

Capital Market Research in Transition and Emerging Research Directions

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Abstract

Capital market research has experienced substantial transformation alongside changes in financial systems, technological innovation, investor behavior, and sustainability concerns. This study aims to examine the development, intellectual structure, thematic relationships, and emerging research directions in the capital market literature. A bibliometric approach was employed to map the evolution of capital market research using publication data and keyword analysis. Network visualization was used to identify major thematic clusters and relationships among keywords, while overlay visualization was applied to examine the temporal development of research themes. The findings indicate that capital market research remains strongly grounded in conventional themes, including *market efficiency*, *asset pricing*, *liquidity*, *volatility*, *financial development*, *investment*, and *economic growth*. However, the research landscape has increasingly expanded toward interdisciplinary themes involving *financial technology*, *artificial intelligence*, *machine learning*, *algorithmic trading*, *behavioral finance*, *corporate governance*, *systemic risk*, *sustainable finance*, *ESG*, and *Islamic capital markets*. The overlay visualization further indicates a gradual shift from traditional market-oriented research toward technology-driven, behavioral, institutional, sustainability-oriented, and ethical finance perspectives. These developments suggest that technological innovation and changing financial-market conditions are reshaping both the methodological approaches and substantive research questions in capital market studies. The study concludes that future research should increasingly integrate financial economics with artificial intelligence, behavioral finance, regulatory studies, sustainability, climate finance, and Islamic finance. This study contributes to the literature by providing a structured overview of the transition in capital market research and identifying potential directions for future scholarly investigation.

Keywords: capital market; bibliometric analysis; financial technology; artificial intelligence; behavioral finance; sustainable finance; Islamic capital market

Introduction

Capital markets constitute an important component of modern financial systems because they facilitate the mobilization and allocation of long-term financial resources. Through capital markets, individuals and institutional investors with surplus funds can channel their resources toward firms and other economic entities that require financing for investment, business expansion, and productive activities. Capital markets also provide investors with opportunities to generate financial returns, diversify investment portfolios, and manage financial risks, while enabling firms to access alternative sources of financing beyond conventional bank-based intermediation. From a broader economic

perspective, developed and efficient capital markets can improve the allocation of financial resources, enhance liquidity, reduce information and transaction costs, facilitate risk sharing, and support capital accumulation and economic development (Arestis et al., 2001; Beck & Levine, 2004).

The relationship between financial market development and economic growth has therefore become an important research issue in economics and finance. Financial development can influence economic performance through savings mobilization, investment allocation, risk diversification, technological innovation, and improved financial intermediation. However, the magnitude and direction of the relationship remain dependent on institutional, structural, and macroeconomic conditions. Arestis et al. (1997) emphasized that financial development should not be evaluated solely through aggregate indicators because the structure and institutional characteristics of financial systems can affect their contribution to economic growth. Similarly, Arestis et al. (2001) demonstrated that both stock markets and banking systems can contribute to economic growth, while Beck and Levine (2004), using dynamic panel estimation, found that stock market and banking development are positively associated with economic growth. These findings suggest that capital markets represent an important component of the broader financial system and may complement the role of banking institutions in supporting economic activity.

The importance of capital markets has become increasingly evident in emerging economies, where financial systems are undergoing structural transformation, financial deepening, technological development, and greater integration with international markets. Stock market development can expand corporate financing opportunities, mobilize domestic savings, improve market liquidity, and facilitate investment and risk sharing. At the same time, capital market performance is affected by macroeconomic conditions, interest rates, inflation, exchange rates, financial openness, institutional quality, investor protection, regulatory frameworks, and technological development. Evidence from ASEAN economies indicates that stock market development, banking development, economic growth, and macroeconomic conditions can interact within the broader financial development process (Pradhan et al., 2014). Thus, capital markets should be examined as part of an interconnected financial and economic system rather than as an isolated market mechanism.

The research landscape has consequently expanded beyond traditional studies of stock market development and economic growth. Contemporary capital market research encompasses market efficiency, asset pricing, liquidity, volatility, market microstructure, investor behavior, financial integration, corporate governance, market manipulation, financial stability, market regulation, financial technology, sustainable finance, and Islamic capital markets. Technological development has also encouraged increasing research attention toward stock market forecasting, algorithmic trading, computational finance, and data-driven investment decision-making. Scientometric evidence indicates that stock market forecasting has developed into a broad research domain involving diverse methodological approaches and research communities, with VOSviewer-based mapping revealing important trends in research outlets, influential publications, countries, and keywords (Adebayo et al., 2023). More recent bibliometric research similarly demonstrates the growing diversity of stock market research and highlights opportunities for further investigation and international collaboration (Fahami & Basri, 2025).

The expansion and diversification of capital market research have resulted in a complex and fragmented body of academic literature. Different research communities focus on different dimensions of capital markets, ranging from market behavior and pricing mechanisms to regulation, sustainability, technology, and investor decision-making. Recent bibliometric research on stock

market microstructure, for example, mapped 867 Scopus-indexed publications and identified multiple thematic pillars while highlighting emerging connections between market microstructure, governance, environmental, social, and governance (ESG) issues, and market fairness (Said et al., 2026). Similarly, bibliometric research on the relationship between social media and capital markets demonstrates how capital market scholarship increasingly intersects with communication technologies, investor behavior, and information dissemination (Zhang et al., 2024). These developments indicate that capital market research is no longer concentrated within traditional financial economics but increasingly involves interdisciplinary perspectives.

However, the increasing volume and diversity of capital market publications make it increasingly difficult to identify the major intellectual structures, dominant research themes, influential contributions, and emerging research directions through conventional narrative literature reviews alone. Traditional reviews are useful for synthesizing theoretical and empirical findings but may have limitations in systematically identifying relationships among large numbers of publications, authors, institutions, countries, journals, and keywords. Bibliometric analysis provides an alternative approach because it enables researchers to quantitatively examine large bodies of scientific literature and uncover the evolution, structure, relationships, and emerging areas within a research field (Donthu et al., 2021). Bibliometric techniques can identify publication trends, citation structures, influential authors and journals, institutional and country contributions, collaboration networks, keyword co-occurrence, co-citation relationships, and thematic developments.

The application of bibliometric methods has become increasingly relevant in capital market research. Existing studies demonstrate that VOSviewer and related bibliometric tools can be used to identify research clusters, thematic relationships, temporal developments, and collaboration structures within financial market literature. For example, Fahami and Basri (2025) analyzed 6,426 Scopus-indexed stock market studies and identified prominent authors, articles, countries, keywords, collaboration patterns, and future research opportunities. Their findings also indicate that although stock market research is globally distributed, cross-national collaboration remains relatively limited. Such evidence demonstrates the usefulness of bibliometric analysis for understanding not only what has been studied but also how research communities are connected and how research priorities evolve over time.

Despite these developments, existing bibliometric studies generally focus on particular dimensions of capital markets rather than providing an integrated mapping of the broader research landscape. Previous studies have concentrated on specific areas such as stock market forecasting, market microstructure, social media and capital markets, investment decisions, Islamic capital markets, or market manipulation. Although these studies provide important insights into their respective subfields, their narrower focus makes it difficult to understand the relationships among different capital market research streams. Furthermore, the increasing methodological diversity of capital market research, including econometric analysis, event studies, machine learning, computational techniques, network analysis, and bibliometric methods, creates a need for an integrated research mapping that captures the broader intellectual and thematic structure of the field.

Another important dimension is the geographical development of capital market research, particularly in emerging economies. Developed financial markets have historically received substantial academic attention because of their mature institutions, extensive market data, and established regulatory environments. Nevertheless, emerging markets have become increasingly important research settings because their capital markets are undergoing rapid institutional, technological, and regulatory

transformation. Indonesia represents a particularly relevant case because its capital market operates within a financial system in which banking remains important while market-based financing continues to expand. Indonesian capital market development is also increasingly connected with sustainable finance, investor protection, digital financial services, market deepening, and Islamic finance. The Indonesia Capital Market Roadmap 2023–2027, for instance, identifies market deepening, sustainable finance, investor protection, digital financial services, and strengthening market participants as important development priorities (OJK, 2023). These developments demonstrate the multidimensional nature of capital market research in Indonesia.

The Indonesian context has also attracted increasing academic attention regarding the relationship between capital markets, macroeconomic conditions, and economic growth. Empirical studies have examined the role of stock market capitalization, stock prices, inflation, exchange rates, interest rates, and other financial indicators in explaining Indonesian economic performance. Recent evidence suggests that stock market development can have an important relationship with economic performance, although the effects may differ according to the dimensions of market development and the analytical approach employed. For example, recent Indonesian research has examined the relationship between stock market development and economic growth using time-series approaches, while other studies have investigated the influence of macroeconomic factors on stock prices and economic growth. These studies demonstrate the continuing relevance of capital market research within Indonesia's broader economic development agenda.

Despite the growing number of Indonesian-related publications, the position of Indonesia within the global capital market research landscape remains insufficiently mapped from a comprehensive bibliometric perspective. Existing Indonesian studies cover diverse themes, including stock market performance, macroeconomic determinants, investor behavior, financial integration, corporate governance, market efficiency, Islamic capital markets, sustainability, and financial stability. Recent bibliometric research focusing specifically on Islamic capital markets in Indonesia and Malaysia, for example, demonstrates substantial differences in research pathways and thematic development across the two countries (Noval et al., 2026). However, a broader mapping of capital market research is still necessary to determine how Indonesia-related research connects with the global literature across conventional and emerging themes.

Therefore, this study seeks to systematically map the development of capital market research using Systematic Literature Review (SLR), bibliometric mapping, and content analysis. Based on a curated dataset of scientific publications indexed in the Scopus database, VOSviewer is employed through network, overlay, and density visualizations to identify the intellectual structure, conceptual relationships, temporal developments, and thematic concentration of capital market research. The study identifies major research streams encompassing stock market development, market efficiency, asset pricing, market liquidity and volatility, market microstructure, investor behavior, financial integration, corporate governance, market regulation, financial stability, financial technology, sustainable finance, and Islamic capital markets. Particular attention is given to Indonesia-related publications to examine the contribution, thematic characteristics, and position of Indonesian capital market research within the global research landscape.

By integrating systematic literature selection, bibliometric visualization, and content analysis, this study contributes a structured understanding of dominant research themes, influential contributions, scientific collaboration patterns, conceptual relationships, and temporal developments within capital market research. The study also identifies emerging research opportunities related to financial

technology, sustainable and Islamic capital markets, investor behavior, market regulation, financial stability, digitalization, and the interaction between capital markets and broader economic development. In this way, the study provides a comprehensive research map that can support researchers in identifying research gaps and developing future research agendas while offering policymakers and financial practitioners a broader understanding of the evolution of capital market scholarship.

Accordingly, this study contributes to the literature by providing an integrated mapping of capital market research and identifying emerging research opportunities, particularly in financial technology, sustainable and Islamic capital markets, market regulation, financial stability, investor behavior, financial integration, and the interaction between capital markets and broader economic development.

Research Method

Research Design

This study employs a Systematic Literature Review (SLR) integrated with bibliometric mapping and content analysis to systematically examine the development, intellectual structure, thematic patterns, and emerging research directions in banking and machine learning. The integration of these approaches enables the study to combine systematic evidence synthesis with quantitative mapping of scientific publications and qualitative interpretation of research themes. SLR provides a structured procedure for identifying, screening, selecting, and synthesizing relevant studies, while bibliometric analysis enables the examination of publication patterns, citation structures, keyword relationships, research clusters, and scientific networks (Snyder, 2019; Donthu et al., 2021). Content analysis is subsequently employed to interpret the substantive meaning of the identified clusters and to identify methodological developments, research gaps, and emerging research opportunities.

The research focuses on applications of machine learning (ML) and artificial intelligence (AI) within banking and financial services, particularly in credit risk assessment, fraud detection, customer churn prediction, financial forecasting, customer segmentation, cybersecurity, financial stability, privacy-preserving technologies, and financial decision-support systems. The methodological framework was designed to ensure that the selected literature was relevant to the research objectives and sufficiently representative of the major research streams connecting banking and machine learning.

Systematic Literature Review Procedure

The SLR procedure follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) framework. PRISMA 2020 provides a transparent reporting structure for systematic reviews by documenting the processes of study identification, screening, eligibility assessment, and final inclusion (Page et al., 2021). The framework is particularly useful for minimizing arbitrary literature selection and improving the transparency and reproducibility of the review process.

The literature selection process consisted of four main stages: identification, screening, eligibility, and inclusion. During the identification stage, potentially relevant publications were collected using combinations of keywords related to banking, machine learning, artificial intelligence, financial analytics, credit risk, fraud detection, customer churn, cybersecurity, and financial decision-making. The search strategy was designed to capture studies addressing both conventional and emerging applications of machine learning in financial institutions.

The principal search terms included combinations of the following keywords: “banking,” “machine learning,” “artificial intelligence,” “financial risk,” “credit risk,” “fraud detection,” “customer churn,” “financial analytics,” “cybersecurity,” and “financial services.” Boolean combinations were used to increase the relevance of the retrieved literature. The search strategy was subsequently refined according to the research focus and the substantive relationship between machine learning and banking or financial services.

During the screening stage, duplicate, irrelevant, and non-substantive publications were removed. Studies that discussed machine learning without a meaningful connection to banking or financial services were excluded. Similarly, publications that focused exclusively on general artificial intelligence without addressing relevant banking or financial applications were excluded. The eligibility stage involved a more detailed examination of titles, abstracts, keywords, research objectives, methodological approaches, and substantive contributions.

Following the screening and eligibility assessment, a final dataset of **53 curated scientific articles** was obtained for bibliometric and content analysis. The selection process was conducted systematically to ensure that the final dataset represented studies with substantive relevance to machine learning applications in banking and finance. The use of explicit inclusion and exclusion criteria enhances the consistency and traceability of the literature selection process, which is an important characteristic of systematic reviews (Snyder, 2019; Page et al., 2021).

Bibliometric Data Collection and Processing

The bibliographic information of the selected publications was organized and processed using Microsoft Excel 365, with Publish or Perish used as supporting software for bibliographic retrieval and citation management. The cleaned bibliographic dataset was subsequently imported into VOSviewer for network construction and visualization. VOSviewer is widely used for constructing and visualizing bibliometric networks based on relationships among publications, authors, keywords, citations, and other bibliographic elements (van Eck & Waltman, 2010). Its clustering and visualization capabilities enable researchers to identify conceptual structures and relationships within large bodies of scientific literature.

Bibliometric analysis is particularly appropriate for the present study because the banking and machine learning literature has expanded across multiple disciplines and research communities. Bibliometric methods can identify influential publications, research trends, keyword relationships, thematic clusters, and emerging research areas that may be difficult to identify through conventional narrative reviews alone (Zupic & Čater, 2015; Donthu et al., 2021). Donthu et al. (2021) further emphasize that bibliometric analysis can be used to investigate the evolutionary structure of a research field and identify emerging areas of scientific inquiry.

VOSviewer Bibliometric Mapping

Three principal VOSviewer visualization techniques were employed: network visualization and overlay visualization

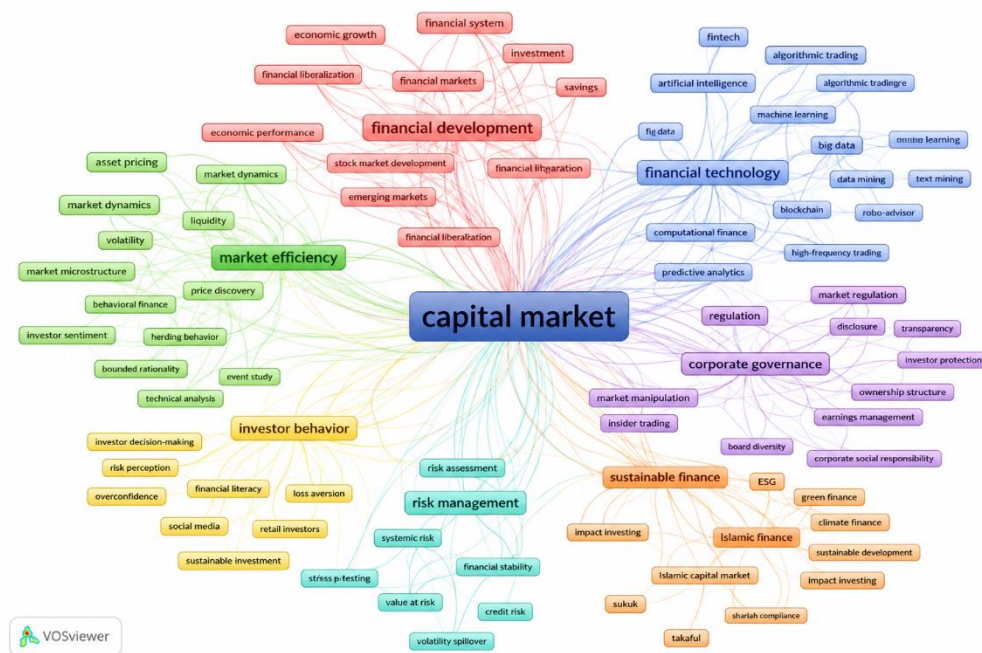
Network visualization was used to identify relationships among keywords and to determine the clustering structure of banking and machine learning research. In this visualization, closely related keywords are positioned near one another, while links between keywords represent their

relationships based on co-occurrence. The resulting clusters provide an indication of major conceptual and thematic research streams.

Overlay visualization was employed to examine the temporal evolution of research themes. The visualization enables the identification of relatively established research topics and newer research areas by considering the average publication year associated with keywords. This approach is useful for identifying shifts in research priorities and methodological developments over time.

The methodological basis for the VOSviewer analysis follows the bibliometric mapping approach developed by van Eck and Waltman (2010), who introduced VOSviewer as a software tool for constructing and visualizing bibliometric networks. VOSviewer supports the analysis of co-occurrence, co-citation, bibliographic coupling, and other relationships among scientific objects.

Result and Discussion



Picture 1. Network Visualization of Capital Market Research in Transition and Emerging Research Directions.

Figure 1 presents the network visualization of capital market research, illustrating the conceptual relationships among the main keywords identified in the literature. The visualization shows “capital market” as the central concept, with strong connections to several major research themes, including market efficiency, financial development, financial technology, corporate governance, investor behavior, risk management, and sustainable and Islamic finance. The network indicates that capital market research has developed from a relatively conventional focus on market performance and financial development toward a more diverse and interdisciplinary research landscape.

The first cluster, represented by the market efficiency and market dynamics themes, includes keywords such as *market efficiency*, *asset pricing*, *market dynamics*, *liquidity*, *volatility*, *market*

microstructure, *price discovery*, and *behavioral finance*. This cluster reflects the traditional foundation of capital market research, particularly studies examining how prices are formed, how efficiently information is incorporated into financial markets, and how liquidity and volatility influence market performance. The presence of *event study*, *technical analysis*, and *investor sentiment* also indicates increasing attention to the interaction between market information and investor responses.

The second cluster focuses on financial development and macroeconomic conditions. Important keywords include *financial development*, *financial markets*, *economic growth*, *investment*, *savings*, *financial system*, *financial integration*, *stock market development*, and *emerging markets*. This cluster demonstrates the continuing importance of capital markets within the broader financial system and their relationship with investment, savings mobilization, financial integration, and economic growth. The strong position of *financial development* suggests that capital markets continue to be examined not only as investment platforms but also as mechanisms supporting broader economic development. The third cluster highlights the transformation of capital markets through financial technology and data-driven approaches. Keywords such as *financial technology*, *artificial intelligence*, *machine learning*, *algorithmic trading*, *big data*, *data mining*, *computational finance*, *predictive analytics*, *blockchain*, and *robo-advisor* demonstrate the growing integration of digital technologies into capital market research. This cluster represents an important transition from conventional econometric and financial analysis toward computational and data-intensive approaches, particularly for forecasting, automated trading, risk analysis, and investment decision-making.

The fourth cluster is associated with regulation and corporate governance, with keywords including *corporate governance*, *regulation*, *market regulation*, *disclosure*, *transparency*, *investor protection*, *ownership structure*, *earnings management*, *board diversity*, *market manipulation*, and *insider trading*. This cluster indicates that capital market research increasingly considers institutional and governance mechanisms as important determinants of market integrity and investor confidence. The connections between regulation, transparency, investor protection, and corporate governance suggest a broader concern with creating efficient, fair, and resilient capital markets.

The fifth cluster represents investor behavior and financial decision-making. Prominent keywords include *investor behavior*, *investor decision-making*, *financial literacy*, *risk perception*, *overconfidence*, *loss aversion*, *retail investors*, *social media*, and *sustainable investment*. The emergence of these terms demonstrates the increasing influence of behavioral finance in explaining market outcomes. Rather than assuming that investors always make rational decisions, this research stream emphasizes psychological biases, perceptions of risk, financial literacy, information obtained through social media, and behavioral responses among retail investors.

The sixth cluster centers on risk management and financial stability, represented by keywords such as *risk management*, *risk assessment*, *systemic risk*, *financial stability*, *stress testing*, *value at risk*, *credit risk*, and *volatility spillover*. This cluster demonstrates the continuing importance of risk-oriented research, particularly in understanding how individual market risks can interact and potentially generate broader financial instability. The connection between risk management and the central *capital market* concept also indicates that market development is increasingly evaluated alongside resilience and stability considerations.

Finally, the seventh cluster reflects the emergence of sustainable and Islamic capital market research. Keywords including *sustainable finance*, *ESG*, *green finance*, *climate finance*, *impact investing*, *sustainable development*, *Islamic finance*, *Islamic capital market*, *sukuk*, *shariah compliance*, and

takaful indicate that capital market research is expanding toward sustainability and ethical finance. This cluster represents an important emerging direction because it connects capital market development with environmental objectives, responsible investment, sustainable development, and Shariah-compliant financial instruments.

Overall, the network visualization demonstrates a transition from conventional capital market research toward a multidimensional and interdisciplinary research structure. Traditional themes such as market efficiency, asset pricing, liquidity, financial development, and economic growth remain important, but they are increasingly interconnected with digital technology, behavioral finance, risk management, governance, sustainability, and Islamic finance. This pattern supports the identification of emerging research directions in financial technology, sustainable finance, Islamic capital markets, investor behavior, regulation, financial stability, and the interaction between capital markets and broader economic development, consistent with the research objectives of the study.

Temporal Evolution of Capital Market Research Themes by overly visulization

The findings indicate that research on capital markets has undergone a substantial shift in thematic focus, moving from conventional financial-market issues toward more dynamic, technology-driven, behavioral, sustainable, and interdisciplinary topics. In the earlier period, research primarily focused on market efficiency, asset pricing, volatility, liquidity, market microstructure, price discovery, behavioral finance, and technical analysis. These themes reflect strong academic interest in price formation mechanisms, information efficiency, market liquidity, volatility, and market behavior as fundamental components of capital market research.

Subsequent developments demonstrate a stronger connection between capital markets and financial development, economic growth, investment, savings, financial markets, stock market development, and emerging markets. Research within this stream positions capital markets as an important component of the financial system that contributes to fund mobilization, investment, financial sector development, and economic growth. Accordingly, capital market research has expanded beyond asset pricing and market dynamics to examine the broader role of capital markets in economic development and financial system transformation, particularly in emerging economies.

More recent developments show a growing emphasis on financial technology, artificial intelligence, machine learning, big data, data mining, algorithmic trading, blockchain, robo-advisors, and predictive analytics. The emergence of these themes indicates the increasing integration of digital technologies and computational methods into capital market research. The research agenda has consequently expanded from conventional financial analysis toward technology-based approaches to forecasting, automated trading, risk assessment, portfolio management, and data-driven investment decision-making.

In parallel, capital market research has increasingly addressed regulation, corporate governance, transparency, disclosure, investor protection, and market integrity. This development suggests that capital market performance is increasingly understood not only in terms of market mechanisms but also through the quality of institutions and governance structures that support transparent, credible, and well-functioning markets. These institutional dimensions are particularly relevant in emerging markets, where regulatory reforms and improvements in market infrastructure remain important aspects of capital market development.

Another important development is the growing attention to investor behavior and financial decision-making. Research increasingly examines investor decision-making, financial literacy, risk perception, overconfidence, loss aversion, retail investors, and social media. This development reflects the growing importance of behavioral perspectives in capital market research. Investment decisions are increasingly recognized as being influenced not only by rational economic considerations but also by investor psychology, financial literacy, risk perceptions, behavioral biases, and information obtained through digital platforms and social media.

At the same time, research on risk management and financial stability has expanded through themes such as risk assessment, systemic risk, stress testing, value at risk, credit risk, and volatility spillover. These developments broaden the scope of capital market research from the measurement of individual market risks and volatility toward a deeper understanding of market resilience, risk transmission, and systemic vulnerabilities. Consequently, capital market research is increasingly concerned with how financial markets can maintain stability and resilience amid growing uncertainty and interconnectedness.

The most recent developments are particularly evident in the growing emphasis on sustainable finance, ESG, green finance, climate finance, impact investing, sustainable development, Islamic finance, Islamic capital markets, sukuk, and Shariah compliance. These themes demonstrate that contemporary capital market research increasingly incorporates environmental, social, ethical, sustainability, and Islamic finance considerations. This development broadens the research agenda beyond the traditional focus on returns and risk toward issues related to sustainable investment, climate-related financial risks, responsible investment, ethical finance, and the development of Shariah-compliant capital market instruments.

Overall, the findings demonstrate a clear transformation in the capital market research agenda from conventional and fundamental financial issues toward a more multidimensional research landscape. Earlier research was largely centered on market efficiency, asset pricing, liquidity, volatility, financial development, and economic growth, whereas more recent research increasingly emphasizes digital finance, artificial intelligence, behavioral finance, governance, risk management, sustainability, ESG, and Islamic capital markets. This transformation indicates that the future of capital market research will increasingly involve the integration of finance, technology, investor behavior, institutional governance, sustainability, and alternative financial systems, creating substantial opportunities for interdisciplinary research and the development of new research frontiers.

Discussion

The network and overlay visualizations indicate that capital market research has undergone a substantial thematic transition from a predominantly conventional financial-market perspective toward a more interdisciplinary research structure involving technology, behavioral finance, institutional governance, risk management, sustainability, and Islamic finance. The central position of *capital market*, together with its strong connections to *financial markets*, *investment*, *financial development*, *market efficiency*, and *economic growth*, confirms that capital markets remain a fundamental component of the financial system. This finding is consistent with Levine (2005), who argues that well-developed financial systems and markets facilitate resource allocation, investment, and economic growth by reducing external financing constraints.

The network structure also demonstrates that the intellectual foundation of capital market research continues to be associated with market efficiency, asset pricing, liquidity, volatility, market

microstructure, and price discovery. These themes represent the traditional research foundation concerned with how information is incorporated into security prices and how markets allocate financial resources. The importance of market efficiency is theoretically grounded in the efficient-market literature, particularly the argument that security prices incorporate available information and consequently provide signals for investment and resource allocation (Fama, 1970). However, the relatively broader connections between these conventional themes and behavioral, technological, and risk-related topics suggest that contemporary research is increasingly questioning whether conventional assumptions alone are sufficient to explain complex capital market behavior.

A second important research stream concerns the relationship between capital markets, financial development, investment, and economic growth. The strong association among these keywords indicates that capital markets continue to be examined as mechanisms for mobilizing savings, allocating capital, facilitating investment, and supporting economic development. This perspective is particularly important in emerging markets, where financial-market development can contribute to improved access to external finance and economic expansion. Levine (2005) emphasizes that both financial intermediaries and financial markets play important roles in economic growth, although the strength and direction of the relationship may vary across institutional and economic contexts. Thus, future studies could move beyond examining simple relationships between stock-market development and economic growth by investigating how market depth, liquidity, institutional quality, financial inclusion, and technological development jointly influence economic performance.

The visualization further reveals a significant transition toward technology-driven and data-intensive capital market research. The emergence of *financial technology*, *artificial intelligence*, *machine learning*, *big data*, *algorithmic trading*, *blockchain*, and *predictive analytics* indicates that digital transformation has become an increasingly important research frontier. Gomber, Koch, and Siering (2017) describe digital finance as a transformation that extends beyond the digital delivery of conventional financial services toward new financial products, business models, technologies, and forms of interaction. In capital markets, this transformation is reflected in the increasing use of computational methods for forecasting, portfolio construction, automated trading, and risk management.

The growing role of artificial intelligence and machine learning represents an important methodological transformation. Traditional capital market studies have often relied on econometric models based on linear relationships and predefined assumptions. In contrast, machine learning and deep learning techniques can identify nonlinear relationships and complex interactions in high-dimensional financial data. Heaton, Polson, and Witte (2017), for example, demonstrate the potential of deep learning for financial prediction, portfolio construction, and risk management. Recent systematic evidence further indicates that AI-based financial-market research has expanded considerably, including the use of recurrent neural networks, LSTM, transformers, generative models, and reinforcement learning for market prediction. Therefore, the increasing prominence of AI-related keywords in the research landscape should not simply be interpreted as technological adoption, but as an indication of a broader methodological transition in capital market research.

Nevertheless, the technological transition also generates important research challenges. The increasing use of AI does not automatically guarantee superior investment performance. Recent evidence indicates that AI-based stock-selection strategies may face difficulties in consistently generating abnormal returns when market participants have access to similar technologies. This suggests that future research should focus not only on predictive accuracy but also on economic significance, model robustness, transaction costs, explainability, data quality, and the stability of AI models under changing market conditions. Consequently, the emerging research agenda should integrate financial theory with machine learning rather than simply replacing conventional econometric methods with artificial intelligence.

Another important development is the growing emphasis on corporate governance, regulation, disclosure, transparency, and investor protection. The network relationship between these themes and capital markets indicates that market development is increasingly viewed in conjunction with institutional quality and market integrity. Efficient capital markets require not only information availability but also institutional mechanisms that ensure credible disclosure, protect investors, reduce information asymmetry, and prevent market manipulation. This suggests a shift from a narrow focus on market outcomes toward a broader analysis of the institutional conditions under which markets operate effectively.

The overlay visualization also indicates increasing attention to investor behavior and behavioral finance. Keywords such as *investor behavior*, *financial literacy*, *risk perception*, *overconfidence*, *loss aversion*, *retail investors*, and *social media* indicate that capital market research increasingly recognizes the importance of psychological and informational factors in explaining investment decisions. This development challenges the assumption that investors consistently behave rationally and suggests that market outcomes can also be influenced by cognitive biases, emotions, information overload, and social interactions. The growing connection between investor behavior and digital platforms is particularly relevant because social media and online investment communities can accelerate information diffusion while simultaneously increasing the possibility of herd behavior and misinformation.

The development of risk management and financial stability represents another important direction. The appearance of *systemic risk*, *financial stability*, *stress testing*, *value at risk*, *risk assessment*, and *volatility spillover* demonstrates that contemporary capital market research increasingly considers market development together with resilience. This is important because greater financial integration and technological connectivity may improve market efficiency while simultaneously increasing the speed at which financial shocks are transmitted across markets. Consequently, future research should investigate the interaction between market integration, technological innovation, investor behavior, and systemic risk rather than analyzing market risks in isolation.

One of the most visible emerging directions is the development of sustainable finance and ESG-oriented capital market research. The increasing prominence of *ESG*, *sustainable finance*, *green finance*, *climate finance*, *green bonds*, and *impact investing* indicates that sustainability considerations are becoming increasingly integrated into financial decision-making. Edmans and Kacperczyk (2022) note that sustainable finance has moved from a relatively specialized investment concern toward a more mainstream component of financial decision-making. Similarly, Friede, Busch, and Bassen (2015), based on an aggregation of more than 2,000 empirical studies, document substantial evidence concerning the relationship between ESG factors and corporate financial performance. Recent reviews further show that sustainable-finance research has expanded around ESG performance, green bonds, sustainable investment, financial risk, and the role of financial markets in supporting sustainability transitions.

The emergence of ESG-related themes also creates several research opportunities. First, future studies can examine whether ESG information is consistently incorporated into asset prices across developed and emerging markets. Second, researchers can investigate the effects of ESG disclosure regulation, ESG-rating disagreement, and greenwashing on investor confidence and market efficiency. Third, the growing importance of climate finance provides opportunities to examine how climate risks affect asset pricing, portfolio allocation, market volatility, and financial stability. Thus, sustainable finance should increasingly be understood not as a separate research domain but as an integral dimension of modern capital market research.

Another emerging research direction is Islamic capital market research, particularly concerning *Islamic finance*, *Islamic capital markets*, *sukuk*, and *Shariah compliance*. The appearance of these themes alongside sustainable finance suggests an expanding interest in alternative financial systems that

incorporate ethical, religious, and social considerations. This direction is especially relevant for emerging economies with significant Muslim populations and established Islamic financial institutions. Recent bibliometric evidence shows increasing interaction between Islamic finance and emerging technologies, including Islamic fintech, blockchain, machine learning, cryptocurrencies, cybersecurity, and takaful. This development indicates that Islamic capital market research is itself moving beyond traditional questions of Shariah compliance and financial performance toward digital transformation, technological governance, sustainability, and financial inclusion.

Taken together, the network and overlay visualizations suggest that capital market research is experiencing a transition from a relatively specialized study of market performance toward a multidimensional research ecosystem. The earlier research frontier was strongly associated with *market efficiency, asset pricing, liquidity, volatility, financial development, and economic growth*. More recent research increasingly incorporates *financial technology, artificial intelligence, machine learning, behavioral finance, governance, systemic risk, ESG, sustainable finance, and Islamic capital markets*. This transition does not imply that conventional capital market theories have become irrelevant. Rather, it suggests that traditional financial-market theories are increasingly being combined with technological, behavioral, institutional, and sustainability perspectives.

Therefore, the emerging research agenda can be organized into several interconnected directions. First, AI-driven capital markets require further research on explainable AI, algorithmic trading, model stability, and the economic rather than merely statistical performance of predictive models. Second, sustainable capital markets require deeper investigation of ESG measurement, greenwashing, climate risk, green bonds, and sustainability disclosure. Third, behavioral capital markets require greater attention to retail investors, financial literacy, social media, and investor sentiment. Fourth, institutional and regulatory research should examine how regulation, disclosure, governance, and investor protection affect market integrity. Fifth, Islamic capital markets offer opportunities for research on sukuk, Shariah-compliant investment, Islamic fintech, blockchain, and the intersection between Islamic finance and sustainable development.

Overall, the findings indicate that the future of capital market research lies not in abandoning its traditional theoretical foundations but in integrating conventional financial theory with digital technology, behavioral insights, institutional analysis, risk management, sustainability, and alternative financial systems. This interdisciplinary transition provides a strong basis for future research and demonstrates that capital markets are increasingly being studied as dynamic systems shaped simultaneously by information, technology, institutions, investor behavior, environmental challenges, and ethical considerations.

Conclusion

This study examines the development and transformation of capital market research through network and overlay visualizations. The findings indicate that capital market research has evolved from a predominantly conventional focus on *market efficiency, asset pricing, liquidity, volatility, financial development, and economic growth* toward a more interdisciplinary research landscape. Emerging themes include *financial technology, artificial intelligence, machine learning, behavioral finance, corporate governance, systemic risk, sustainable finance, ESG, and Islamic capital markets*. The overlay visualization further indicates a temporal shift from traditional financial-market topics toward technology-driven, behavioral, sustainability-oriented, and ethical finance research. These findings suggest that future capital market scholarship will increasingly integrate financial theory with technological innovation, investor behavior, institutional governance, sustainability, and alternative financial systems. Despite these contributions, several limitations should be acknowledged. First, the

findings depend on the coverage and indexing characteristics of the bibliographic database used, meaning that publications not included in the database may not be represented. Second, keyword co-occurrence and overlay analyses primarily identify conceptual and temporal patterns but cannot fully capture the theoretical depth, methodological quality, or causal relationships of individual studies. Third, the results may be influenced by keyword selection, data cleaning, synonym consolidation, and threshold settings. Finally, the identification of emerging themes does not necessarily imply that these topics will become permanent research priorities. Future research can build on these findings in several directions. First, further studies should investigate the application of AI, machine learning, and FinTech in asset pricing, forecasting, algorithmic trading, and financial risk management. Second, greater attention should be given to behavioral finance, particularly retail investors, financial literacy, investor sentiment, and social media. Third, research should examine ESG, climate finance, green bonds, and sustainable investment, including the problems of greenwashing and ESG-rating differences. Fourth, Islamic capital markets, sukuk, Islamic FinTech, and the relationship between Islamic finance and sustainability warrant further investigation. Finally, future studies could combine bibliometric analysis with systematic reviews, meta-analysis, and empirical approaches to provide stronger evidence regarding the theoretical mechanisms and causal relationships underlying the identified research trends.

AUTHOR CONTRIBUTIONS

Conceptualisation, Wiyandi, W.; Methodology, Wiyandi, W.; Investigation Wiyandi, W; Analysis, M, Khairi.; Original draft preparation, M, Khairi.; Review and editing, M, Khairi.; Visualization M, Khairi.

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CONFLICTS OF INTEREST

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