Mapping the Evolution of Financial Statement Analysis: A Comprehensive Bibliometric Review

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Abstract

This paper conducts a bibliometric analysis to map the evolution of financial statement analysis (FSA) research from 1937 to 2023, but the first substantial body of literature emerged from the 1970s. Drawing from 7,411 papers in the Scopus database, the paper applied the PRISMA protocol to refine the dataset to 2,364 relevant papers. Using VOSviewer software, the analysis identified seven key thematic clusters: methodological approaches, population studies, educational aspects, predictive models, return on assets, international accounting standards, and sector-specific research. The results show significant growth in FSA publications since the 1990s, driven by technological advancements and major financial events. The United States leads in publication volume and citation impact. Methodological innovations, such as machine learning, panel data analysis, and advanced econometric techniques, emerged as critical to the field's

development. The paper highlights underexplored areas, including the application of advanced analytics in small and medium-sized enterprises (SMEs) and the role of cultural factors in financial reporting. Future research should integrate artificial intelligence (AI), conduct cross-country studies, and focus on sector-specific analyses to address modern financial complexities. These findings provide valuable insights for academics, policymakers, and practitioners, promoting enhanced financial analysis methodologies and regulatory practices.

Keywords: financial statement analysis, bibliometric analysis, PRISMA protocol, VOSviewer, methodological approaches

JEL classification: M41

1 Introduction

Financial statement analysis (FSA) serves as a cornerstone of modern financial decision-making, enabling investors, regulators, and corporate managers to assess organizational health and performance. As financial markets grow in complexity, the tools and approaches for interpreting financial data have evolved in tandem. Yet, despite its central role, the academic mapping of how FSA research has developed over time remains limited.

The realm of FSA has experienced significant transformation over the past several decades, evolving in response to both methodological advancements and the changing landscape of global finance. Financial statement analysis allows stakeholders to quickly and thoroughly understand routine financial statements, providing them with the maximum amount of useful information in the shortest possible time (Choate, 1974). This role is underpinned by theories such as information asymmetry (Akerlof, 1970) and market efficiency (Fama, 1970), which highlight the importance of accurate and transparent disclosures.

This study uses bibliometric techniques to trace the evolution and thematic shifts in FSA literature over nearly nine decades, identifying emerging research

trends and intellectual foundations. Bibliometrics involves the quantitative analysis of bibliographic units, including books, journal articles, and similar materials (Donohue, 1972). Bibliometric analysis is a meticulous approach that examines vast amounts of scientific data, shedding light on the progression and segmentation of research areas (Donthu et al., 2021).

We identified a gap in the literature when a search of indexed articles in the Scopus database revealed an absence of bibliometric analyses in the field of financial statement analysis.

While several bibliometric studies have been conducted in the broader domains of accounting, auditing, and financial reporting, a comprehensive bibliometric mapping of financial statement analysis as an independent research domain is lacking. For instance, Dumay and Cai (2014) conducted a bibliometric review of intellectual capital research, while Bosi et al. (2021) focused on financial reporting literature. Studies such as De Villiers and Sharma (2020) explored auditing trends using co-citation analysis. These works provide valuable methodological insights but do not isolate FSA as a distinct thematic field.

Our paper addresses this gap by focusing exclusively on FSA and applying a rigorous PRISMA protocol to a dataset spanning the period from the 1970s to 2023, acknowledging that the effective publication coverage begins in the early 1970s. It differs from prior reviews in three key ways: (1) it treats FSA as a distinct bibliometric corpus rather than a subset of accounting, (2) it identifies domain-specific thematic clusters using co-occurrence analysis, and (3) it introduces sentiment analysis to capture underlying tones in scholarly communication. These contributions establish the uniqueness and necessity of our study in the bibliometric landscape. In light of this, our article explores the following research questions (RQ):

RQ1: What are the primary trends observed in financial statement analysis research?

RQ2: Which peer-reviewed scientific articles, authors, journals, and countries have had the greatest impact on the academic discourse in financial statement analysis?

RQ3: What are the key hotspots within the field of financial statement analysis?

RQ4: What issues, challenges, and emerging themes dominate the current literature on financial statement analysis, and which of these are likely to persist in the future?

To address these research questions, we gathered the necessary data by extracting textual information and keywords from peer-reviewed articles published in academic journals. The dataset for this analysis was obtained from the Scopus database, nominally covering the period from 1937 to 2023. However, due to the scarcity of indexed documents prior to the 1970s, most of the empirical analysis in this study reflects developments from 1970 onwards. A total of 2,364 relevant papers were retrieved from the Scopus database and used as the basis for the bibliometric analysis.

The analysis revealed a significant increase in scholarly output over time, particularly from the 1990s onwards, highlighting the growing interest in FSA driven by the integration of computational technologies and global financial events that necessitate robust financial scrutiny. For instance, the sharp rise in publications during the early 2000s correlates with the proliferation of digital data analysis tools and significant global financial crises that underscored the need for advanced financial analysis techniques.

Key to this paper is the use of VOSviewer software (version 1.6.19) for analyzing keyword co-occurrence, which facilitates the construction and visualization of networks based on bibliometric data. This tool, developed by Van Eck and Waltman (2014), is widely used across various research fields, particularly in organizational and managerial sciences, to generate network and density visualization maps. These maps graphically represent connections and clusters among keywords, providing insights into the thematic focus areas and methodological approaches within FSA research. The paper's findings underscore the central role of methodological approaches in FSA, encompassing diverse research methods such as statistical models, regression analysis, and neural networks, which are critical for predicting

financial distress and assessing financial performance (Altman, 1968; Ohlson, 1980). Additionally, the analysis highlights the significance of international accounting standards (IAS) in ensuring consistency and transparency in financial reporting across different jurisdictions (Ball, 2006).

Furthermore, the paper delves into the educational aspects of FSA, exploring how financial analysis is taught and how students engage with this discipline. This focus aligns with the broader objective of enhancing understanding and application of financial analysis through improved pedagogical approaches (Beaver, 1966).

This bibliometric analysis not only maps the historical and contemporary landscape of financial statement analysis but also identifies key thematic clusters and methodological trends. The findings suggest a sustained interest in FSA research, with future developments likely to integrate advanced analytical tools to address the complexities of modern financial systems. This paper provides a robust foundation for future research directions, emphasizing the need for continuous methodological innovation and international collaboration in FSA.

The increasing complexity of financial markets and the corresponding growth in FSA research can be contextualized through established economic theories. The theory of information asymmetry (Akerlof, 1970; Spence, 1973) suggests that stakeholders often have unequal access to financial information, which can lead to adverse selection or moral hazard. Financial statement analysis plays a critical role in mitigating such asymmetries by offering a transparent and structured interpretation of corporate performance. Furthermore, the efficient market hypothesis (Fama, 1970) posits that all available information is rapidly incorporated into asset prices; thus, high-quality, timely financial disclosures—enabled and enhanced by FSA—are essential for supporting market efficiency. This bibliometric review contributes to these theoretical frameworks by illustrating how research in FSA has evolved to address information gaps, improve transparency, and support rational decision-making in capital markets.

This article is structured to begin with the introduction in the first section. The second section details the methods used for the bibliometric analysis. The third section presents and discusses the main findings and results. The fourth section offers directions for future research, and the fifth section presents the main conclusions.

2 Methodology

We employ bibliometric analysis to systematically review the evolution and current landscape of financial statement analysis. Bibliometric analysis is a widely used and meticulous approach that examines and interprets vast amounts of scientific data, revealing the developmental subtleties and highlighting new and evolving segments within a particular area of study (Donthu et al., 2021).

Our dataset was derived from the Scopus database, spanning the extensive period from 1937 to the end of 2023. The search was focused using the keyword "financial statement analysis", yielding an initial count of 7,411 papers. Although the keyword search technically retrieved articles as early as 1937, the earliest relevant and indexed records with full metadata begin in the early 1970s. Therefore, the temporal coverage for meaningful bibliometric analysis effectively spans the period from 1970 to 2023.

To ensure a rigorous and transparent literature review, we adopted the PRISMA protocol for systematic reviews (Moher et al., 2009), which is delineated into four distinct stages: identification, screening, eligibility, and inclusion. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol was chosen over other systematic review methodologies due to its structured and transparent approach to literature selection and analysis. Unlike traditional narrative reviews, PRISMA offers a rigorous, step-by-step process that enhances the reproducibility and reliability of the bibliometric analysis. This protocol ensures a systematic approach to identifying, screening, and including relevant studies, reducing the risk of selection bias, and providing a clear audit trail for

the research process. Additionally, PRISMA's widely accepted guidelines facilitate the inclusion of only the most relevant and high-quality studies, which is crucial when handling large datasets, such as the 7,411 initial studies identified in this research.

In the identification phase, we filtered the dataset to exclude papers from the incomplete year 2024 and limited our selection to articles only. This refinement reduced the corpus to 5,433 papers. During the screening phase, we further narrowed the pool by eliminating non-English articles and duplicates, resulting in a reduced total of 3,927 papers. The subsequent eligibility phase involved a more in-depth review to assess the relevance of each paper to our research focus. This led to the removal of 1,563 papers. Finally, in the inclusion phase, we distilled the collection to 2,364 papers deemed most pertinent to the field of financial statement analysis. Figure 1 illustrates the completed processes of identification, screening, eligibility, and inclusion as outlined in the PRISMA protocol.

This structured approach, adhering to the PRISMA protocol, ensures the comprehensiveness and reliability of our bibliometric analysis, providing a robust foundation for understanding the trends and developments in financial statement analysis over the decades.

Additionally, VOSviewer software (version 1.6.19) was used for analyzing keyword co-occurrence. Developed by Van Eck and Waltman in 2014, this tool facilitates the construction and visualization of networks based on bibliometric and textual information. Its wide-ranging utility is evident across numerous research fields, especially in the areas of organizational and managerial sciences. With this program, we generated network and density visualization maps and graphically represented the connections and clusters among keywords.

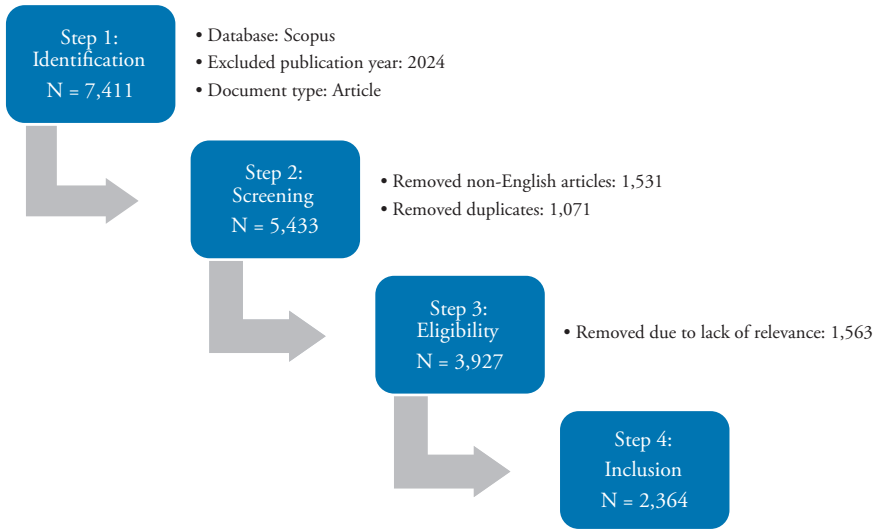
To explore the emotional tone and framing of the literature, a sentiment analysis was conducted on the abstracts of the 2,364 selected papers to detect the presence of positive or negative sentiment within the scientific discourse surrounding financial statement analysis. Known also as emotion AI or opinion mining,

sentiment analysis enables researchers to detect, gather, measure, and study the subjective elements of data (Fischer & Steiger, 2020).

The analysis was implemented using Python, employing the VADER (Valence Aware Dictionary and sEntiment Reasoner) sentiment analysis tool from the NLTK (Natural Language Toolkit) package. VADER is specifically designed for short, formal texts and is often used in academic and social science applications due to its capacity to capture subtle polarity.

Each abstract was scored on a continuous scale ranging from -1 (most negative) to +1 (most positive), based on the aggregate of positive, neutral, and negative word frequencies. A score > 0.05 was considered positive, < -0.05 was negative, and in between was considered neutral, following the standard VADER threshold guidance.

Figure 1: *PRISMA Protocol Visualization*



Source: Authors' elaboration.

Because academic writing often aims for objectivity and uses technical language, we conducted an internal validity check by manually reviewing a random subset of abstracts to ensure that the tool was adequately capturing tone and not just technical jargon. While most academic texts are neutral to mildly positive, sentiment analysis still provides useful meta-level insight into how researchers frame problems and findings—optimistically, critically, or cautiously.

Country-level attribution in this study was based on the affiliation of the first author as recorded in the Scopus database. In cases where the first author listed multiple affiliations across different countries, the primary institutional affiliation was used. Publications co-authored by researchers from different countries were not double-counted; only the country of the first-listed author was considered to ensure consistency and avoid inflation in national publication counts.

It is important to note that country-level comparisons in this study are based on absolute publication and citation counts without normalization. Factors such as the size of a country's academic community, number of researchers, or research output per capita are not accounted for, which may favor larger nations such as the United States or China. While this approach enables consistent Scopus-based measurement, future studies could consider normalizing by population size or R&D expenditure to provide a more equitable basis for comparison.

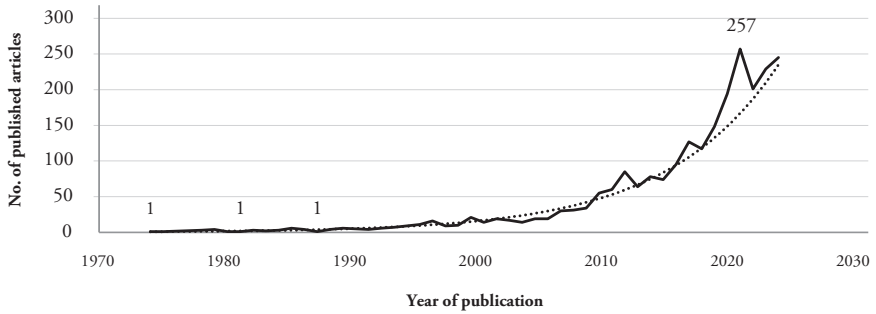
3 Results and Discussion

This section presents the core bibliometric results on the evolution of FSA research. A total of 2,364 documents published between 1937 and 2023 were analyzed. Over this period, the field experienced constant growth, with a substantial increase in scholarly output in the last two decades. The analysis includes top publication sources, citation metrics, author productivity, country-level distribution, and keyword-based thematic clusters. For clarity and focus, only the most salient indicators are presented in the main text, while additional supporting data and full tables are provided in the Appendices.

3.1 Descriptive Analysis

In the academic realm, the discipline of FSA has evolved significantly, as depicted by the bibliometric data spanning more than five decades. This evolution is crucial both for understanding historical trends and forecasting future research directions in the field.

Figure 2: *Annual Trends of FSA Article Publications*



Note: While the search returned articles dating back to 1937, the earliest relevant publications begin from 1970 due to Scopus indexing limitations.

Source: Authors' elaboration.

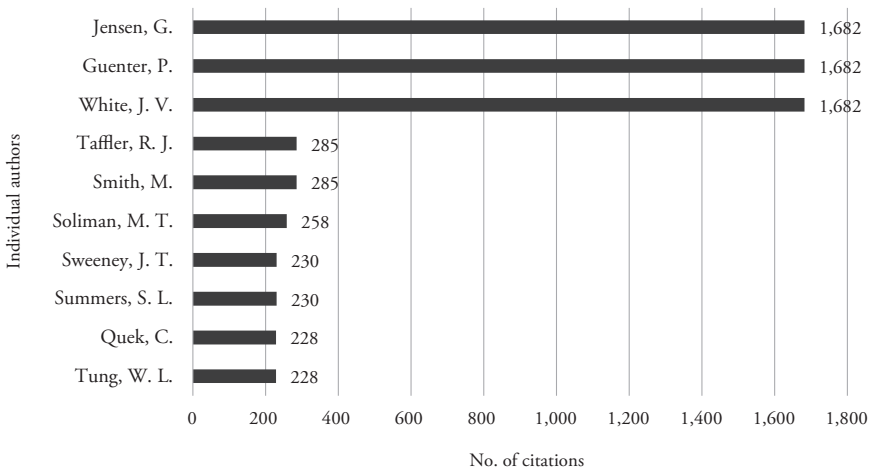
Figure 2 presents a long-term bibliometric trend starting from the 1970s. Initially, the field appears nascent, with publications in single digits, such as 1 or 3 articles per year in the early '70s, slowly increasing to 14 by the late '80s. This period likely represents the embryonic stage of FSA, with foundational theories and methodologies being established. Entering the 1990s, there was a noticeable uptick in scholarly output, with numbers like 56 publications in 1997, suggesting a growing interest and perhaps the beginning of FSA's integration with emerging computational technologies. The trend sharply accelerates from the early 2000s onwards, peaking at 257 articles in 2021. This explosive growth could correlate with the proliferation of digital data analysis tools and global financial events that demand more robust financial scrutiny. It is important to interpret this increase with caution. The observed growth in FSA-related publications coincides with the general expansion of scientific output globally, as well as with the inclusion of a

greater number of journals in the Scopus database after its formal launch in 2004. Hence, the rise may partly reflect enhanced coverage and indexing rather than a proportional rise in scholarly attention alone.

The numerical details in these figures paint a vivid picture of FSA's academic journey—from a period of slow academic engagement to a current state of vibrant, high-volume research output. The sharp rise in recent decades signifies FSA's maturation and increased relevance, particularly in response to financial crises and advancements in data analytics technologies. The figures suggest a sustained interest in FSA research, with potential future developments geared toward integrating advanced analytical tools to cope with the complexities of modern financial systems.

Identifying the most prolific authors and countries provides a clearer picture of where and by whom the field is being developed. The author network reveals a relatively small group of core contributors with repeated publications, surrounded by a long tail of peripheral scholars who have authored single papers, indicating episodic interest in FSA within broader research agendas.

Figure 3: *Most-Cited Individual Authors*



Source: Authors' elaboration.

Figure 3 highlights the ten most frequently cited individual authors. It is evident that Guenter, P., Jensen, G., and White, J. V. are the top three authors, each receiving 1,682 citations. The remaining authors have significantly fewer citations, ranging from 285 to 228, demonstrating a notable gap in citation frequency compared to the leading three authors.

Author-level productivity is led by a small group of highly active contributors, with the top three authors accounting for over 8 percent of the total publication volume. These authors typically publish in thematic clusters related to sustainability reporting, earnings management, and valuation. Beyond this core group, the field shows a long tail of contributors who provide specialized insights. This distribution suggests a maturing domain where central thought leaders are supported by a diverse community of topic-specific researchers.

Next, identifying the key publication outlets shaping discourse in financial statement analysis can provide insight into both productivity and influence.

Table 1: *Top 10 Journals by Number of Publications and Citations*

Journal name	Number of published articles	Number of citations
Accounting Review	20	**1,461**
Expert Systems with Applications	18	1,290
European Accounting Review	17	641
Accounting Horizons	18	616
Sustainability	**42**	477
Managerial Auditing Journal	18	377
Investment Management and Financial Innovations	28	178
Journal of Applied Accounting Research	18	123
Journal of Asian Finance, Economics and Business	21	115
Academy of Accounting and Financial Studies Journal	35	112

Source: Authors' elaboration.

We catalogued a total of 940 journals that have featured articles on FSA, selected based on several criteria. These criteria include the highest number of citations for articles on this subject, the highest total number of articles published, the

latest available impact factor, and the latest SCImago journal rankings. Data on some of these metrics were sourced from the Scopus database, while information regarding the latter metrics was obtained from the publicly accessible SCImago Journal & Country Rank website (SCImago, 2024).

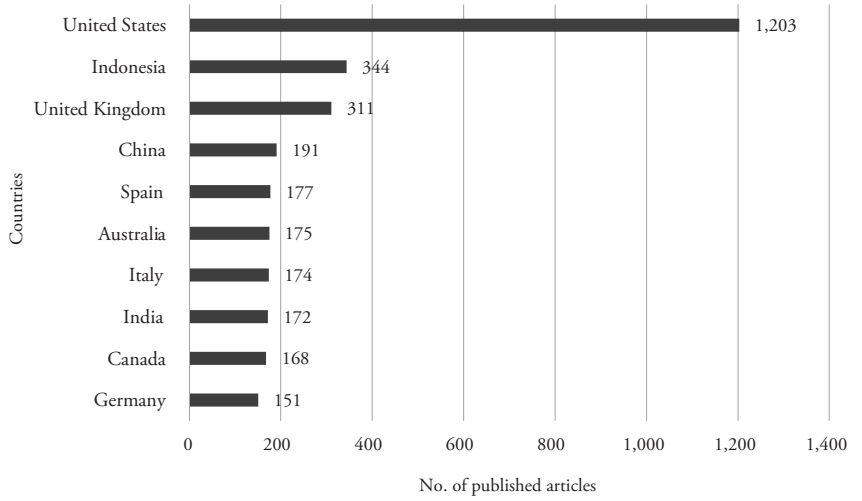
In an extensive analysis of journals publishing articles on FSA, distinct leaders have emerged across a range of evaluative metrics, each highlighting different aspects of academic influence and prestige (Table 1 and Appendix A). *Sustainability* leads the field in volume with 42 published articles, indicating a robust platform for ongoing discourse in sustainability and FSA topics. Meanwhile, *Accounting Review* dominates in several critical impact metrics: it not only has the highest number of citations at 1,461, underscoring its broad influence and utility in academic citations, but also excels with the top SCImago Journal Rank (4.640) and impact factor (5.03), signaling its high regard and quality within the academic community. Additionally, *Expert Systems with Applications* distinguishes itself with the highest impact factor of 10.35, reflecting its sustained contribution to highly impactful research. This comprehensive assessment helps delineate the academic landscape for FSA-related publications, with each journal making significant contributions to the field in different ways.

Regarding the citations of the papers, out of a total of 2,364 articles included in the analysis, 75 percent (1,773 articles) were cited at least once, while 25 percent (602 articles) had more than ten or double-digit citations.

The analysis of journal productivity reveals a dual pattern: while open-access journals like *Sustainability* lead in terms of volume with 42 published articles, traditional, high-impact journals such as the *Accounting Review* and *Accounting Horizons* show stronger academic influence, with substantially higher citation counts per article. This distinction underscores a key dynamic in the field—journals that emphasize accessibility and topical relevance drive publication growth, whereas journals with stricter review standards tend to concentrate academic authority through higher impact. The mix of practice-oriented and theoretical journals also reflects the thematic diversity of financial statement analysis research.

To assess the influence of different countries in the realm of published research, we examined both the volume of publications and the extent of citations each country received. As noted in the methodology, country attribution is based on the affiliation of the first-listed author, which provides a consistent measure of national productivity. While the United States appears to lead in both citation volume and publication count based on raw Scopus data, these figures must be interpreted with caution. They reflect absolute counts that are not adjusted for population size, number of researchers, or research funding levels across countries. However, it is clear that being prominent in article publication does not necessarily correlate with leading in citations.

Figure 4: *Top Countries by Total Number of Published Articles*



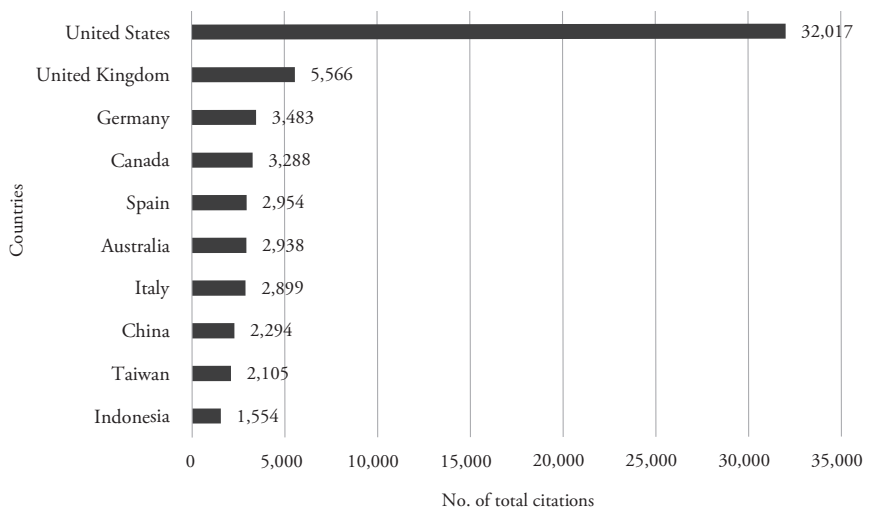
Source: Authors' elaboration.

Figure 4 indicates the number of articles published by each country. The United States has published the most articles by a significant margin, at 1,203 articles. Indonesia follows with 344 articles, and the United Kingdom with 311. Other countries, such as China, Spain, Australia, Italy, India, Canada, and Germany, have fewer articles, ranging from 151 to 191 articles each.

The geographic distribution of research is dominated by contributions from developed economies, particularly the United States and the United Kingdom, followed by Germany, Australia, and Canada. These countries benefit from established academic infrastructures and prominent accounting research communities. Emerging contributions from countries such as India, Indonesia, and Malaysia reflect increasing global engagement and expanding regional interest in financial statement analysis. The trend points toward a progressively internationalized research landscape.

This concentration of output in developed nations reflects their historically dominant academic infrastructure and access to financial databases. However, the rising contributions from emerging economies signal a gradual diffusion of research capacity, likely driven by global standardization and increasing participation in international capital markets.

Figure 5: *Top Countries by Total Number of Citations*



Source: Authors' elaboration.

This geographic concentration reflects the academic dominance of institutions in developed economies, particularly in North America and Western Europe. However, the growing presence of authors from countries such as India, Indonesia, and Malaysia points to an ongoing democratization of FSA research and the increasing global relevance of financial reporting standards.

Figure 5 shows the total number of citations received by articles from each country. Again, the United States leads significantly with 32,017 citations, indicating not only a high volume of publications but also substantial recognition or utilization of the research within these publications. The United Kingdom and Germany follow with 5,566 and 3,483 citations, respectively. Other countries, such as Canada, Spain, Australia, Italy, China, Taiwan, and Indonesia, receive fewer citations, indicating varying levels of impact or recognition of their research publications.

The analysis indicates that while some countries like the United States excel in both volume and impact, other countries achieve significant research recognition even with fewer publications. This could be reflective of the strategic focus areas, research quality, and international collaborations that enhance citation metrics. Almost all countries appear in both classifications, except India (which appears only in the group of top countries by number of published articles) and Taiwan (which appears only in the group of top countries by citations).

However, we caution that these rankings reflect scale rather than efficiency or intensity. Countries with larger research infrastructures naturally produce more publications. Therefore, comparing raw counts without adjusting for researcher population or GDP may exaggerate the apparent dominance of large countries. Comparative bibliometric indicators, such as publication-per-capita or citations-per-researcher, would yield more nuanced insights, but were outside the scope of this study.

In summary, the empirical results illustrate the evolution and diversification of financial statement analysis research. The field has expanded rapidly over the past two decades, marked by a sharp rise in publication output and the emergence of

new thematic clusters. While publication volume is often concentrated in open-access or practice-oriented journals, academic influence remains strong among traditional, high-impact outlets. The authorship and geographic data suggest that while a core group of researchers leads output, participation is broadening, both geographically and thematically. This evolution supports the growing relevance of financial statement analysis in a complex and global financial environment.

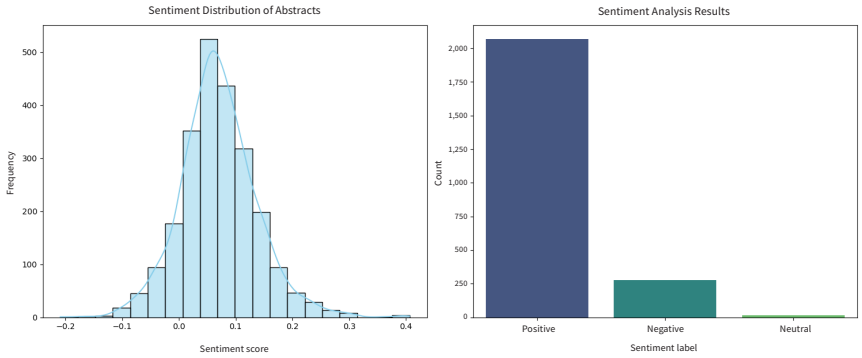
3.2 Sentiment Analysis

Beyond publication trends, the emotional tone embedded in abstracts provides additional context for how researchers position their contributions. The sentiment analysis results reveal an overwhelmingly positive tone within the academic discourse on financial statement analysis. Of the 2,364 abstracts analyzed, 2,080 (88.0 percent) were classified as positive, 260 (11.0 percent) as negative, and only 24 (1.0 percent) as neutral. This distribution, visualized in Figure 6, illustrates a bell-shaped curve skewed slightly toward positive values, consistent with the formal and constructive style characteristic of scholarly writing.

The predominance of positive sentiment reflects the forward-looking and solution-oriented nature of much of the FSA literature. Many abstracts focus on methodological advancements, the development of new predictive models, or the application of financial analysis tools to emerging challenges, often framed as improvements or contributions to the field. These findings reinforce the impression that FSA research is typically positioned to advance analytical capabilities, improve transparency, or enhance decision-making processes. In contrast, negative sentiment was most often associated with papers addressing critical issues such as financial distress, fraudulent reporting, governance failures, or methodological limitations. These papers tend to emphasize gaps in the existing literature, challenges in practical implementation, or systemic shortcomings in regulatory frameworks. Although fewer in number, such papers play a vital role in shaping the field by drawing attention to unresolved problems and catalyzing future inquiry. Neutral sentiment was rare, likely due to the fact that even descriptive or review papers tend to frame their purpose in terms of relevance or contribution, which introduces a slight positive skew. The low

proportion of neutral abstracts also reflects the tendency of academic authors to adopt evaluative language, even in methodologically descriptive texts. Figure 6 illustrates the overall sentiment distribution across the corpus, with the left panel showing the histogram of sentiment scores and the right panel presenting the categorical sentiment classification (positive, negative, and neutral).

Figure 6: *Sentiment Analysis Results*



Source: Authors' elaboration.

Overall, the sentiment distribution provides an additional layer of insight into how FSA research is framed within the literature. While quantitative in nature, these results complement the keyword and thematic cluster analyses by revealing how researchers communicate the tone and perceived value of their contributions. In particular, the prevalence of positive framing suggests a maturing discipline that is largely oriented toward constructive problem-solving rather than disciplinary self-critique.

3.3 Keyword Analysis

A thematic overview of the literature is developed by analyzing how keywords cluster together, revealing dominant topics and emerging areas. The keyword co-occurrence analysis illustrates the distribution of terms within each cluster, based

on the abstracts from the 2,364 articles that met the criteria of the PRISMA protocol's inclusion phase. In this analysis, we focused on keywords that appeared at least five times, aiming to cover a range of topics and terms related to FSA. From this data, we created a network visualization map and a density visualization map to highlight the key, current, and pertinent terms in the literature on this subject. These maps, produced using VOSviewer software, allowed us to observe the evolution and expansion of FSA applications in scholarly discussions. Additionally, this analysis provided a basis for recommending future research directions and identifying upcoming trends.

Initially, after analyzing the abstracts, we identified a total of 35,507 items, of which 2,304 met the criteria when a minimum occurrence threshold for terms or keywords was set at five. Subsequently, relevance scores were assigned to each term or keyword, with the rule of thumb to select the top 60 percent most relevant terms, resulting in 1,382 terms (Van Eck & Waltman, 2014). These keywords were intended for the creation of a keyword co-occurrence map from the textual data and underwent a manual review to evaluate their relevance to the topic under study. During this review, we decided to retain terms that pertained to the methodological approaches used in the studies and the geographical areas they covered, providing a detailed view of the different research contexts and approaches across all clusters. The terms excluded during this manual review are detailed in Appendix B.

The keyword co-occurrence map ultimately consisted of 1,137 items organized into seven clusters, linked by 2,170 connections with a total link strength of 4,760. This is displayed in the network visualization map shown in Figure 7. On this map, larger circles and labels indicate items of greater significance, while smaller, less significant items might not be shown to prevent clutter and improve clarity (Van Eck & Waltman, 2010). Items are arranged into clusters based on their thematic connections and proximity, with each cluster differentiated by a unique color. The variety of unique colors displayed represents the number of distinct clusters present. Items sharing the same color are part of the same cluster.

Links, represented by lines, indicate relationships between items; shorter and thicker lines suggest stronger relationships (Van Eck & Waltman, 2010). The seven clusters are:

Blue Cluster – Methodology Approach: This cluster is the most prominent, with 277 occurrences and 813 links, showcasing a total link strength (TLS) of 1,987. It indicates that methodological approaches in financial statement analysis are central to the field, encompassing diverse research methods and analytical techniques, which are crucial for advancing understanding and application in this area. Researchers have extensively explored statistical models, regression analysis, and neural networks to predict financial distress and assess financial performance (Altman, 1968; Ohlson, 1980). For example, Altman's Z-score model, a pioneering work in bankruptcy prediction, remains a critical empirical method in financial analysis, demonstrating the enduring relevance of robust methodologies (Altman, 1968). Additionally, recent advancements in machine learning models, including random forests and support vector machines, have broadened the methodological toolkit available to financial analysts, enhancing the predictive accuracy and robustness of financial assessments (Hajek & Henriques, 2017).

Light Blue Cluster – Population: The light blue cluster, with 97 occurrences and 384 links (780 TLS), suggests a significant focus on population studies within financial analysis, likely referring to the populations of companies, industries, or economies analyzed using financial statements to derive broader economic and financial insights. Empirical studies, such as Beaver's (1966) work on financial ratios as predictors of failure, highlight the value of population-wide analyses, enabling researchers to validate financial theories across diverse demographic or economic environments. Additionally, large-scale population studies often incorporate cross-sectional and longitudinal data, enabling dynamic analyses of market trends, economic cycles, and corporate financial health in different geopolitical and regulatory environments (Lev, 1989).

Green Cluster – Student: This cluster, comprising 82 occurrences and 311 links (569 TLS), perhaps surprisingly focuses on the educational aspect, possibly exploring how students engage with financial statement analysis, the educational methodologies employed, or research conducted in academic settings. Surprisingly, this cluster examines the role of education in financial statement analysis, possibly investigating how financial analysis is taught or how students perform empirical financial research (Beaver, 1966). This could include exploring pedagogical approaches or curriculum designs that enhance the understanding of financial analytics. Studies by Apostolou et al. (2015) and Watty et al. (2010) underscore the need for innovative teaching strategies, such as experiential learning and technology-assisted instruction, to enhance students' practical and analytical skills in financial analysis. The academic focus within this cluster also includes empirical studies that evaluate the effectiveness of various pedagogical approaches, comparing traditional lecture-based teaching with interactive modules, case-based learning, and simulation exercises that mimic real-world financial analysis scenarios.

Violet Cluster – Prediction: The violet cluster, smaller yet impactful with 75 occurrences and 74 links (472 TLS), highlights the emphasis on predictive models and forecasting in financial statement analysis. Predictive models, such as the neural network approaches to financial prediction (Hajek & Henriques, 2017), are instrumental in risk assessment and investment decision-making, offering empirical evidence of their effectiveness in predicting corporate financial distress. This area is crucial for anticipating financial trends and making informed investment or policy decisions. Emphasizing prediction, this cluster relates to the development and application of predictive models in finance, such as forecasting bankruptcy and financial stability (Altman, 1968). These models are crucial for risk assessment and financial planning, offering valuable tools for investors and policymakers. Furthermore, this cluster includes the development of hybrid predictive models that combine traditional statistical techniques with machine learning algorithms to improve forecast accuracy, particularly in volatile market conditions or during financial crises.

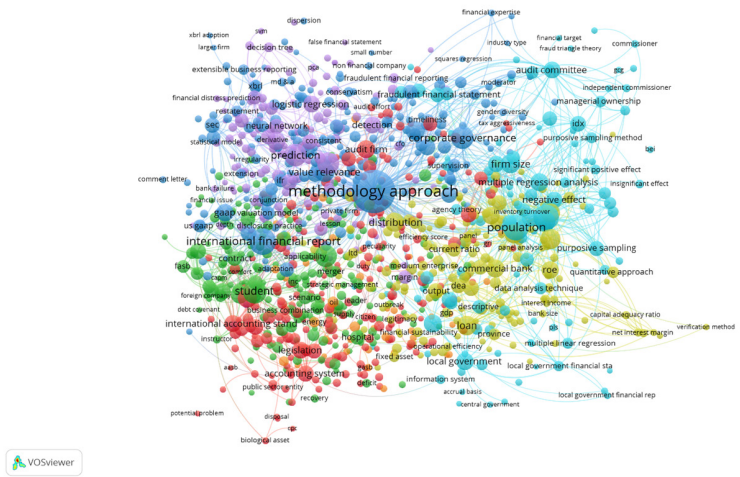
Yellow Cluster – ROA (Return on Assets): This cluster features 60 occurrences and 263 links (453 TLS), underscoring the importance of ROA as a key metric in evaluating a company's efficiency in generating profits from its assets. Studies such as Lev's (1989) research on financial ratios provide empirical validation of ROA as a critical indicator of managerial efficiency and operational performance. This cluster also delves into sector-specific analyses, where ROA is used to benchmark performance across industries, providing insights into sectoral competitiveness and guiding investment strategies by highlighting companies that maximize asset utilization effectively.

Red Cluster – IAS (International Accounting Standards): With 54 occurrences and 237 links (393 TLS), the red cluster focuses on international accounting standards, highlighting ongoing discussions and research into how these standards influence financial reporting and analysis globally. Research by Ball (2006) emphasizes the impact of IAS on financial transparency and comparability, providing case studies of multinational corporations adapting to international standards. Further, the cluster explores the challenges of harmonization in international financial reporting, including the complexities of transitioning from local accounting standards to IAS and the implications for stakeholders, such as investors, auditors, and regulatory bodies.

Orange Cluster – Oil: The smallest cluster, with 18 occurrences and 88 links (106 TLS), this cluster's focus on the oil sector suggests specialized research within this industry. Focused on the oil industry, this cluster likely investigates financial practices and economic implications within this sector, including profitability analyses and the impact of global economic shifts on financial stability (Hamilton, 1983). Such research is crucial for stakeholders in the oil market and related industries. Case studies such as Hamilton's (1983) analysis of oil price shocks and their economic implications exemplify the empirical research within this cluster, providing insights into how financial analysis can inform strategic decisions in the oil market and related industries. The research within this cluster also includes financial risk assessments for oil companies, examining how fluctuations in global oil prices impact financial stability, profitability, and long-term strategic planning.

The keyword co-occurrence analysis reveals a diverse thematic structure in financial statement analysis research. The red and blue clusters focus on foundational topics such as profitability, liquidity, and audit assurance, reflecting the discipline's traditional roots. The green and yellow clusters signal a shift toward emerging areas, including sustainability, ESG disclosure, and governance accountability. Meanwhile, the light blue and violet clusters represent specialized subfields such as digital reporting technologies and performance evaluation frameworks, while the orange cluster captures educational and behavioral dimensions. Collectively, these clusters illustrate how financial statement analysis has evolved from a ratio-centric technical field into a more multidimensional, interdisciplinary research domain shaped by new societal and regulatory demands.

Figure 7: *Network Visualization Map of Keyword Co-occurrence in Articles About FSA*



Source: Authors' elaboration.

Additionally, a word cloud was generated through a program executed in Python (Figure 8). This word cloud showcases the most frequently occurring terms in the current literature. The term "financial" appears 1,219 times, "analysis" is mentioned 519 times, "accounting" occurs 407 times, "reporting" is used 271 times, "management" comes up 267 times, "performance" is noted 265 times, "audit" is found 252 times, "statements" appears 215 times, and "corporate" is seen 205 times. Keywords that are relevant yet less frequently used, appearing more than 30 times, are presented in Appendix C.

The prominence of terms such as "financial", "analysis", "accounting", and "reporting" reinforces the methodological and technical focus of early research in this field. However, the frequent appearance of terms like "management", "performance", "audit", and "corporate" suggests that the literature has progressively incorporated organizational, evaluative, and governance dimensions. This lexical pattern is consistent with the thematic evolution observed in the co-occurrence clusters, highlighting a growing convergence between financial statement analysis and broader management and regulatory concerns.

Figure 8: *Word Cloud of the Most Frequent Terms*

Source: Authors' elaboration.

The word cloud analysis not only highlights the dominance of fundamental terms like "financial", "analysis", and "accounting", but also reflects the field's evolving priorities. The prominence of terms like "management", "performance", and "corporate" suggests a strong focus on the managerial implications of financial statement analysis. Additionally, terms like "audit" and "reporting" underscore the critical role of regulatory compliance and transparency in financial practices. By analyzing less frequent terms, researchers can identify emerging niches, such as "sustainability" and "governance", which align with global trends toward responsible and ethical financial reporting. This detailed examination of keyword frequencies offers a nuanced perspective on the thematic focus of contemporary FSA research and can guide future studies toward addressing both established and emerging topics within the discipline.

These frequently occurring terms emphasize the field's ongoing focus on fundamental concepts such as financial performance, accounting, and reporting. The prominence of terms like "management", "corporate", and "audit" signals the integration of organizational and governance dimensions into traditional analytical frameworks.

3.4 Research Hotspots

From the abstract text data, an overlay visualization map (Figure 9) was created, illustrating the chronological development of the most popular methods in FSA research. The analysis highlights distinct methodological shifts that mirror broader trends in financial research and technological progress.

Pre-2012: The initial phase up to 2012 was characterized by traditional analytical techniques, with a strong emphasis on foundational methods such as financial statement analysis, bankruptcy prediction models, experiments, discriminant analysis, logit analysis, and multivariate analysis. These methods predominantly focused on financial stability assessments, corporate health evaluations, and predictive modeling for financial distress. The widespread adoption of discriminant

and logit analyses during this period highlights the influence of seminal works, such as Altman's (1968) bankruptcy prediction model and Ohlson's (1980) probabilistic prediction models, which set the groundwork for quantitative financial analysis.

2012–2014: The period between 2012 and 2014 marked a transition toward more refined financial metrics and analytical approaches. There was a growing preference for financial analysis, ratio analysis, financial ratio analysis, and data envelopment analysis. These methods enabled deeper insights into corporate performance, efficiency measurement, and benchmarking, particularly valuable for comparing firm performance across industries or within specific sectors. The introduction of data envelopment analysis (DEA) added a non-parametric method for evaluating the efficiency of decision-making units, aligning with the increasing demand for performance assessments in public and private enterprises.

2014–2016: As the field progressed from 2014 to 2016, a diversification of methods became evident. Researchers increasingly employed financial ratio analysis, trend analysis, factor analysis, cluster analysis, sensitivity analysis, case studies, and valuation models. This phase indicates a methodological broadening, incorporating both quantitative and qualitative analyses. The rise of trend and factor analyses reflected a shift toward understanding dynamic market behaviors and the underlying factors driving financial outcomes. Cluster and sensitivity analyses provided robust tools for segmenting data and assessing the impact of variable changes on financial models. The case study approach enriched empirical research, offering in-depth insights into specific corporate scenarios and enhancing the practical applicability of FSA methods.

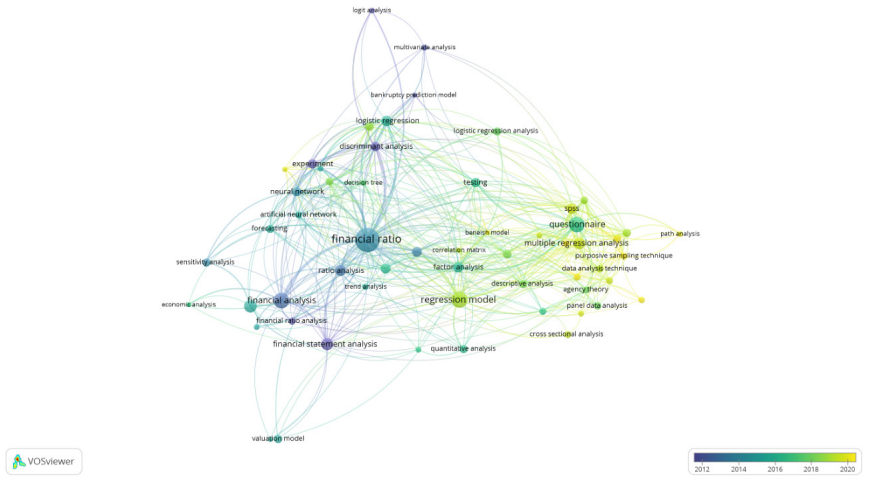
2016–2018: The period from 2016 to 2018 signaled a technological leap with the adoption of advanced analytical techniques, including neural networks, artificial neural networks (ANNs), questionnaires, testing, quantitative analysis, and logistic regression. The integration of neural network models, inspired by machine learning (ML) and artificial intelligence (AI), marked a pivotal shift toward predictive analytics and automated financial modeling. These models

contributed to improved accuracy in forecasting financial distress and identifying patterns in large datasets. Logistic regression remained relevant for binary outcome predictions, especially in risk assessment and bankruptcy prediction studies. The use of questionnaires and testing methods indicates an expansion into mixed-method research, blending quantitative rigor with qualitative insights to explore stakeholder perceptions and behavioral finance elements.

2018–2020: Between 2018 and 2020, there was a continued expansion of methods, with a strong focus on advanced statistical and econometric techniques. Regression models, panel data analysis, cross-sectional analysis, principal component analysis (PCA), and descriptive analysis became prominent. The adoption of panel data analysis facilitated longitudinal studies, allowing researchers to track financial performance over time and control for unobserved heterogeneity. PCA enabled dimensionality reduction in large datasets, enhancing the efficiency of data processing and visualization. The application of agency theory in this period introduced a theoretical lens for understanding corporate governance and managerial decision-making within financial analysis frameworks.

Post-2020: The post-2020 era showcases a paradigm shift toward sophisticated software tools and data-driven methodologies. The use of SPSS, path analysis, multiple regression analysis, panel data regression analysis, purposive sampling, the Beneish model, and machine learning indicates a robust embrace of technological advancements. SPSS provided a versatile platform for statistical analysis, while path analysis enabled the exploration of complex causal relationships within financial models. The Beneish model, designed for detecting earnings manipulation, gained traction in forensic accounting and fraud detection studies. Machine learning techniques further enhanced predictive analytics, enabling the processing of large volumes of financial data with improved accuracy and efficiency. The emphasis on purposive sampling techniques reflects a methodological refinement, ensuring that research samples align closely with study objectives and improve the validity of research findings.

Figure 9: *Overlay Visualization Map of Keywords*



Source: Authors' elaboration.

Overall, the evolution of methodologies in FSA research mirrors broader developments in analytical technologies and financial theory. Early reliance on traditional statistical models gradually gave way to more advanced and automated approaches, demonstrating the field's adaptive nature and its alignment with global trends in data analytics and financial transparency. The bibliometric analysis underscores the dynamic and evolving nature of FSA research, highlighting both continuities in foundational methods and innovation through the adoption of emerging technologies.

The findings of this bibliometric analysis reveal critical trends in FSA research that have significant policy implications. Policymakers can utilize insights from methodological advancements, such as predictive models and international accounting standards, to enhance financial transparency and regulatory compliance. Additionally, the integration of advanced technologies, like artificial intelligence and machine learning, with FSA can support governmental financial oversight and economic stability initiatives.

4 Directions for Future Research

The bibliometric analysis revealed several underexplored areas within financial statement analysis, highlighting significant opportunities for future research. Notably, there is a gap in the application of advanced analytics in small and medium-sized enterprises (SMEs) and a limited understanding of how cultural factors influence financial reporting practices. Addressing these gaps through empirical studies that implement innovative FSA methods in diverse organizational contexts could substantially enrich academic discourse, offering fresh insights and practical applications.

One promising research direction involves integrating advanced technologies, such as artificial intelligence and machine learning, with FSA to enhance the precision and predictive power of financial analysis models. AI and ML have demonstrated significant potential across various disciplines, with machine learning algorithms, for instance, proving effective in classification techniques and bankruptcy prediction in banking and corporate settings (Biju et al., 2024; Hajek & Henriques, 2017). Expanding the use of these technologies within FSA could lead to more dynamic and adaptive financial models that improve strategic decision-making.

In addition, future studies should focus on conducting granular financial analyses within specific sectors, such as technology, healthcare, and renewable energy. Developing industry-specific financial models would not only refine financial forecasting but also enhance the strategic alignment of financial reporting practices. Studies in natural resource industries and earnings management underscore the need for tailored approaches, demonstrating that unique financial dynamics often necessitate customized analytical frameworks.

Another critical area of exploration is the impact of adopting International Financial Reporting Standards (IFRS) on the comparability and quality of financial reporting across different jurisdictions. Existing studies indicate that while IFRS adoption can improve accounting quality and investor confidence, it

also introduces challenges related to standardization and interpretation (Chua et al., 2012). Future research could delve into these dual aspects, offering insights into best practices for harmonizing financial reporting on a global scale.

Furthermore, advancing educational methodologies in FSA represents an additional promising research avenue. There is a need to develop and assess innovative pedagogical strategies and curricula that enhance both theoretical understanding and practical skills among students. Literature reviews on accounting education emphasize the effectiveness of modern teaching methods, such as experiential learning and technology-assisted instruction, in bridging the gap between academic knowledge and real-world application (Apostolou et al., 2015; Watty et al., 2010).

Finally, conducting cross-country comparative studies can provide valuable insights into how different national contexts shape the practices and outcomes of FSA. Such studies are instrumental in identifying the influence of regulatory environments, economic conditions, and cultural factors on financial analysis practices. Previous research in law, finance, and corporate governance highlights how national contexts impact financial behaviors, suggesting a rich potential for cross-disciplinary exploration (Hope, 2013).

By addressing these underexplored areas through empirical research and innovative methodologies, future studies can significantly contribute to the evolution of FSA as a dynamic and impactful discipline. These efforts will not only fill existing research gaps but also provide practical insights that enhance financial reporting practices and educational frameworks in diverse organizational and cultural contexts.

5 Conclusion

This paper presents a comprehensive bibliometric analysis of the evolution and current landscape of financial statement analysis, using a dataset that nominally spans the period from 1937 to 2023. However, the core of the bibliometric analysis reflects literature from 1970 onward, as earlier indexed works are sparse. Using the Scopus database and the PRISMA protocol, we refined an initial pool of 7,411 papers to a final dataset of 2,364 relevant publications.

Through the application of VOSviewer software, we constructed and visualized keyword co-occurrence networks that revealed seven thematic clusters within the FSA domain, including methodological approaches, population studies, educational aspects, predictive models, return on assets, international accounting standards, and sector-specific research.

Our findings highlight a significant growth in FSA publications, particularly from the 1990s onwards, driven by technological advancements and global financial events. This increase underscores the growing interest and importance of FSA in both academic and practical contexts. The United States leads in both the volume of publications and citations, indicating its prominent role in shaping the field. The findings highlight the central role of methodological innovation in FSA. Techniques such as statistical modeling, regression analysis, and neural networks are increasingly used to predict financial distress and assess organizational performance. Additionally, the paper emphasizes the importance of international accounting standards in ensuring consistency and transparency in financial reporting across different jurisdictions.

Moreover, the educational aspects of FSA are explored, revealing the need for improved pedagogical approaches to enhance students' understanding and application of financial analysis. This aligns with the broader objective of fostering a deeper comprehension of FSA through better educational methodologies.

The paper identifies several key contributors and influential journals in the field, providing a robust foundation for future research directions. These directions

include integrating advanced analytical tools such as AI and machine learning to address modern financial complexities, conducting sector-specific financial analyses, investigating the impact of IFRS adoption on financial reporting comparability, exploring new pedagogical approaches in FSA education, and conducting cross-country comparative studies to understand the influence of different national contexts on FSA practices. This bibliometric analysis offers valuable insights into the historical and contemporary landscape of financial statement analysis, highlighting the significant trends, key contributors, and emerging research directions. The findings suggest a sustained interest in FSA research, with future developments likely to focus on methodological innovation and international collaboration to address the complexities of modern financial systems.

These findings suggest clear implications for various stakeholders. Policymakers should promote the adoption of AI-driven tools in financial regulation. Financial institutions and corporations are encouraged to strengthen transparency by aligning with international accounting standards. Meanwhile, academic institutions should modernize their curricula to equip future professionals with advanced FSA competencies.

While this study contributes significantly to the understanding of FSA literature, it has certain limitations. Chiefly, the reliance on a single database (Scopus) may exclude relevant studies indexed elsewhere. Publication trends should be interpreted in light of the evolving coverage of the Scopus database. Its inclusion of new journals over time and broader indexing criteria post-2004 likely contribute to the upward trend. Future research could extend this work by incorporating additional sources, such as Web of Science, to ensure broader coverage and comparative robustness. Finally, while country-level productivity and citation patterns were examined, these results must be interpreted within the limitations of non-normalized data, which favor large research systems like those of the USA and China.

Appendix A

Table A1: *Top Journals Where Articles About FSA Are Published*

Journal	Metrics	Score
Sustainability	Number of published articles	42
	Number of citations	477
	SCImago Journal Rank	0.664
	Impact factor of the journal	3.39
	H-index	136
Academy of Accounting and Financial Studies Journal	Number of published articles	35
	Number of citations	112
	SCImago Journal Rank	0.2
	Impact factor of the journal	0.65
	H-index	17
Investment Management and Financial Innovations	Number of published articles	28
	Number of citations	178
	SCImago Journal Rank	0.189
	Impact factor of the journal	1.02
	H-index	21
Journal of Risk and Financial Management	Number of published articles	23
	Number of citations	69
	SCImago Journal Rank	0.258
	Impact factor of the journal	2.82
	H-index	7
Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis	Number of published articles	21
	Number of citations	50
	SCImago Journal Rank	0.169
	Impact factor of the journal	0.55
	H-index	22
Journal of Asian Finance, Economics and Business	Number of published articles	21
	Number of citations	115
	SCImago Journal Rank	0.192
	Impact factor of the journal	2.78
	H-index	20
International Journal of Innovation, Creativity and Change	Number of published articles	21
	Number of citations	7
	SCImago Journal Rank	0.23
	Impact factor of the journal	0.3
	H-index	14

Accounting Review	Number of published articles	20
	Number of citations	1,461
	SCImago Journal Rank	4.640
	Impact factor of the journal	5.03
	H-index	180
Accounting Horizons	Number of published articles	18
	Number of citations	616
	SCImago Journal Rank	0.997
	Impact factor of the journal	2.16
	H-index	87
Journal of Applied Accounting Research	Number of published articles	18
	Number of citations	123
	SCImago Journal Rank	0.567
	Impact factor of the journal	3.3
	H-index	31
Managerial Auditing Journal	Number of published articles	18
	Number of citations	377
	SCImago Journal Rank	0.606
	Impact factor of the journal	3.4
	H-index	67
Expert Systems with Applications	Number of published articles	18
	Number of citations	1,290
	SCImago Journal Rank	1.873
	Impact factor of the journal	10.35
	H-index	249
European Accounting Review	Number of published articles	17
	Number of citations	641
	SCImago Journal Rank	1.072
	Impact factor of the journal	4.07
	H-index	83

Source: Authors' elaboration.

Appendix B

Excluded keywords (terms) from the bibliometric analysis:

main difference, related institution, subject code, supplementary material, islamic financial institution, teaching note, finland, main problem, bucharest stock exchange, fundamental signal, higher value, french company, article analyze, complexity academic level, unrestricted non commercial use, commercial license, creative common, open access article, original work, synopsis, short run, experimental result, key indicator, ireland, case synopsis, subject area, chile, creativecommons org license, copyright, bosnia, herzegovina, shanghai stock exchange, slovakia, critic, better result, ecuador, case description, russian federation, important element, significant increase, greek, break, important tool, chinese listed company, present, educator, theoretical basis, indonesian local government, hanoi stock exchange, certain period, lower level, united kingdom, substantial difference, recent decade, england, research instrument, non big, south korea, statistical sample, representative sample, france, precision, origin, significant role, july, italian company, external pressure, input variable, main component, serbia, fall, european company, taiwan, final sample, great extent, http, research background, hour, istanbul stock exchange, us security, desire, higher return, important aspect, second part, potential impact, banker, last year, practical use, main reason, uae, special attention, main goal, empirical basis, practical application, start, french, reasoning, us company, sample selection, czech company, slovenia, onward, revision, important information, september, switch, default, input data, russian company, essence, current year, research period, significant amount, united arab emirate, alternative method, fair view, significant variable, present value, slovak republic, romania, main aim, research population, useful insight, well, data sample, logic, total number, great importance, egyptian stock exchange, previous year, croatia, iii, beginning, nexus, vital role, warsaw stock exchange, higher degree, germany, primary source, interested party, footnote, current research, chapter, greece, high risk, indian company, significant negative

relationship, next, iran, overall result, main factor, april, research problem, past decade, statistical data, high degree, march, spain, tanzania, ghana, lens, ukraine, paper deal, firm year, bibliometric analysis, major finding, turkey, years period, study variable, concern opinion, lot, narrative, vietnam, november, significant predictor, tunisia, past, sub saharan africa, korea, indonesian stock exchange, entry, india, significance level, new zealand, statistical package, consecutive year, medium, key factor, research object, speed, indonesia stock exchange, room, bursa malaysia, kuwait, united state, present research, june, kenya, dollar, czech republic, significant positive relationship, first year, sample data, us firm, european union, first paper, kosovo, first, rest, main source, study finding, total sample, cross section, february, big, pakistan, none, study period, analysis result, table, august, prior literature, check, amman stock exchange, thought, ease, semi, top, indonesia, information user, era, research objective, prior research, jordan, month, study sample, prior study, significant effect, research design, study result, significant influence, africa, release, current study, positive influence.

Appendix C

Less frequently used terms from the word cloud:

"statement" (172 times), "value" (163 times), "risk" (161 times), "disclosure" (155 times), "quality" (146 times), "capital" (144 times), "earnings" (143 times), "IFRS" (139 times), "information" (123 times), "data" (121 times), "business" (117 times), "assets" (116 times), "model" (115 times), "governance" (106 times), "ratios" (105 times), "profitability" (105 times), "fraud" (102 times), "stock" (99 times), "ratio" (98 times), "standards" (88 times), "companies" (87 times), "sector" (87 times), "efficiency" (83 times), "social" (76 times), "credit" (75 times), "market" (74 times), "firm" (74 times), "international" (73 times), "industry" (71 times), "public" (68 times), "decision" (68 times), "return" (68 times), "theory" (68 times), "income" (66 times), "structure" (65 times), "economic" (64 times), "cost" (63 times), "on" (62 times), "equity" (62 times), "sustainability" (62 times), "prediction" (61 times), "tax" (61 times), "cash" (60 times), "environmental" (59 times), "bank" (56 times), "investment" (56 times), "system" (55 times), "valuation" (54 times), "bankruptcy" (52 times), "report" (51 times), "regression" (50 times), "the" (48 times), "distress" (48 times), "auditing" (47 times), "indicators" (47 times), "banks" (47 times), "banking" (47 times), "ownership" (47 times), "company" (46 times), "control" (44 times), "fair" (43 times), "government" (43 times), "relevance" (43 times), "responsibility" (43 times), "learning" (43 times), "development" (42 times), "finance" (42 times), "firms" (42 times), "neural" (42 times), "internal" (41 times), "leverage" (41 times), "auditor" (40 times), "crisis" (40 times), "liquidity" (39 times), "exchange" (39 times), "debt" (39 times), "enterprises" (36 times), "mining" (36 times), "intellectual" (35 times), "reports" (34 times), "envelopment" (34 times), "models" (33 times), "flow" (33 times), "profit" (33 times), "health" (33 times), "regulation" (32 times), "institutional" (32 times), "strategy" (32 times), "policy" (32 times), "growth" (32 times), "local" (31 times), "intangible" (31 times), "measurement" (30 times), "markets" (30 times), "covid-19" (30 times).

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