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# MAPPING RESEARCH ON PROBLEMS FACED BY STOCK INVESTORS: A BIBLIOMETRIC STUDY AND LITERATURE REVIEW

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***Abstract:*** Investing in stocks has several challenges that need to be considered by investors. This research aims to find out what problems are faced by stock investors. This research utilizes a literature review and bibliometric approach as a basis to facilitate researchers in systematically reviewing and identifying scientific articles, following predetermined steps. The utilization of VOSviewer was also carried out to conduct network analysis of related documents and identify relationships between authors. Careful and accurate bibliometric analysis is carried out based on data obtained from the Scopus database. This research revealed that there were 474 articles that had been selected from 682 articles that were relevant to the topic discussed. The analysis resulted in three distinct clusters of 22 concepts relevant to the study of the problems faced by stock investors. By using network visualization and density visualization modes to analyze the dominant themes and authors, there are several topics that have a strong connection with the problems faced by stock investors, namely financial markets, investment optimization, portfolio selection, and strategic planning. This research provides a brief overview of the literature that can be accessed by researchers focusing on this area, providing recommendations for future research directions.

***Keywords:*** Bibliometrics, Equity Investors, Portfolio Selection, Financial Markets

## Introduction

Investment is delaying present consumption to be used in efficient production within a certain period of time (Alhammadi et al., 2018). Investments in the form of financial assets can be direct and indirect investments. Direct investments are made by buying financial assets directly from the company. Conversely, indirect investment is made by buying shares in investment companies that have a portfolio of other companies' financial assets.

Investing in stocks involves several challenges that need to be addressed by investors. Unpredictable market fluctuations can increase investment risks due to factors such as global economic conditions, political events, or company news (Soebagiyo & Prasetyowati, 2017). The constraint of knowledge and experience in analyzing stocks, such as understanding financial reports and fundamental analysis, can be a hurdle, especially for novice investors. Additionally, the ever-changing regulatory landscape requires constant monitoring and adaptation to changes in stock market regulations or government rules. Investor psychology is also a crucial factor, as emotional reactions to market fluctuations can negatively impact investment decisions. Finally, diversification risk must be managed wisely to avoid overreliance on a single stock or sector,

optimizing potential gains while minimizing overall portfolio risk. With patience, discipline, and a deep understanding of the market, investors can overcome these challenges and enhance their chances of success in stock investments (Mahardhika & Zakiyah, 2020).

In general, the potential risks are systematic and unsystematic risks (Wijoyo & Firmansyah, 2021). Systematic risk is called market risk. The risk of market changes depends, for example, on the country's economic conditions, inflation, changes in exchange rates or government policies. Meanwhile, unsystematic risk is the risk that comes from the company itself or several similar companies with the liquidity of the company's shares (Sadalia et al., 2017). The risks associated with an investment can be systematic or unsystematic. Systemic risk is unavoidable because this risk is an economic change that the company cannot control. The level of risk of an instrument, especially in the Indonesian capital market, is greatly influenced by economic and political factors in the country and the condition of the company itself (Febriandika et al., 2023). Therefore, it is better for an investor in making investment decisions to first analyze the investment instrument he chooses (Athief, 2019). This analysis is useful for minimizing existing risks.

Investors can lose all their capital if the issuer goes bankrupt. However, issuer bankruptcy is rare because investors are always looking for investment opportunities that offer the highest returns for a certain level of risk (Jing-Hua et al., 2013). To do this, in terms of stocks, analysis is needed to measure the value of shares, namely fundamental analysis and technical analysis (Alam & Saputro, 2021). When conducting fundamental analysis, investors must consider the health of the company itself as well as the economic conditions in which the company operates. Even for technical analysis, investors can see trends from the price of the stock they choose (Sriyono et al., 2021). Given the unpredictable and precarious characteristics of financial markets, an effective intelligent system should possess the capability to handle and mitigate risks. Furthermore, recognizing that investors vary in their willingness to take risks, it becomes crucial for a risk management system to take into account and accommodate their individual risk preferences (Eskandari et al., 2022).

It is very important to critically analyze the results of existing research to pave the way for future research, as well as to provide projections as government proposals for stock investor policies. This evaluation process depends heavily on the availability and accuracy of scientific research data. Bibliometric indicators are a tool that plays an important role in evaluating the results of scientific research; examines the interaction of science and technology, maps themes, explores or tracks the development of new knowledge in a particular field, and is an indicator of the future when making strategic plans (Apriantoro et al., 2022).

This research endeavors to identify the trajectory of research development pertaining to issues and risks encountered by stock investors. The investigation utilizes systematic literature review techniques and incorporates bibliometric analysis of publications indexed in the Scopus database spanning the years 1973 to 2022. The choice of Scopus is based on its status as an abstract database and reference source, curated by acknowledged experts in various fields (De Moya-Anegón et al., 2007). Scopus, with its extensive repository comprising 1.8 billion citations since 1970, 84 million records, 17.6 million author profiles, and 94.8 thousand partner profiles for 7 thousand publishers, was selected for its comprehensive and reputable nature (Baas et al., 2020).

Moreover, the outcomes of this bibliometric research extend beyond the academic realm, having potential relevance for stakeholders, decision-makers, and the general public with an interest in the domain of stock investment (Pratama et al., 2021). The comprehensive nature of Scopus makes it a valuable resource for extracting insights into the evolution of research on the challenges and hazards faced by stock investors over the specified period.

Researchers conducting research in a particular field can find out which topics have been studied and which have not, which topics are being studied, trends, and which topics have reached

their research capacity. This allows the results of bibliometric research to become a reference and starting point for more researchers in Indonesia and elsewhere working on certain topics.

In particular, this research provides a projection as a suggestion for the government to improve the policy system by involving the community in it, especially the community which includes stock investors. This study provides a review of the literature that can be accessed by future researchers to conduct research on the problems and risks faced by stock investors and provide recommendations for future research trends, especially regarding policies carried out by the government towards the general public and the stock investors themselves.

## Literature Review

Bibliometrics, initially introduced by Pitchard in 1996 to measure characteristics in literature, involves mathematical and statistical methods applied to books and other literary works (Khan et al., 2022). The analysis includes variables such as authorship, publication location, keywords describing the subject, and citations. Utilizing systematic literature review techniques, data for this study were gathered from publications indexed in the Scopus database. Apriantoro et al. (2023) conducted research on the impact and trends of Corporate Social Responsibility (CSR), employing bibliometric methods to explore community empowerment. They utilized VOSviewer for network analysis of related documents and author relationships. Additionally, Hakim & Fenny Mei Angraeni (2022) used bibliometric analysis to investigate research on marketing strategies in Islamic banks.

The research conducted by Alexander & Destriana (2013) in their article titled "The Effect of Financial Performance on Stock Returns" aimed to investigate the impact of economic value added, operating cash flow, residual income, profit, operating leverage, market value added, and dividend yield on stock returns. The findings suggest that economic value added, operating cash flow, residual income, profit, and market value added exert a significant influence on stock returns. In contrast, operating leverage and dividend yield were found to have no significant impact on stock returns.

According to Tambunan's (2020) article "Stock Investment during the COVID-19 Pandemic," it is stated that investors can continue to achieve profits despite the pandemic by making informed decisions. Investors should be meticulous in selecting sectors, perform fundamental analysis, and diversify their stock portfolio to minimize risks. The suggested sectors encompass the consumer industry, telecommunications (data, tower), and healthcare (pharmaceuticals and hospitals) as viable options in the midst of the pandemic.

Both studies have differences when compared to the current study. While both explore the topic of equity investment, this article will add a new dimension by going in-depth into analyzing the problems and risks often faced by equity investors.

## Method

The method used in this article is bibliometric analysis and systematic literature review. Bilibliometric analysis is a quantitative method that analyzes bibliographic data in articles or journals. Meanwhile, systematic literature review is the process of identifying, assessing and interpreting all available research evidence with the aim of providing answers to specific research statements (Kitchenham et al., 2010). Information was obtained using a Boolean search engine to browse Scopus pages between 1973 and 2022. The search was conducted on Wednesday, 30 November 2022 at 06.05 WIB. In research, researchers use R and Rstudio tools, VosViewer software which can be used to build and visualize bibliometric networks such as journals, titles,

authors, authors, publications and so on and Microsoft Excel to analyze citations, document content and networks.

In the first stage, the researcher conducted a literature review on related themes to ensure relevant research was carried out on bibliometric topics. In addition, literature review is useful for determining appropriate keywords and is seen as representing the scope of research. Furthermore, in the second stage, to get an idea of whether the research will cover the minimum number required, the researcher will look at the number of publications that have been published. At this stage the researcher uses the boolean operator TITLE-ABS-KEY ( problems AND risks AND of AND stock AND investor ) to perform a search on Scopus which produces 682 documents. Furthermore, filtration is carried out with boolean operators by issuing research in 2023, TITLE-ABS-KEY ( problems AND risks AND of AND stock AND investor ) AND ( EXCLUDE ( PUBYEAR , 2023 ) ) AND ( LIMIT-TO ( DOCTYPE , “ar” ) ) AND ( LIMIT-TO ( LANGUAGE , “English” ) ) AND ( LIMIT-TO ( SRCTYPE , “j” ) ) To enter documents that are only in English with document types only in the form of articles with journal sources so as to produce a final document of 474 documents.

In the final stage, an analysis is performed on the final searched documents using Scopus analyzer and R and Rstudio to find out the number of documents based on journal, author, affiliation, and subject/field. Furthermore, an analysis was carried out at the document network level by reading visualizations through VOSViewer and processing Microsoft Excel data with the type of co-authorship analysis and keywords (co-occurance). In this study, co-authorship and co-occurrence will be used to map the development of research on the publication of the problems faced by stock investors. The procedure for this research can be seen in graph 1 below:


**Graph 1. Article Review Process**

## Result and Discussion

### Relatedness and Grouping of Themes in the Analysis of Problems Faced by Stock Investors

VosViewer comes with a default cluster network, where a cluster refers to a grouping of closely related nodes. Each node within the network is affiliated with a specific cluster, and the number of clusters is contingent on the resolution parameter. Increasing the value of this parameter results in a greater number of clusters, as elucidated by Nafi’ah et al. (2021).

For bibliometric network visualization, VosViewer utilizes color to depict clusters to which nodes are assigned. The clustering technique employed by VosViewer is detailed by Waltman et al. (2010), involving an algorithm aimed at solving optimization problems. In the visualization of the network, elements are represented by their labels, typically displayed as circles by default. The size of both labels and circles is proportional to the weight of the corresponding item. Items with higher weights may not be displayed to prevent overlap. The color assigned to an item corresponds to the cluster it is part of.

In this representation, links between elements signify connections, with the proximity of two journals indicating a stronger association. Lines delineate the most robust citations between journals, with their thickness reflecting the strength of the association. Overall, the visualization aims to illustrate the network structure, highlighting clusters and connections within the bibliometric landscape.

**Table 1. Dominant Themes in The Analysis of Problems Faced by Stock Investors**

| No. | Keywords | Occurences | Total Link Strength |
|---|---|---|---|
| **Cluster 1: Financial Markets** | | | |
| 1 | Financial Markets | 72 | 575 |
| 2 | Portofolio Optimization | 58 | 333 |
| 3 | Commerce | 47 | 408 |
| 4 | Risk Assessment | 41 | 341 |
| 5 | Decision Making | 21 | 166 |
| 6 | Profitability | 11 | 75 |
| 7 | Stock Price Prediction | 4 | 38 |
| 8 | Prediction Accuracy | 4 | 25 |
| 9 | Economic Analysis | 3 | 12 |
| **Cluster 2: Investments** | | | |
| 1 | Investments | 100 | 819 |
| 2 | Financial Data Processing | 28 | 240 |
| 3 | Dynamic Programming | 19 | 124 |
| 4 | Portofolio Choice | 17 | 32 |
| 5 | Economic | 15 | 120 |
| 6 | Optimal Investments | 8 | 62 |
| 7 | Strategic Planning | 7 | 57 |
| **Cluster 3: Portofolio Selection** | | | |
| 1 | Portofolio Selection | 49 | 291 |
| 2 | Costs | 25 | 214 |
| 3 | Genetic Algorithms | 22 | 226 |
| 4 | Budget Control | 5 | 59 |
| 5 | Surveys | 3 | 25 |
| 6 | Factor Analysis | 3 | 6 |

Network Visualization has a function to show networks between visualized topics. In this section, based on the concepts that will be explained into several visualizations related to the theme of this research, cartographic analysis from VOSviewer is used by selecting co-occurrence (keyword) analysis as the analysis method and selecting all keywords as the unit of analysis. The minimum number of citations was set to '3' and the minimum clustering value to 40 to identify meaningful clusters, the researcher found 3 main clusters for 22 papers out of 223 papers. Furthermore, from the results of their review using VOSviewer, it was explained that there were 3 clusters (see table 1).

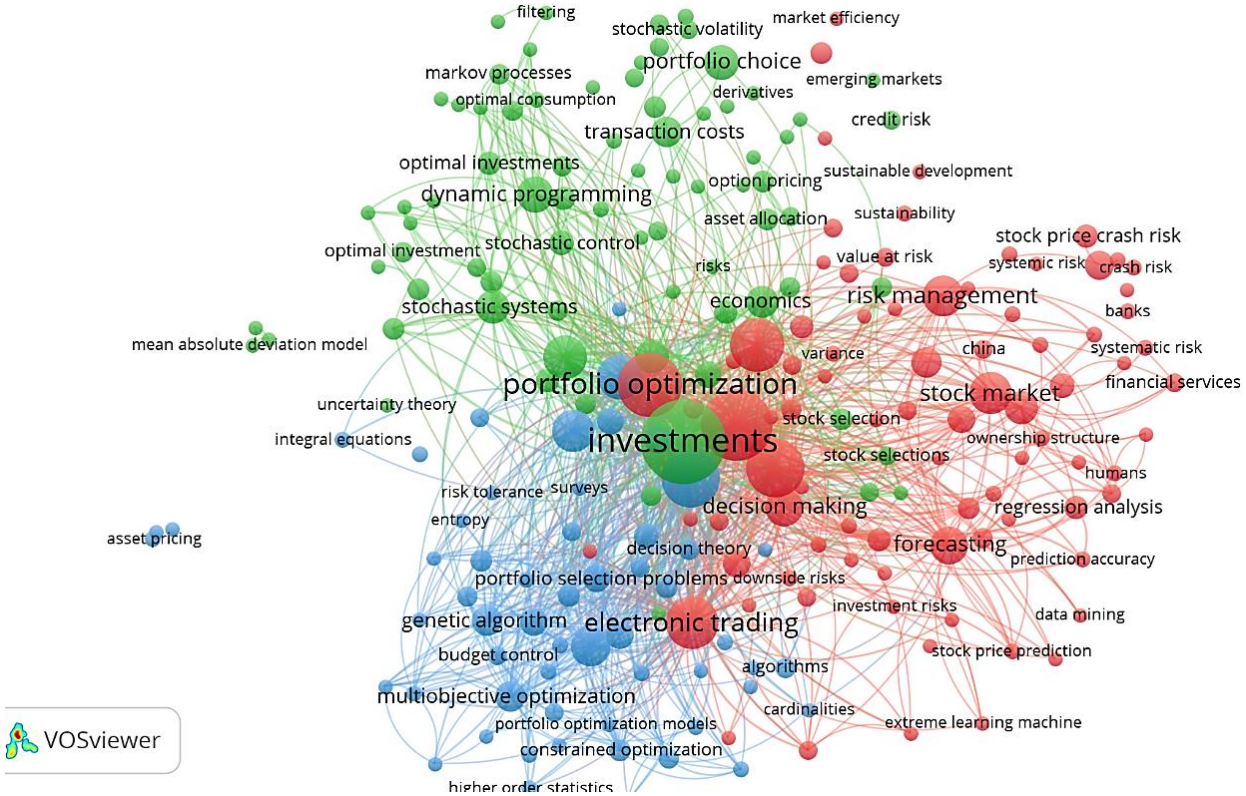


**Figure 1. Thematic Relationships in The Analysis of Problems Faced by Stock Investors**

Figure 1 illustrates that each cluster's density is distinctly represented by a different color, facilitating the identification of related topics of discussion grouped within each cluster. This visual distinction simplifies the process for future researchers to pinpoint clusters associated with specific themes or discussions, streamlining the exploration of relevant research areas.

The mapping in Figure 1 can help further research that will start from scratch. Once they find a topic of interest in a particular area of interest, they can read articles related to the topic to be covered using this research. In red cluster 1, related concepts are financial market, portfolio optimization, commerce, risk assessment, decision making, profitability, stock price prediction, prediction accuracy, and economic analysis. Meanwhile, cluster 2, which is green in color, discusses investments, financial data processing, dynamic programming, portfolio choices, economics, optimal investments, and strategic planning. The last thing in cluster 3 which is blue in color, discusses more about portfolio selection, costs, genetic algorithms, budget control, surveys, and factor analysis.

**Dominant Themes in the Analysis of Problems Faced by Stock Investors**

In Figure 2, the dominance of specific concepts becomes evident through the results of density visualization, signified by pronounced color thickness. Notably, words or topics of discussion are highlighted in bold colors, emphasizing the dominant themes explored in previous research and their relevance to the challenges faced by stock investors.

This section aims to identify key themes for discussion based on prior research pertaining to issues encountered by investors in the stock market. The importance of topics is discerned by examining the color density, with bolder colors indicating more significant and dominant themes. The utilization of density visualization will be elucidated through various visualizations related to the study's theme. By employing this technique, it becomes more straightforward for the writer to identify dominant themes, as bold and distinct colors underscore the prominence of particular topics in the research landscape.

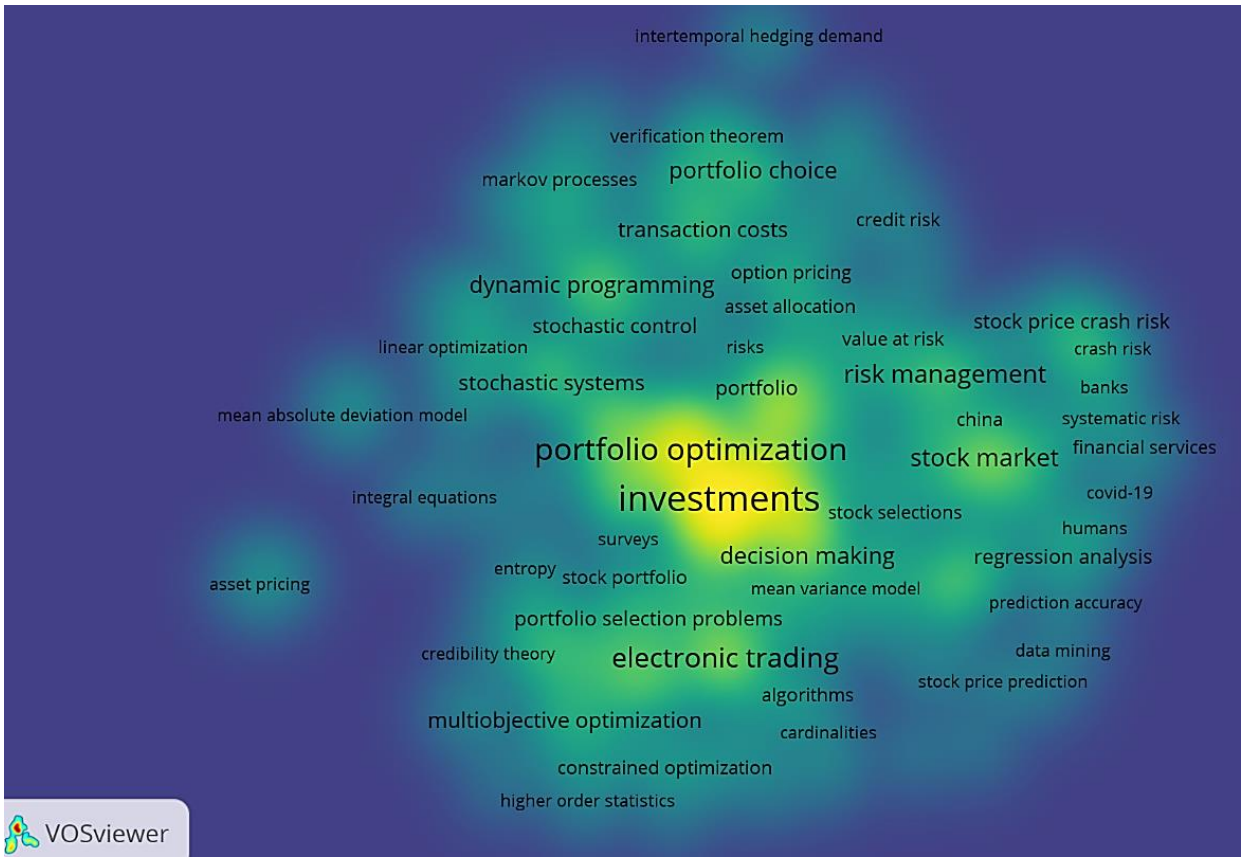


**Figure 2. Dominant Concepts Seen from Density Visualization**

Utilizing density visualization proves to be advantageous in pinpointing pertinent topics for discussion in this study, offering a clearer perspective compared to network visualization, where authors may sometimes share similar positions on discussed topics, making it challenging to discern specific findings. As depicted in Figure 2, the color intensity of discussed topics is evident, amalgamating insights from each cluster.

A prominent concept that emerges is "Investments," displaying clear dominance as it is frequently employed by researchers in their published articles. This dominance aligns seamlessly with the intended themes for future research. Other concepts, such as "Portfolio Optimization," "Portfolio Selection," and "Stock Market," are complementary or supportive in nature. These concepts contribute to the overarching discussion objectives, aligning with and bolstering the dominant concept of "Investments." This interconnectedness enhances the coherence and relevance of the topics, fostering a comprehensive understanding of the research landscape.

**The Dominant Author in the Study of Analysis of Problems Faced by Stock Investors**

In this segment, the application of Author Network Visualization facilitates researchers by presenting findings that highlight the interconnectedness among the authors of these articles. Within this network, authors or researchers demonstrate a collaborative relationship in producing articles, indicating a shared alignment of ideas. Through Author Network Visualization, it becomes evident that the authors involved in this network share common thematic discussions that align with the overarching theme of Problems Faced by Stock Investors. Figure 3 visually represents a collection of topics discussed by a group of authors engaged in research within their respective articles.

In the author data mapping using author network visualization, as illustrated in Figure 3, several authors are categorized into three distinct clusters derived from their research articles. To delve deeper into these clusters, researchers employed a co-authorship analysis, utilizing the fractional calculation method. The rationale behind using fractional calculations is to mitigate the impact of documents authored by multiple individuals. Two separate co-authorship analyses were conducted, with the minimum number of country documents and citations set at '1' to ensure a comprehensive analysis of the source document's origin. Additionally, researchers established a minimum clustering value of 20 to discern meaningful clusters.

Following these parameters, 9 authors were selected from the initial pool of 72 authors, which were initially grouped into three clusters. The resulting color scheme in the cluster data mapping indicates that cluster 1 is represented in red, cluster 2 in green, and cluster 3 in blue. This color-coded representation provides a visual insight into the distinct clusters and aids in understanding the collaborative patterns among authors within each cluster.

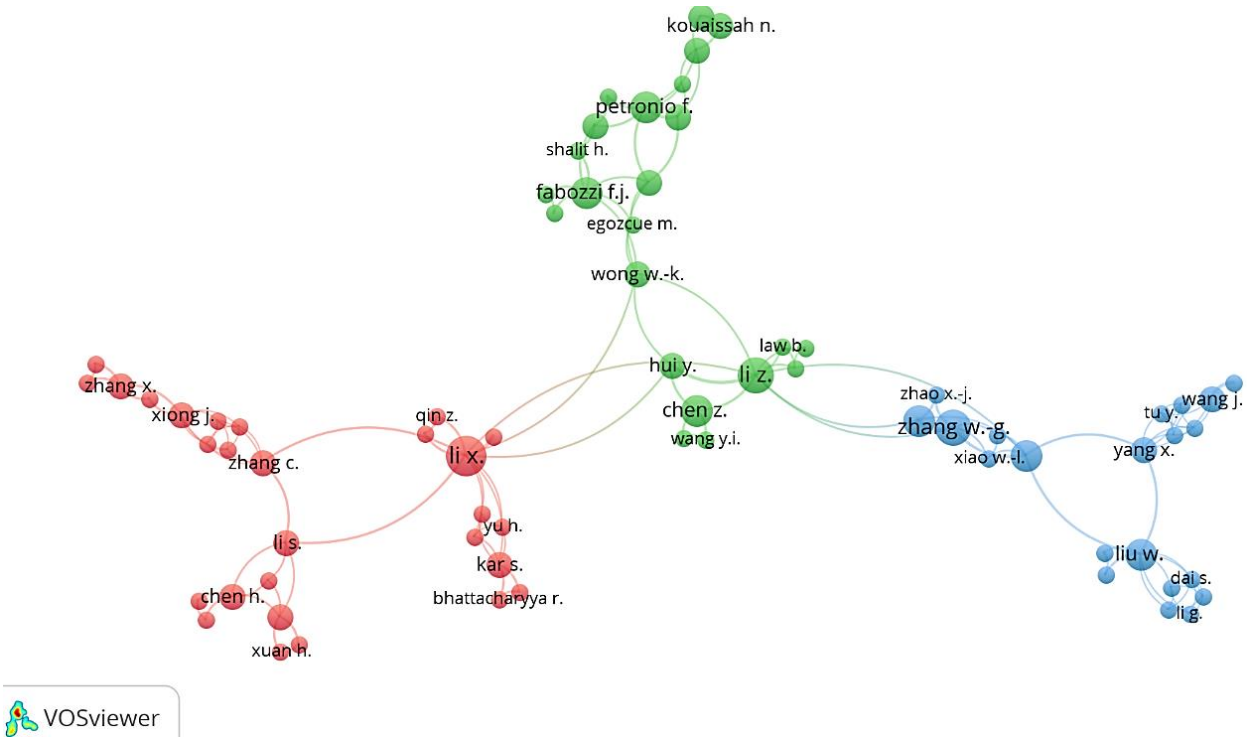


**Figure 3. Author Data Mapping with The Network Visualization Model**

Based on Figure 3, each cluster is connected to one another in producing research studies related to the discussion theme of Problems Faced by Stock Investors. However, in mapping author data using density visualization mode, it can be seen that each author occupies a joint position at

one point in each cluster in studying the theme of Problems Faced by Stock Investors. The significance of the authors depicted in the aforementioned picture lies in their crucial roles in generating findings that will serve as foundations for future research. Both authors hold pivotal positions, and their work is integral to subsequent studies. Furthermore, their relevance extends to the examination of challenges encountered by stock investors, indicating a direct connection between their contributions and the thematic focus of the research.

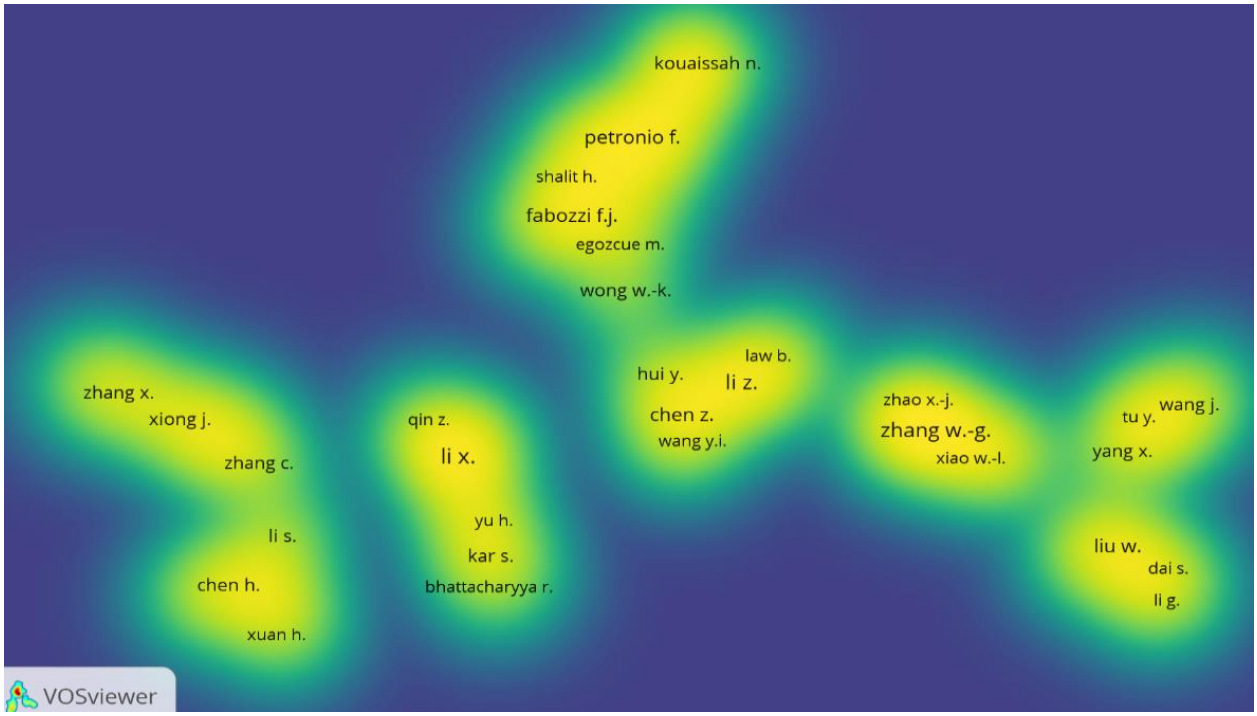


**Figure 4. Author Data Mapping with The Density Visualization Model**

To identify the predominant author, scholars can employ author density visualization. This visualization technique facilitates the identification of a dominant author for potential future research endeavors. By examining the color density output from author density visualization, researchers can discern the prevalent author in the analyzed articles. Figure 4 illustrates the author data mapping using the Density Visualization mode. This analysis not only aids in pinpointing the dominant author but also allows researchers to deduce the thematic focus of issues faced by stock investors through the prevalence of a specific author in the studied articles.

Moreover, the visualization reveals distinct groupings of authors within the realm of stock investor studies. This grouping offers insights into collaborative efforts or shared research interests among authors, contributing to a more comprehensive understanding of the research landscape in this particular field.

**Table 2. Grouping of Authors in the Study of Analysis of the Problems Faced by Stock Investors**

| Cluster | Author Name | Document | Citation | Total Link Strength |
|---|---|---|---|---|
| **Cluster 1: li x** | | | | |
| 1 | li x. | 5 | 99 | 500 |
| 2 | kar s. | 2 | 118 | 200 |

| | | | | |
|---|---|---|---|---|
| 3 | chen h. | 2 | 27 | 200 |
| 4 | zhang c. | 2 | 5 | 200 |
| **Cluster 2: li z** | | | | |
| 1 | li z. | 4 | 44 | 400 |
| 2 | fabozzi f.j. | 3 | 30 | 300 |
| 3 | petronio f. | 3 | 9 | 300 |
| **Cluster 3: zhang y** | | | | |
| 1 | zhang y. | 3 | 24 | 300 |
| 2 | liu w. | 3 | 11 | 300 |

In mapping the table above, several authors have contributed in conducting research related to the theme of Problems Faced by Stock Investors. Researchers try to examine several previous studies that have related topics or themes with other authors. Overall of the 3 clusters, the most dominant author in his research in cluster 1 is Li X., in Cluster 2 is Li Z., while in Cluster 3 is Zhang Y.

Precise and efficient analysis of financial data is pivotal for risk management and the formulation of prosperous investment strategies. Jiang (2022) emphasizes the significance of financial data analysis in research, presenting a stock selection model with two sequential steps: Stock prediction and stock evaluation. Initially, generate stock predictors and employ machine learning forecasting techniques to predict the future prices of individual stocks. Subsequently, construct a stock evaluation mechanism to appraise each stock using factors from the prediction and financial realms outlined in the preceding step. Ultimately, opt for stocks with elevated scores and invest with a uniform weighting.

In their study, Dutordoir et al., (2022) interviewed institutional investors to explore decisions regarding the issuance of convertible bonds. Investors express a preference for conversion over equity issuance to mitigate the risk of diluting equity value. The research findings provide backing for conventional theories related to the issuance of convertible bonds, including concepts like equity backdoor, sequential financing, risk transfer, and risk dissent models.

Predicting systematic risk is vital for making sound investment choices. As per Puspitaningtyas (2017), foreseeing systematic risk aids investors in comprehending the risks they may encounter, as it acts as a metric for investment risk. Alongside returns, rational investors consistently balance the trade-off between return and risk in their investment considerations. When faced with a particular return rate, investors are likely to prefer investments with minimal risk. Conversely, when confronted with a specific risk level, investors tend to choose investments with the highest potential returns.

The research study in cluster one, involving Bhattacharyya et al. (2011), concludes that in portfolio selection, factors such as expected returns, risk, and liquidity are challenging to predict accurately. Portfolio decisions rely more on investors' experience and economic knowledge. Therefore, deterministic portfolio selection is less optimal. In recent literature, fuzzy set theory is widely used to model fuzzy MVS portfolio selection problems. Three different models with optimistic, pessimistic, and combined views are applied, and their solutions involve integrating fuzzy simulation (FS) and elitist genetic algorithm (EGA) to create a more efficient Hybrid Intelligent Algorithm (HIA).

In Asghar et al.'s (2019) study, the efficiency of predicting stock market trends is highlighted as a crucial tool for investors, companies, and governments. Most studies focus on developing stock-based prediction systems using data from social media (sentiment-based) and secondary sources (financial websites). However, data from these sources is often limited, and the selection

of predictor variables is suboptimal, resulting in decreased predictive model performance. To address these issues, the research proposes the development of an effective prediction model by improving the quality of input data and optimizing the selection of predictor variables.

According to Chen & Hung (2009), the goal of stock portfolio selection is to allocate capital to various stocks so as to generate optimal returns for investors. They proposed the use of linguistic TOPSIS and linguistic ELECTRE methods as a new approach in decision-making regarding stock selection. In this method, linguistic evaluation of experts is used to consider the investor's risk preference after determining the investment set. The investment ratio for each stock in the portfolio is then calculated based on the risk preference. To illustrate the practicality of the proposed method, this study includes an applied example.

In contrast to the research conducted by Liu et al. (2018), the topic addressed is multi-period portfolio selection with discounted transaction costs in the context of uncertain and opaque investments, which has not received much attention before. The assumption is that investors want to find a portfolio that can maximize terminal wealth and cumulative skew on the portfolio, while minimizing cumulative risk on the portfolio. The main criteria considered involve wealth, risk, skew, transaction cost, entropy of proportion, transaction lot, maximum number of assets in the portfolio, and budget constraints. The proposed model is a mean-semivariance-skewness model with discounted transaction costs for multi-period fuzzy portfolio selection.

Research by Asgari & Behnamian (2022) emphasizes the complexity of selecting a portfolio of stocks in the financial market. The main objective is to find the best solution to allocate capital among the various stocks available, with the intention of achieving optimal returns and reducing risk. Most current stock portfolio models lack consideration of future changes and rely too heavily on past data. We propose an approach that combines scenario modeling with multi-stage stochastic programming, allowing investors to generate solutions based on historical data and future scenarios. The proposed model uses a meta-heuristic algorithm based on the harmony search algorithm. This study involves a numerical example using real stock data from the Iranian stock market and compares the performance of the proposed algorithm with a genetic algorithm. The results show the superiority of the proposed algorithm in terms of solution quality and execution time.

The portfolio optimization problem, addressed by Zhang et al. (2022) with sell orders, where investors sell risky assets as soon as their price reaches a preset selling threshold. The planning strategy at the first stage involves constructing the investment strategy returns as LR-power fuzzy numbers based on historical data. They proposed a fuzzy mean-semi-variance portfolio optimization model considering sell orders. In the second stage, a multi-objective genetic algorithm was designed to solve the model. In the third stage, an optimal investment strategy was selected from the efficient solution based on the Fuzzy Value-at-Risk ratio. This research opens a new outlook on the challenges of portfolio optimization with sales orders and provides a reliable solution using an integrated approach.

In research related to the value of investors' portfolios, Nkeki (2018) found that inflation, interest rate, and income risks have a significant influence on risky asset portfolios. Risk aversion correlates with an increase in consumption and portfolio risk can increase with an increase in income. Meanwhile, research by Abbas et al. (2022) highlighted the link between risk-based capital, risk taking, and profitability. The relationship between risk-based capital and risk-taking behavior tends to be negative, particularly in Islamic banks, where managers may prefer investments in risky assets while maintaining minimal capital. The concept of profit and loss sharing in Islamic banks encourages managers to take high risks for greater returns. This finding is consistent with agency theory, suggesting that bank managers may tend to take excessive risks in order to get higher compensation for achieving higher profitability. Moreover, a positive

relationship was revealed between risk-taking and profitability, supporting portfolio theory in finance.

For continuous and discrete financial markets, Redeker & Wunderlich (2018) study the impact of imposing dynamic risk constraints on the expected utility loss from consumption between time and terminal wealth. They formulate dynamic programming equations for the arising stochastic optimal control problem and solve them numerically. The numerical results show that, although the loss of portfolio performance is insignificant, the risk is significantly reduced. The study also explores the effect of time discretization, showing that the loss of portfolio performance due to risk constraints tends to be greater than the loss caused by trading recklessness.

## Conclusion

In reviewing 474 articles selected from 682 articles in the Scopus database, this research explores the issues and risks faced by equity investors. Through the Vosviewer application, the research identified dominant concepts in three main clusters. The first cluster, in red, discusses financial markets, portfolio optimization, commerce, risk assessment, decision making, profitability, stock price prediction, prediction accuracy, and economic analysis. The second cluster, in green, discusses investments, financial data processing, dynamic programming, portfolio choice, economics, optimal investments, and strategic planning. The third cluster, colored blue, focuses more on portfolio selection, costs, genetic algorithms, budget control, surveys, and factor analysis.

This research helps future researchers identify relevant information. This article highlights topics related to the problems and risks of stock investors, including financial markets, investment optimization, portfolio selection, and strategic planning. The proposed stock selection model includes two important steps, namely stock prediction and stock valuation, using machine learning forecasting methods. Inflation, interest rate, and income risks play a major role, with an increase in income increasing portfolio risk. The solution model using fuzzy simulation and elitist genetic algorithm creates a powerful and effective hybrid intelligence algorithm. Overall, the article provides deep insights into crucial concepts related to stock investment and its risks.

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