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Research Article

Navigating Advancements in Economic Forecasting Under Crisis: A Bibliometrix Analysis of Global Research Trends

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Abstract: Economic forecasting is becoming increasingly important year after year, especially during crises such as the pandemic of COVID-19 and the Russia-Ukraine war. Its development can be seen from the use of basic statistical models to the increasingly widespread use of machine learning technology. Economic forecasting plays an important role in helping to formulate policies and is also a reliable tool for researchers in dealing with uncertainty. Global crises, such as inflationary pressures due to the pandemic and supply chain disruptions from the Russia-Ukraine conflict, have prompted increased research in this field in an effort to anticipate economic shocks and emphasize the urgency of forecasting to prepare strategies for dealing with future uncertainty. This literature review uses the Scopus database with 2561 publications from 2020 to 2025, analyzed using R Studio with a bibliometrix approach (specifically biblioshiny) and VOSviewer to map relevant thematic connections. This analysis shows that economic forecasting is greatly influenced by market uncertainty and geopolitical factors, and at the same time influences public policy formulation and financial stability. Research contributions from Indonesia are still limited, with only 40 documents, thus emphasizing the need to strengthen economic forecasting studies in Indonesia to support monetary policy and national financial stability.

Keywords: Bibliometrix Review; Economic Forecasting; Economic Uncertainty; Economics; Forecasting

1. Introduction

Economic forecasting is frequently used in strategic asset allocation, risk management, investment strategies in a long term, and economic capital requirements (Jakhria et al., 2019). Economic forecasting also used by some researchers when faced with uncertainty, such as global uncertainty, for example during the Russia-Ukraine war. Many researchers even used economic forecasting during the COVID-19 pandemic to predict possible economic changes or developments. In such situations, forecasting provides decision makers with analytical tools to anticipate possible outcomes, mitigate risks, and design adaptive strategies.

In times of crisis, traditional forecasting methods, namely econometric models, are mostly unable to catch the non-linear patterns and complex dynamics that occur. During such times, most economic forecasting models are unable to determine the right timing because crisis events are so rare that there is still a lack of training samples. Simple economic forecasting models are unable to accurately predict outcomes in crisis situations (Stankevich, 2025). Therefore, in recent years, forecasting, including in the economic field, has undergone developments such as through deep learning, big data, and machine learning.

Machine learning and deep learning methods are not just a temporary trend, but both are capable of providing accurate predictions. In the application of economic forecasting based on machine learning, data and algorithms are used to create a computer system that can predict the future economy. The economic forecasting system in machine learning begins with data input, then finds patterns and makes predictions, until the final stage is decision making. Through research (Shastri et al., 2020) shows that deep learning algorithms such as Long Short-Term Memory (LSTM), Bi-directional LSTM, and Convolutional LSTM can be used to predict the development of COVID-19 cases in India and the United States with a

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high degree of accuracy. This approach demonstrates that machine learning is also relevant in economic forecasting amid uncertainty and fluctuations.

The economy forecast itself can predict several macroeconomic variables, including inflation, GDP, interest rates, exchange rates, and unemployment. Many economic variables are only available on a monthly or quarterly basis, which can make real-time economic monitoring and forecasting difficult (Barbaglia et al., 2023). For example, there is research that says it is difficult to predict inflation rates in order to make rational economic decisions with appropriate decision making. Inflation forecasting is quite important because it can have a major impact on households, businesses, and policymakers. (Medeiros et al., 2021).

With today's technological advances, a new challenge has emerged in economic forecasting, namely how to effectively utilize large data sets (big data). The availability of large amounts of data often causes economic prediction models to face curse of dimensionality (Giannone et al., 2021). Furthermore, there is also a sparse modeling-based approach that attempts to select a small number of the most important variables, as well as dense modeling which assumes that all variables can be relevant even if their contribution is small. Through this, it can be said that the use of big data analytics methods is important in predicting complex and interrelated macroeconomic variables.

The growing interest in economic forecasting research has resulted in a wide range of literature discussing its methods, challenges, and benefits in the context of the global economy. This exploration is not limited to traditional approaches, but also extends to modern techniques designed to address the complexity of economic data and the uncertainty of crises. Thus, economic forecasting is increasingly recognized as an important instrument in supporting public policy, business strategy, and future investment planning.

Advancements in artificial intelligence have significantly driven the progress of economic forecasting techniques. Approaches based on machine learning and deep learning have become more prominent, particularly after 2022 when modern algorithms started to lead research in this domain. Such technologies are able to process big datasets, uncover non-linear patterns, and deliver predictions that are more adaptive than those generated by conventional methods. These developments confirm a paradigm shift towards forecasting models that are more responsive to the dynamics and complexity of the global economy.

This study focuses on reviewing literature published between 2020 and 2025 through the Scopus database, limited to the fields of economics, econometrics, and finance. The analysis process was carried out using R Studio to process bibliometric data and VOSviewer to identify research trends. Bibliometric analysis enables researchers to identify publication trends, scientific productivity, frequently used keywords in economic forecasting, and so on. This analysis will also map the relationship between economic forecasting and other factors such as geopolitical events or crises, thereby guiding policy-making and navigating global uncertainty. The results provide a comprehensive overview of how economic forecasting research has developed and contributed to global knowledge.

2. Literature Review

Economic Forecasting Performance with Markov-Switching MIDAS (Mix Data Sampling) in Facing the COVID-19 Period

In a study conducted by Stankevich (2025) shows that during the COVID-19 crisis period, using Markov-Switching MIDAS (MS MIDAS), which is based on endogenous switching, there was a significant increase in the accuracy of short-term GDP forecasting in G20 countries. The MS MIDAS model has been proven to be able to reduce prediction errors by almost half compared to simple reference models such as random walk. The advantage of MS MIDAS is the ability to catch the timing of crises and recoveries more accurately than linear or machine learning models. These results show that the greatest benefits of applying MS MIDAS were obtained by countries that rely on the industrial and agricultural sectors, such as India, Indonesia, and China. Meanwhile, countries whose economies rely on the service sector, such as the United States, France, and Germany, obtained smaller benefits.

Forecasting Economic Growth with the Artificial Neural Network (ANN) Approach

Similarly, the role of artificial intelligence and machine learning in forecasting macroeconomic dynamics has gained significant attention in recent years. For instance, Bhardwaj and Chauhan (2022) developed a hybrid deep learning model to predict GDP growth in developing countries and found that combining neural networks with autoregressive models improves predictive accuracy during volatile economic conditions. Furthermore, Wang et al. (2023) demonstrated that AI-based forecasting models outperform traditional econometric approaches, especially during periods of economic uncertainty, such as the post-pandemic recovery phase. In line with this, Hossain and Rahman (2024) emphasized that integrating real-time big data with neural network algorithms enhances the responsiveness of economic forecasts, offering policymakers more reliable and timely insights.

These findings strengthen the argument that ANN and related models have become indispensable tools in contemporary economic forecasting, particularly when analyzing global shocks and structural changes.

Development of Economic Forecasting Methodology

Meanwhile, research conducted by Chakraborty et al. (2021) provides a comprehensive review of methodological developments in economic and financial forecasting. They emphasize that although classical models such as ARIMA, VAR, and structural models are still widely used, new challenges have emerged related to high-frequency data, non-linear dynamics, and heterogeneity among economic variables. This study also highlights the difficulty in predicting important macroeconomic variables such as unemployment, inflation, and GDP when structural changes or external shocks occur. Therefore, this literature encourages the integration of econometric approaches with more adaptive machine learning-based methods. The essential contribution of this study is to offering guidance for future studies on forecasting research should emphasize a combination of traditional methods and new technologies to improve accuracy and relevance in policy making.

GDP Forecasting with Enhanced Radial Basis Function Neural Networks (RBF-NN)

Furthermore, research conducted by Yu (2022) developed a GDP forecasting model using the Improved Radial Basis Function Neural Network (RBF-NN) approach. "The model was enhanced through the optimization of key parameters using a genetic algorithm, aiming to improve prediction stability and accuracy of predictions. The results show that the improved RBF-NN method is able to overcome the weaknesses of traditional models, especially when dealing with non-linear and complex data. This finding is important because GDP serves as a vital measure of a nation's economic condition, and achieving higher predictive accuracy supports the design of more precise policies. In addition, this study highlights the contribution of machine learning in enhancing macroeconomic forecasting accuracy, which was previously difficult to achieve with classical econometric approaches.

Forecasting in Economic Uncertainty

Bouteska et al. (2025) researching the forecast prices of the US and G7 stock indices in uncertain times using a hybrid Artificial Neural Network (ANN) approach. The uncertain times used are the pre-financial crisis years of 2003–2007, the recovery phase following the 2008 crisis spanning 2009–2016, and the more recent era of economic instability from 2017 to 2022. The results show that ANN can predict the next day with higher accuracy and perform consistently in each period. Pre-crisis data shows high accuracy but low RMSE, suggesting that market conditions were stable at that time. In the post-crisis period, RMSE and MAPE only experienced a slight increase but still maintained accurate predictions. In the 2017–2022 period, a time of uncertainty due to the impact of COVID-19, it was found that ANN was still able to maintain stable prediction performance despite increased market volatility. Through this research, it can be said that forecasting using an AI or ML approach, especially hybrid ANN, is more recommended for use because the model is more adaptive to non-linear dynamics.

Forecasting based on Machine Learning and Time Series

The latest literature study comes from Feizabadi (2022), a research with machine learning-based demand forecasting in a focusing of supply chains. This literature purpose is developed a hybrid method that combines time series with ML-based exogenous factors such as ARIMAX and Neural Network. A case study in the steel industry shows that this method significantly improves forecasting accuracy, improves inventory turnover, and shortens the cash conversion cycle compared to traditional methods. This study found empirical evidence that machine learning is not only useful in predicting demand, but also for enhancing supply chain performance, especially by mitigating the bullwhip effect and increasing operational efficiency.

3. Research Method

This study was conducted using a systematic review approach, beginning with the process of searching, collecting, and screening literature related to the topic of economic forecasting. The analysis was conducted descriptively using bibliometric methods to trace the latest developments and trends in research in this field. To support the analysis, R Studio was used to process publication data, while VOS Viewer was used to visualize the relationships between keywords, countries, publication sources, and author collaboration networks. The combination of these two tools enabled researchers to obtain a more comprehensive picture of the direction of economic forecasting research.

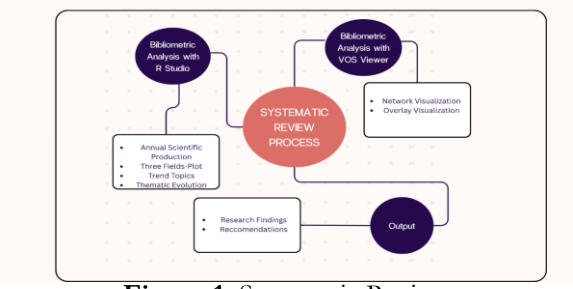

Figure 1. Systematic Review

This analysis uses a systematic review with two bibliometric analysis approaches using R Studio and VOS Viewer tools. The analysis with R Studio focuses more on publications from each journal, ranging from annual scientific production to developing trend topics. Meanwhile, VOS Viewer focuses more on network visualization, ranging from topics currently often associated with economic forecasting or forecasts. The results of the systematic process are research findings or updates on topics related to economic forecasting and recommendations on approaches or methods currently used in economic forecasting.

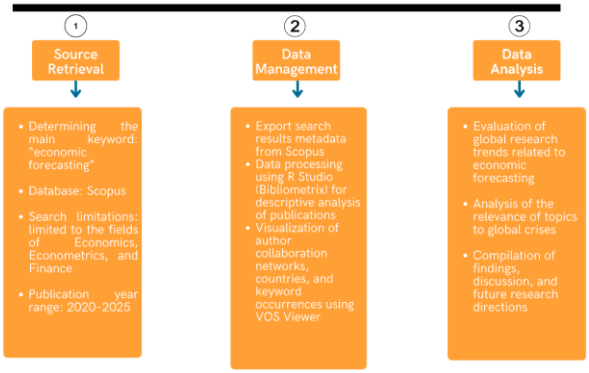

Figure 2. Research Procedure of Economic Forecasting Bibliometric Study

The process of this study was divided into three main stages as illustrated in Figure 2. (Phase 1) Source retrieval was conducted by defining the main keyword "economic forecasting" in the Scopus database, with search limitations set to the fields of Economics, Econometrics, and Finance for the period 2020–2025. (Phase 2) The retrieved documents were exported from Scopus and processed using R Studio (Bibliometrix) for descriptive analysis, along with the visualization of collaboration networks, countries, and keyword occurrences using VOS Viewer. (Phase 3) Data analysis was performed to evaluate global research trends related to economic forecasting, assess the relevance of research topics to global crises, and compile findings, discussions, and directions for future research.

The study applied a total sampling approach, in which all retrieved documents that matched the search criteria were included for analysis. The variables observed consisted of publication title, author, abstract, keywords, year of publication, journal publisher, document type, and author affiliation. The data were extracted directly from the Scopus repository and exported in CSV format, which was then organized and synchronized for further processing. For the descriptive analysis, such as annual scientific production, authorship patterns, and journal distribution, the data were processed using R Studio with the Bibliometrix package. In addition, topic mapping and trend visualization were performed with VOS Viewer, focusing on keyword co-occurrence analysis as the main unit. This allowed the construction of keyword networks, collaboration structures, and density visualization (hotspot areas), providing a clearer picture of the evolving themes in the field of economic forecasting.

4. Results and Discussion

Analysis with R Studio (Bibliometrix)

Overview Main Information

The results of the main information analysis using R Studio show that there are 2.561 documents indexed in the 2020–2025 period, sourced from 515 journals. The annual publication growth rate is relatively stable at 5,77%, indicating consistent research interest in the field of economic forecasting. The literature study to date involves 9,808 authors, but there are no documents written by a single author. In terms of publication quality, each document is on average 2,31 years old, which indicates a combination of older research that

is still frequently referenced and newer publications that are beginning to develop. Each article also received an average of 7.509 citations, reflecting a significant academic impact. In addition, there were 10.028 keywords used and 17.895 references recorded, illustrating the breadth of the literature and the diversity of approaches in this study. The results of this literature analysis provide an overview that research on economic forecasting has a high level of collaboration, both between authors and between countries, and shows strong academic relevance. As economic forecasting continues to evolve, particularly in response to global uncertainty, this research remains highly relevant.

Figure 3. Main Information

Annual Scientific Production

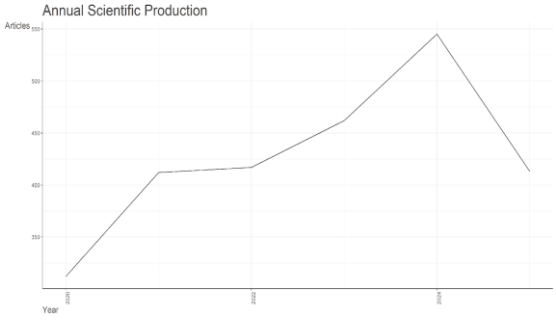

Figure 4. Annual Scientific Production

The graph above shows the dynamics of the number of scientific publications related to economic forecasting throughout the 2020–2025 period. It can also be seen that there is an upward trend, especially in 2022, reaching its peak in 2024. The surge in publications during this period can be attributed to the context of the COVID-19 pandemic and the post-pandemic phase, when many researchers sought to predict the economic and health impacts, as well as global recovery. However, in 2025, the number of publications actually experienced a sharp decline. This condition is likely due to the reduced intensity of the global crisis that triggered the need for forecasting research, resulting in a relative decline in research productivity. Other contributing factors include a temporary reduction in research funding and limited access to the latest data, which means that publications from the last year have not been fully compiled.

Three Fields-Plot Analysis

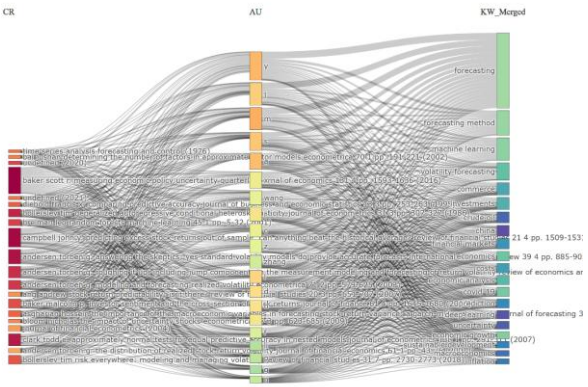

Figure 5. Three Fields Plot

Based on the results of the Three Field Plot analysis, there appears to be a correlation between journal citations (CR), authors (AU), and research keywords (KW). The visualization shows that the larger the rectangle in each category, the higher its frequency of appearance in scientific publications. In the keyword category, forecasting occupies the most dominant position, making this keyword a central topic in the current literature. In addition, keywords such as machine learning, volatility, commerce, and investment also appear frequently. The

high frequency of machine learning indicates a development in the direction of forecasting research that not only focuses on traditional methods but also increasingly adopts modern approaches. Meanwhile, the keywords volatility and investment are used in an effort to understand financial market uncertainty and investment decision-making amid a risky global situation.

In the journal category, one publication that stands out with a high number of citations is Measuring Economic Policy Uncertainty. This work is widely referenced by researchers because it provides a strong theoretical and methodological framework for forecasting studies. The main focus of this publication is on the phenomenon of uncertainty, especially in times of crisis when fiscal and monetary policy dynamics play a major role in determining economic stability.

Documents Analysis with Bibliometrix (Trend Topics)

Table 1. Trend Topics

Term	Frequency	Year (Q1)	Year (Median)	Year (Q3)
Prediction models	27	2025	2025	2025
Technological forecasting	9	2025	2025	2025
Deep learning	62	2023	2024	2025
Machine learning	206	2022	2024	2025
Crude Oil	66	2022	2022	2023
Gross Domestic Product	49	2022	2021	2023
Economic Growth	108	2021	2022	2024
Covid 19	104	2021	2023	2024

The table shows that research in recent years has been dominated by the topics of deep learning and machine learning, as evidenced by the high frequency of these terms occurring in 2023–2025. It can therefore be said that economic forecasting methods in the field of artificial intelligence remain the main focus of global research. In addition, the term crude oil appears with a fairly high frequency of 66 and a median in 2022, indicating a high level of interest in understanding the dynamics of global energy prices, which greatly affect macroeconomic stability. At the same time, the terms gross domestic product and economic growth are also widely studied, showing the literature's attention to fundamental indicators in assessing economic conditions.

Meanwhile, the term Covid-19 appeared 104 times in the initial range of its emergence in 2021 to the median in 2023. This phenomenon occurred because the pandemic was a turning point that drove the need for forecasting in situations of extreme uncertainty. The surge in Covid-19-related studies shows that forecasting is not only used to predict macroeconomic variables, but also to analyze the impact of the global health crisis on economic growth, trade, and financial markets.

Conceptual Structure – Thematic Evolution Map

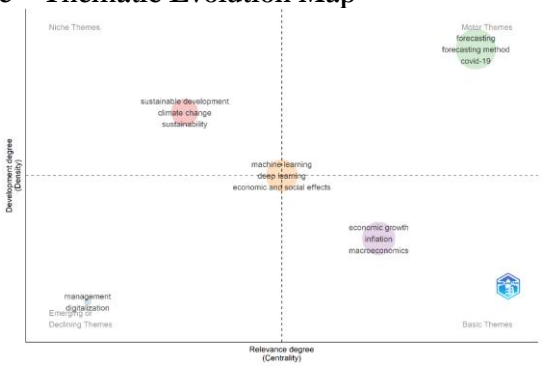

Figure 6. Thematic Evolution Map

The results of the bibliometric analysis based on Thematic Evolution show that there are developments in forecasting research themes divided into four quadrants, namely niche themes, motor themes, emerging or declining themes, and basic themes. This mapping not only shows the connections between themes but also provides an overview of the relevance and level of development of each research theme (Baral et al., 2025). In this way, it can be seen that forecasting research does not stand alone but is interrelated with other issues.

In the upper right quadrant or motor themes, key words such as forecasting, forecasting method, and COVID-19 were found. This theme is categorized as a motor because it has high relevance and a mature level of development, so it can be considered the center of attention in the current literature. The COVID-19 pandemic has driven an increase in research on forecasting methods in the fields of economics, health, and public policy. Meanwhile, in the upper left quadrant or niche themes, themes such as sustainable development, climate change, and sustainability emerge. Although not as relevant as motor themes, these topics indicate new discussions in forecasting research that are increasingly

moving towards sustainability issues. This is important because forecasting has begun to be used to predict environmental impacts, sustainable development planning, and climate change mitigation.

Furthermore, in the lower right quadrant or basic themes, keywords such as economic growth, inflation, and macroeconomics are visible. These topics are the foundation of forecasting research because they have been closely related to monetary policy studies, business cycles, and macroeconomic dynamics, especially in times of uncertainty. However, when viewed in the lower left quadrant, i.e., emerging or declining themes, topics such as management and digitalization are indicated. In this quadrant, related topics are still in their early stages or even declining.

VOS Viewer Analysis

Co-Authorship with Unit of Analysis is Country

Table 2. Number of Publications Based on Country

Country	Documents	Citations	Total Link Strength
United States	1130	52205	566
United Kingdom	578	14618	482
China	705	14602	295
Germany	301	6913	226
Italy	249	7974	206
France	191	4376	189
Australia	230	4767	117
Indonesia	40	316	21
Thailand	38	133	28
United Arab Emirates	37	155	41
Singapore	30	533	39

Through the results of this analysis, with a minimum number of documents per country of 10, the data reveal that the United States makes the greatest contribution to economic forecasting research, with 1,130 publications accumulating 52,205 citations. China ranks next with 705 papers and 14,604 citations, followed by the United Kingdom with 578 papers and 14,618 citations Although China has more publications than the United Kingdom, the number of citations for both countries is relatively balanced, indicating that publications from the United Kingdom tend to be of higher quality in terms of influence.

In addition to publications and citations, the total link strength (TLS) indicator shows the intensity of collaboration between countries. The United States ranks highest with a TLS of 566, demonstrating its role as the center of the international research network. The United Kingdom is in second place with a TLS of 482, but China has a TLS of 295, which is relatively lower than its large number of publications. This indicates that China is still more focused on domestic research production than on building global collaboration networks.

Meanwhile, for Indonesia itself, there are only 40 documents and 316 citations. In Indonesia, research on economic forecasting is dominated by traditional approaches, namely regression-based methods such as ARIMA and VAR. However, amid increasingly complex and uncertain global economic dynamics, reliance on conventional methods needs to be complemented by modern approaches, which involves integrating Artificial Intelligence and machine learning. This is in line with developments in international literature that emphasize the need to combine classical methods and technology so that forecasting results are not only accurate in the short term, but also adaptive to structural economic changes.

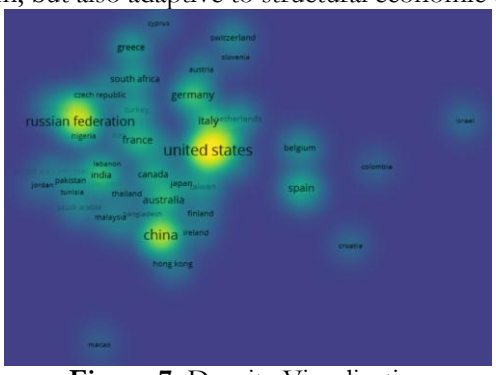

Figure 7. Density Visualization

The results of the VOS Viewer analysis with co-authorship analysis type and country analysis unit through density visualization show different color patterns. Lighter colors represent higher publication intensity, while darker colors indicate relatively low involvement. The map shows that the United States, Russia, and China have the lightest colors, indicating their central position as major actors in global forecasting research. This is due to their large research capacity and funding support. Conversely, areas with darker colors, such as Malaysia,

Saudi Arabia, Hong Kong, and North African countries, show low intensity of economic forecasting research. This could be due to limited research resources, different national policy priorities, or a lack of integration into international research networks.

Co-occurance with Unit of Analysis is All Keywords

Network Visualization

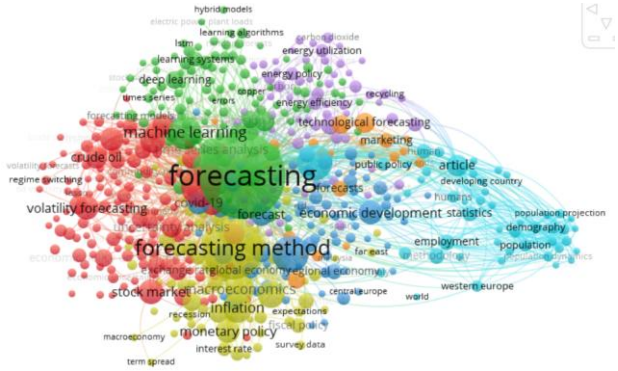

Figure 8. Network Visualization

The image is a visualization of a co-occurrence network based on an analysis of keywords frequently used in various publications related to the topic of forecasting. The circle size (nodes) signifies how often a keyword occurs, with larger nodes corresponding to higher frequencies. Meanwhile, circle colors indicate the clusters of keywords based on thematic relevance

a. Cluster 1 (Light Green)

The first cluster is marked with a light green color and consists of 186 items. This cluster is represented by keywords such as forecasting, machine learning, deep learning, time series analysis, and learning systems. This shows that the main focus of research in this cluster is the development of prediction methods using artificial intelligence and machine learning algorithms. This cluster emphasizes methodological and technical aspects in improving prediction accuracy, particularly through the integration of forecasting models with AI technology.

b. Cluster 2 (Lime)

The second cluster is marked with a lime green color and includes about 141 items. The dominant keywords in this cluster are inflation, interest rate, monetary policy, macroeconomics, and fiscal policy. This cluster illustrates how forecasting is used in a macroeconomic context, particularly to analyze fundamental variables related to economic stability.

c. Cluster 3 (Red)

The third cluster is marked in red and consists of 110 items. This cluster is led by keywords such as volatility forecasting, stock market, uncertainty analysis, and crude oil. Compared to other clusters, the research focus in this cluster is more centered on situations of uncertainty in the economic and financial systems. The presence of keywords such as volatility and uncertainty indicates that this cluster is related to risk and unstable market behavior. Topics such as crude oil prices and the stock market are the main objects of study because both are very sensitive to external shocks, whether geopolitical, global economic policy, or structural changes in the economy.

d. Cluster 4 (purple)

The fourth cluster, colored purple, is related to keywords such as energy policy, energy efficiency, energy utilization, and carbon dioxide. Research in this cluster focuses more on the application of forecasting in energy, environmental, and sustainability issues. Research in this cluster shows how forecasting methods can be used to project future energy needs, assess energy efficiency levels, and formulate policies that support the transition to clean energy. The relevance of this cluster is growing stronger as countries around the world intensify their efforts to promote the concept of a green economy, namely economic growth that is environmentally friendly and does not damage the ecosystem. This has emerged in response to increasing environmental degradation problems, many of which are triggered by energy-intensive economic activities. With its focus on energy and the environment, this supports the environmental economics theory known as the Environmental Kuznets Curve, which discusses the relationship between economic growth and environmental quality.

e. Cluster 5 (Light Blue)

Cluster 5 consists of 57 items and is led by the words economic development, population, and developing country. This cluster focuses on development and public

policy issues. Examples include forecasting population growth and employment dynamics, which are closely related to economic growth, especially in developing countries. The research direction in this cluster is highly relevant to developing countries, where issues such as the demographic bonus, job creation, and sustainable economic growth remain major challenges.

f. Cluster 6 (Orange)

The orange circle cluster focuses on topics such as marketing and technology forecasting and contains 20 items. This cluster highlights forecasting in a more practical and applicable realm. This shows that forecasting can be used to anticipate changes in consumer behavior, project market trends, and design more adaptive business strategies amid increasingly fierce global competition.

Overlay Visualization

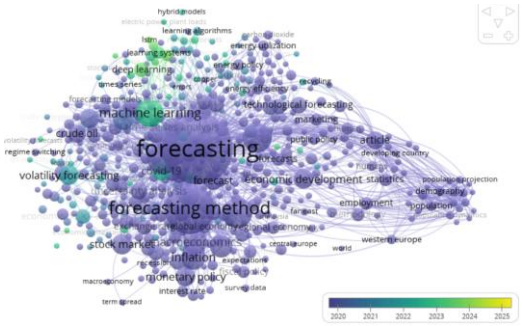

Figure 9. Overlay Visualization

The overlay visualization above shows the dynamics of forecasting developments from 2020 to 2025. Keywords in purple, such as forecasting, inflation, and monetary policy, have long been the focus of forecasting literature because they are often directed at macroeconomic analysis and market volatility. Entering the period from 2022 to 2023, there is a shift in color to green with keywords such as machine learning, deep learning, and hybrid models. This shift reflects a transformation in methodology, where forecasting is no longer limited to conventional approaches but has begun to integrate artificial intelligence. The emergence of AI-based methods demonstrates the literature's efforts to improve prediction accuracy while expanding the scope of forecasting applications in the face of increasingly large data sets.

In the most recent period, from 2024 to 2025, yellow-colored keywords such as energy efficiency and recycling began to appear. Although the intensity of the yellow color is not particularly prominent in the visualization, this trend shows that forecasting research is moving towards sustainability, particularly in relation to energy efficiency and the transition to a green economy. The focus on this topic indicates a shift in global interests, with forecasting as a means of supporting the sustainable development and green economy agenda.

5. Conclusion

Research on economic forecasting is increasingly important in the face of global uncertainty, especially in the 2020–2025 period marked by the COVID-19 pandemic and the Russia–Ukraine war. These two events have prompted an increase in economic forecasting research in response to the crisis, both to mitigate inflation risks, maintain monetary stability, and support public decision-making. A review of the literature shows that various forecasting methods have been developed to address the challenges of increasingly complex data. Traditional models such as ARIMA and VAR are still used, but have proven to be less adaptive in dealing with non-linear changes. Therefore, machine learning and deep learning-based methods such as LSTM, RBF-NN, and hybrid models have emerged, showing higher accuracy in forecasting GDP, inflation, and market volatility.

The results of the analysis using R Studio and VOSviewer provide a comprehensive overview of forecasting research trends. There were 2,561 publications from 515 journals, with an annual growth of 5.77% and involving more than 9,800 authors. In terms of countries, the United States led with 1,130 publications and the highest number of citations, followed by China and the United Kingdom. However, the quality of citations from the United Kingdom is relatively better than China's, even though it has fewer publications. Indonesia itself only contributed 40 documents, with a tendency towards conventional methods. In addition, thematic mapping shows four main directions of research: first, motor themes covering forecasting, forecasting methods, and COVID-19. Second, niche themes related to sustainability issues. Third, basic themes such as economic growth, inflation, and macroeconomics. Finally, fourth, emerging or declining themes related to digitalization. These results confirm that forecasting is a dynamic field, adaptive to crises, and increasingly relevant to new global issues.

For sustainability, forecasting research should focus on integrating traditional methods with modern technology to ensure more accurate and adaptive results. Researchers need to utilize big data effectively, avoid the curse of dimensionality, and expand the application of forecasting to sustainability areas such as energy transition and climate change mitigation. For developing countries such as Indonesia, it is important to build international collaboration and adopt artificial intelligence-based methods so that the prediction results can support national policies while remaining relevant in the global context. Thus, economic forecasting not only serves as an analytical tool but also as an important foundation for future development planning, business strategies, and public policy.

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