, risk assessment tools, asset calculators, risk assessment worksheets, and many other variations. Financial planners utilize these various instruments to identify the risk characteristics of each investor, while also evaluating their level of risk tolerance. This information then forms the basis for developing investment strategies that are in line with investors' preferences and financial goals. The use of appropriate risk assessment tools not only helps create suitable portfolios, but also increases investor confidence in the investment decisions made, and supports the achievement of more measurable and sustainable investment management (Baloyi & Lotter, 2024).

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3. Research Method

This study employed a bibliometric approach to analyze the literature on risk assessment tools in Indonesia. Similar methodologies have been applied in recent studies, such as bibliometric analyses of disaster mitigation and sustainable development by Haris, Tahir, Nurjaya, and Baharuddin (2023), and on financial literacy and risk tolerance in investment decisions by Nisa, Wahono, and Silaningsih (2024). Additionally, Rahmad, Nasirly, Arsi, and Nasution (2024) utilized bibliometric analysis to examine publication trends in information security risk management, while Yusuf, Erwina, and Winoto (2024) applied VOSviewer to map local knowledge related to disaster mitigation. Bibliometric methods have also been employed to investigate trends in sustainable and responsible investments (SRI) by Judijanto, Ladjin, Harsono, Meilisa, and Sangaji (2024), as well as the development of corporate risk management concepts by Judijanto and Zulfikri (2024). These approaches provided a foundation for the current study in selecting, visualizing, and analyzing literature on risk assessment tools in Indonesia.

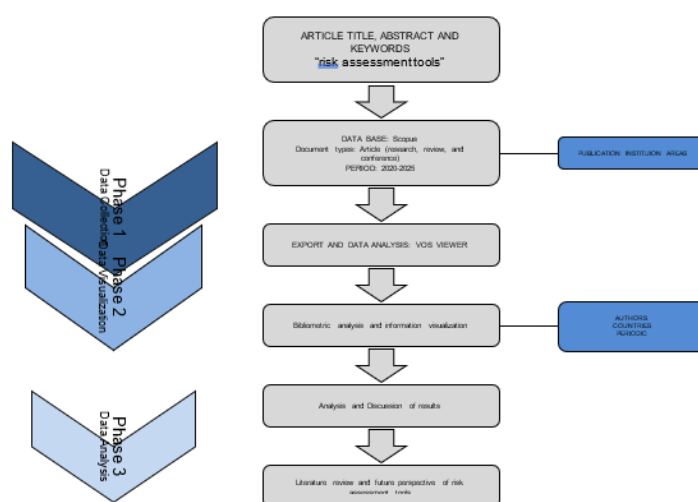


Figure 1. Methodology Phases Applied to the Present Work

This study used bibliographic data sourced from articles indexed in the Scopus database during the period 2019 to 2024 (Figure 1). The sampling method used was total sampling, so that all publications relevant to the study topic were analyzed. The research variables included publication title, author name, abstract, keywords, year of publication, journal publisher, article type, and institutional affiliation. The data was collected through the Scopus repository using Mendeley Desktop software with the English keyword risk assessment tools as the main search query.

The search results were then exported using the Scopus export feature in csv format and synchronized with Mendeley Desktop. Descriptive analyses, such as the distribution of annual publications, the number of publications per author, and journal publishers, were performed using Microsoft Excel. To map research trends, VosViewer version 1.6.20 software based on csv files was used. The mapping was carried out using co-occurrence analysis techniques with keywords as the unit of analysis, which produced a visualization of the network of relationships between keywords and density map (hotspot) to identify the main focus of the research.

4. Results and Discussion

The following figure summarizes key information related to research results covering the publication period from 2020 to 2025. Overall, the data analyzed came from 568 publication sources with a total of 1,827 documents and an annual growth rate of 8.21%. This analysis involved 9,993 authors, including 1 sole author who contributed. Of the total publications, approximately 25.67% were the result of international collaboration, with an average of 10.1 authors involved in each document.

In addition, the data also recorded 11,581 unique keywords used by the authors, as well as a total of 16,145 citations referenced in these documents. On average, each publication was approximately 2.24 years old, indicating that the research analyzed was relatively recent. The citation rate is also quite high, with an average of 8.486 citations per document. These findings provide a comprehensive picture of scientific collaboration patterns, visibility levels, publication productivity, and the impact of research, as reflected in citation frequency.



Figure 2. Main Information Overview (using R Studio)

This dataset contains 11,581 keywords formulated by the authors, reflecting the diversity of themes and breadth of research focus analyzed. The number of publications recorded cites up to 16,145 references, indicating deep academic engagement and close ties to previous literature. The average age of the documents is 2.24 years, which means that the majority of the studies are relatively recent but still connected to previous research. This shows a balance between historical foundations and current perspectives, providing a more comprehensive picture of developments in the field.

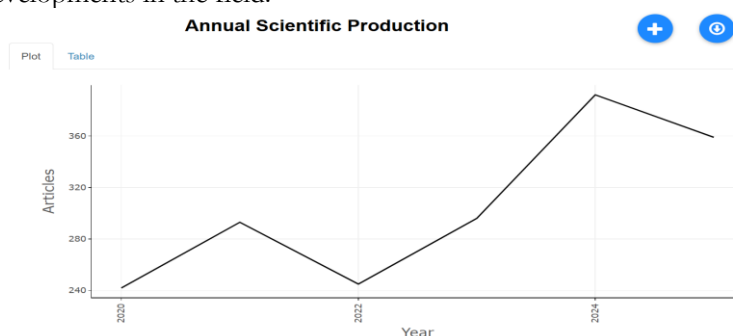


Figure 3. Annual Scientific Production (using R Studio)

The graph above illustrates the trend in the number of scientific publications per year from 2020 to 2025. In 2020, the number of articles recorded was around 242 publications, then increased in 2021 to reach 293 articles. This trend declined again in 2022 to around 245 publications, but after that, a fairly stable increase was seen. The biggest jump occurred in 2024 with the number of publications reaching more than 392 articles, indicating very high research productivity during that period. Although in 2025 there was a decline to around 359 articles, this achievement was still higher than at the beginning of the period.

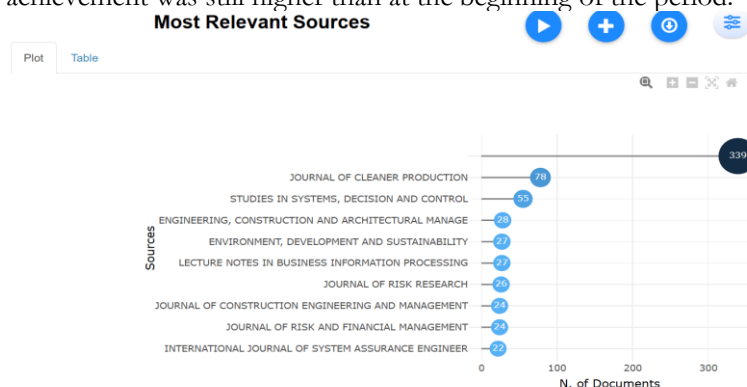


Figure 4. Most Relevant Sources (using R Studio)

The graph shows a list of the most relevant publication sources based on the number of documents published. The journal with the highest rating is the Journal of Cleaner Production with 78 documents, followed by Studies in Systems, Decision and Control (55 documents). Other journals with significant contributions include Engineering, Construction and Architectural Management (28 documents) and there are several journals with almost equal numbers of publications, such as Environment, Development and Sustainability and Lecture Notes in Business Information Processing, each containing 27 documents, and the Journal of Risk Research with 26 documents. Other sources that also contributed significantly were the Journal of Construction Engineering and Management and the Journal of Risk and Financial Management, each with 24 documents, followed by the International Journal of System Assurance Engineer with 22 documents.

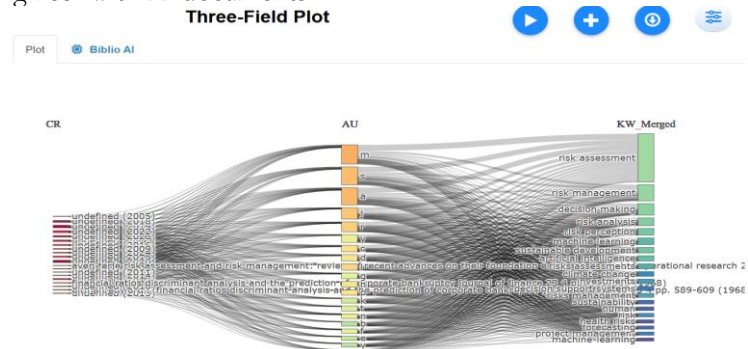


Figure 5. Three-Field Plot

The image shows a Three-Field Plot connecting three main elements, namely the reference list (CR), authors (AU), and keywords used (KW_Merged). From the left side, various reference sources can be seen, which are then connected to the authors in the middle. Next, these connections flow to the keywords on the right side, which describe the focus of the research topic. The most prominent keywords include risk assessment, risk management, decision making, risk analysis, risk perception, and machine learning, indicating that the field of research is largely related to risk management, decision making, and the application of intelligent technology. In addition, there are also additional topics such as artificial intelligence, sustainability, climate change, and forecasting, which indicate the connection between risk studies and global issues and modern technological developments.

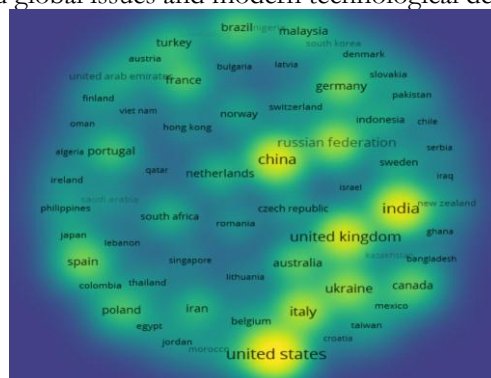


Figure 6. Density Visualization (using Vos Viewer)

The image shows a density visualization depicting the distribution of scientific publication related to risk assessment tools by country. Lighter colors indicate higher publication intensity, while darker colors indicate relatively small contributions. It can be seen that the United States, China, India, and the United Kingdom occupy dominant positions with the highest intensity, demonstrating the central role of these countries in producing scientific work related to risk assessment tools. In addition, several European countries such as Germany, Italy, the Netherlands, Spain, and Portugal, as well as Asian countries such as Malaysia, Japan, South Korea, and Indonesia also show significant contributions. Meanwhile, other countries such as those in the Middle East, Africa, and Latin America are seen to be participating, albeit with a more limited number of publications.

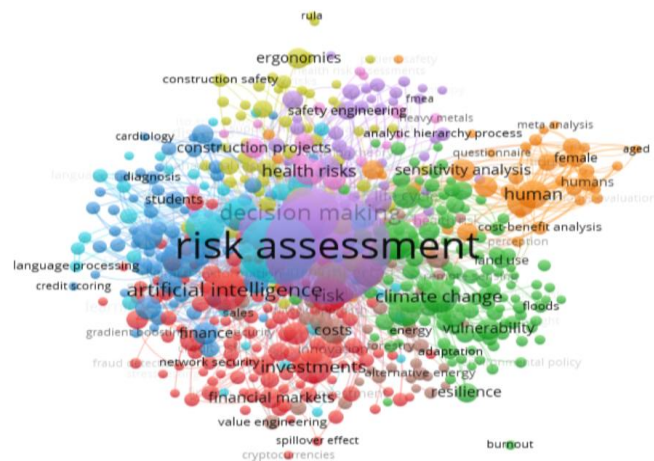


Figure 7. Network Visualization (using Vos Viewer)

The image above shows a visualization of a keyword co-occurrence network that illustrates the interrelationships between research topics in the field of risk assessment tools and related themes. Each color indicates a specific theme group. For example, the red cluster focuses on finance, investment, financial markets, and the use of artificial intelligence technology, which shows how risk analysis plays an important role in anticipating uncertainty in the modern economic sector. The green cluster discusses environmental issues and climate change, including topics such as energy, vulnerability, and resilience, emphasizing that risk assessment is also crucial in supporting sustainable development. Meanwhile, the blue cluster emphasizes engineering, construction projects, and occupational safety, highlighting the practical implementation of risk management in industrial projects. The orange cluster focuses more on human factors, such as health, demographics (age, gender), and risk perception, which reveal the social and psychological dimensions of risk management.

Keywords displayed in larger font sizes, such as “risk assessment”, “decision making”, “artificial intelligence”, “climate change”, “health risks”, and “financial markets”, reflect topics with a high frequency of appearance in scientific publications. This indicates that these fields are the focus of researchers because they play an important role in understanding and managing risks in various sectors. For example, risk assessment serves as the main foundation for analyzing potential threats, while decision making relates to how risk assessment results are used to support specific policies or strategies. Meanwhile, artificial intelligence is increasingly being used in risk data processing to produce more accurate predictions, while the issue of climate change emphasizes the relevance of risk research in facing global environmental challenges. Other topics such as health risks highlight aspects of public health that are vulnerable to environmental and social risks, and financial markets reflect the importance of the economic world in anticipating market uncertainty.



Figure 8. Overlay Visualization (using Vos Viewer)

The overlay visualization in this bibliometric analysis, which is generally created using VOSviewer software, shows a network map of terms or concepts that frequently appear in scientific publications related to risk assessment and its supporting fields. Each circle (node) represents a keyword, where the size of the circle reflects the frequency of its appearance in the research data set. The relationships between keywords are visualized through connecting lines; the thicker and more numerous the lines, the closer the relationship between the topics. The color variation of the nodes indicates the time dimension of publication, as shown by the scale at the bottom of the image, which covers the range from 2022 (marked in purple or blue) to 2024 (marked in yellow). Darker nodes indicate earlier research, while lighter nodes indicate more recent studies or current research trends.

Larger nodes, such as risk assessment, decision making, artificial intelligence, climate change, health risks, and financial markets, indicate that these keywords are most frequently used and are the main focus of academic studies. The purple and blue colors on the map, which represent the early period of 2022 to mid-2022, show that topics such as sensitivity analysis, safety engineering, and construction projects were more dominant at the beginning of the period. Furthermore, the green color that appears in 2023 indicates a shift in research interest towards themes such as health risks, decision making, and financial markets. In 2024, yellow nodes such as artificial intelligence, climate change, resilience, and vulnerability indicate that the latest research focus is moving towards the integration of smart technology, sustainability issues, and adaptation to climate change.

This visualization shows how the interrelationships between topics have developed over time, with risk assessment remaining the central hub connecting various fields of research. The green clusters highlight environmental issues that are gaining attention in the 2023–2024 period, such as climate change and energy resilience. Meanwhile, the red cluster illustrates the integration between technology and the financial sector, such as artificial intelligence, finance, and investments, which have seen a significant increase in discussion since 2023. On the other hand, the orange and purple clusters highlight health and human aspects, such as health risks, humans, and females, which emerged earlier but remain relevant and consistently discussed in recent studies.

5. Conclusion

The results of the bibliometric analysis conducted in this article show that the use of risk assessment tools is increasingly occupying a central position in decision-making in the fields of accounting and economics. The application of these tools not only helps in identifying and mitigating various risks, but also contributes significantly to improving the accuracy, efficiency, and speed of the decision-making process.

The results of the bibliometric study show that publications on this topic experienced a consistent upward trend in the period 2020–2025. This not only reflects the considerable attention paid to the topic by academics and practitioners, but also shows that risk assessment tools are increasingly seen as a strategic factor in dealing with the dynamics of a global market full of uncertainty.

More specifically, the keyword mapping results confirm that issues such as “decision making”, “artificial intelligence”, “climate change”, “financial markets,” and “health risks” are the dominant focus of current research. This shows that the use of risk assessment is not limited to the financial sector, but also extends to the environmental, health, and sustainable development sectors.

In addition, the increasing number of publications with international collaboration trends shows that the use of risk assessment tools has become a global standard that Indonesia needs to adapt. The government can use these findings as a basis for formulating policies that are more adaptive to technological developments, particularly in the cloud accounting, data protection, and digital financial supervision sectors. Therefore, this research not only answers academic objectives, namely mapping the trends in the use of risk assessment tools from 2020 to 2025, but also provides practical recommendations to support the formulation of public policies oriented towards economic resilience, environmental sustainability, and community protection against increasingly complex risks.

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