LITERATURE REVIEW

Bibliometric Evaluation of the Association Between Behavioural Finance and Retail Investor's Decision-Making

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ABSTRACT

PURPOSE: This research article aims to present a bibliometric analysis of relevant publications in the field of behavioural finance and retail investors' decision-making.

DESIGN/METHODOLOGY/APPROACH: A total of 691 documents were collected from Web of Science database from 2000-2022 and bibliometric evaluation was conducted through VOS Viewer software 1.6.17.1.exe. A structured literature review of the top 10 articles, citation analysis and co-occurrence of keywords were performed.

FINDING: Little research was found specifically related to retail investors' investing decisions in the association of behavioural finance.

RESEARCH LIMITATIONS/IMPLICATIONS: This bibliometric study was limited to journal articles and used only the Web of Science database. The survey was restricted to retail investors.

ORIGINAL/VALUE OF THE PAPER: The study offers valuable insights into the intricate dynamics of retail investor decision-making, emphasising the psychological factors that influence investment choices.

PRACTICAL IMPLICATIONS: The current paper contributes to the accumulation of related literature and found the most cited journals, articles, and countries, as well as authors in the field of behaviour finance and retail investors' decision-making.

KEYWORDS: *Behaviour Finance; Investment Decisions; Individual Investor; VOS Viewer; Bibliometric Analysis*

INTRODUCTION

Research on investor decision-making focuses on understanding the process and elements that influence investment decisions (Kengatharan and Kengatharan, 2014). Investment decisions are complex and require a significant amount of time before deciding on a course of action (Jagongo and Mutswenje, 2014). The classic financial models of capital asset pricing, arbitrage pricing, and portfolio management, etc., are based on the premise that people make rational decisions because they have unbounded reason and access to valuable and perfect information (Kumar and Goyal, 2015). If investors are rational decision-makers, these theories support, foster, and reinforce the long-held belief in the concept of rationality in investment decision-making; sometimes, however, investors may take irrational and illogical decisions and make mistakes in their investments (Kim and Kim, 2023). Most investors fail in their efforts to reduce their predicted losses through investing. It is critical to be well-versed on any potential risks to one's investments (Brooks *et al.*, 2008).

Human decision-making has been the subject of several studies aimed at ascertaining the impact of behavioural and cognitive components on the decisions made (Shefrin and Statman, 1985). Investors' illogical behaviour was attributed to psychological biases (Bachmann and Hens, 2015). Accordingly, the objective of behavioural research is to examine how people take decisions and how they interact and inspire others (Birnberg and Ganguly, 2012). Sentiments and emotions affect financial performance (Cuomo *et al.*, 2018). Prospect theory, as discussed by Kahneman and Tversky (1979), is popular for explaining decision-making in uncertain environments. To change from standard finance to behavioural finance, the development of prospect theory brought together the behavioural and emotional characteristics of financial decision-making. As a result of a lack of acceptable explanations for diverse investor irrational actions, the traditional school of thought concentrates on efficient market hypothesis; it further predicted that utility theory was dominated by financial behaviour.

It has therefore been established by the behavioural finance community that irrationality in investing can be explained by the influence of behavioural biases and behavioural functions that are also used to analyse financial markets (Khan, 2017). Consequently, behavioural finance examines investor behaviour and how it influences stock markets from a psychological perspective. The nature of individual investors is different from other forms of investor according to the volume of investment, sources of funds available to invest, approaches and access to information (Bhattacharya *et al.*, 2012). Additionally, investors have a distinct strategy for handling their finances, and investing can be approached in a variety of ways by different types of investors. Some investors like to save money and become extremely methodical in their assessments, while others are more driven by emotion (Fünfgeld and Wang, 2009).

Psychological elements have a crucial part in determining individuals' financial behaviour, and it is crucial to examine these factors in depth (Strömbäck *et al.*, 2017). For Yuan and Zhan (2022),

psychological behaviour becomes critical at time of loss or risk. Additionally, irrationality among the individual investors has a greater effect on making investment decisions (Seth *et al*., 2020). In this context, financial behaviour exemplifies individuals' understanding of economics and their competence to handle outcomes associated with finance (Shim *et al*., 2009). Risk-free and high-return investments are preferred by investors because they allow them to focus on their previous investments as well as their future potential for return and risk (Michailova *et al.*, 2017). They are wary of higher-yielding, lower-risk investments. Even if individuals choose to invest in places where knowledge is readily available, high entrance costs and taxes, inflation, etc., are impediments to optimum investment (Fünfgeld and Wang, 2009). The financial attitude of an individual can serve as a measure of their financial understanding, which can subsequently be enhanced through education (Joo and Grable, 2004). Therefore, it is essential to evaluate the attitude of retail investors, as their financial attitude, together with their financial behaviour and knowledge, might impact their financial well-being and contentment (Falahati *et al*., 2012).

BIBLIOMETRIC RESEARCH ASSOCIATED TO BEHAVIOUR FINANCE AND INDIVIDUAL INVESTORS

In her paper, Bharti Singh (2021) represents a bibliometric network analysis using VOS Viewer software on behavioural finance and behavioural accounting. The study reveals the developing ideas in the field of behavioural finance and in the field of behavioural accounting. Paule-Vianez *et al*. (2020) conducted a bibliometric study on behavioural finance between 1987 and 2017. The study focuses on irrationality and its impact on the market.

Jain *et al*. (2022) took 212 research papers from the Scopus database on behavioural biases and investment decision-making to discover highly cited journals, authors, nations and institutions inspiring behavioural biases. Costa *et al*. (2017) conducted a bibliometric study on 889 articles taken from the Web of Science (WoS) database between 1990 and 2016 on the relationship of behavioural finance and behavioural biases and its impact on decision-making. Over-confidence is the influential element in behavioural finance. López-Medina *et al*. (2021) performed bibliometric research on 492 articles between 1992 and 2021 from the WoS database on financial behaviour. The authors described the role of financial education and literacy on investment decisions. Choiji *et al*. (2022) performed bibliometric research on herd behaviour. Data were extracted from the WoS from the last 30 years. Research in herd behaviour has grown in previous years.

Bajwa and Syed (2022) took 101 articles from the WoS related to the Pakistan stock market, and defined the collaborations of different journals and institutions contributing to the Pakistan stock market. Nguyen (2022) explored 327 articles from 1978 to 2021 on the theme of financial wellbeing. Citation analysis, bibliographic coupling and network analysis was undertaken in the field of financial wellbeing. Ahmed *et al.* (2022) conducted a bibliometric investigation on machine

learning and artificial intelligence in 348 papers between 2011 and 2021 from the Scopus database: R Studio and VOS Viewer were used in this research. The results showed that maximum research on machine learning and artificial intelligence has been conducted in the US, China, and the UK. The current study provides guidelines to various financial institutes to select optimum machine learning and artificial intelligence. In their bibliometric search on "behavioral economics and behavioral finance", Costa *et al*. (2019) collected data from the WoS and found that the field of behavioural economics is much wider than the field of behavioural finance. Vitor Jordão da Gama Silva *et al*. (2019) conducted bibliometric research on Brazilian journals and found that quality has been compromised in the race to produce more publications.

According to the bibliometric analysis presented above, most behavioural finance research focuses on behavioural accounting, behavioural economics, and behavioural biases. This article examines only behavioural finance and the investment decisions of retail investors. Existing literature reviews concentrate on herd behaviour, cognitive errors, irrationality, etc., in addition to prospect theory, heuristics, and other psychological theories of behavioural finance that influence investment decisions. This paper focuses on the investing decisions of retail investors and provides a comprehensive overview of this context.

Using VOS Viewer 1.6.17.1.exe, this paper analysed 691 research publications. To our knowledge, this is the first bibliometric review study on retail investor behaviour. The present study covers the years 2000-2022, and the current analysis offers a distinct set of future research topics for new retail investor researchers. An in-depth literature review begins the study. Bibliometric and network analyses have also been done. The study used content analysis to refine research themes and recommend new research opportunities. This research features four contributions:

- to the authors' knowledge, this is the first bibliometric research of retail investor behavioural finance;
- second, a survey of the top 10 papers in behavioural finance and retail investor decision-making reveals research patterns;
- third, this study employs VOS Viewer to conduct a network analysis to identify themes, co-occurrence of keywords, and bibliographic couplings of journals and authors;
- this study adds to the behavioural finance literature by identifying the most influential authors, journals, institutes, and countries.

This research focuses on the literature on behavioural finance and retail investors in a variety of ways. First, this study is the first comprehensive examination of the existing literature on this vital subject. Second, the bibliometric analysis is based on scant research conducted in the context.

Additionally, it contributes to the methodology of the systematic review of the literature. We have proposed additional research topics based on this structure.

RESEARCH METHODOLOGY AND DATA

Research work is a repository of existing knowledge. References show the variables identified, examined, and linkages developed (Mallawaarachchi *et al*., 2020). A comprehensive literature search combines existing knowledge and identifies research gaps for additional investigations (Denyer and Tranfield, 2009). This paper's literature review focuses on the study done in behavioural finance and retail investors' investment decision-making. The sample of the study is spread over time, from 2000 to 2022. The Web of Science (the most used and trustworthy scientific literature database) is used as the database to search the existing relevant literature, and this research analyses Web of Science data; bibliometric studies support WOS's use. A bibliometric study was performed on the WoS data extracted using VOS Viewer 1.6.17.1.exe. The bibliometric approach is straightforward and reproducible (Van Eck *et al*., 2010), and the VOS Viewer makes it simple to undertake bibliometric mapping and network analysis (Aria *et al*., 2020). In this article, systematic literature review, citation analysis, and co-occurrence of keywords have been undertaken. The analysis has been conducted at three levels:

- a systematic structured review of the top 10 most cited articles;
- combined analysis of countries, authors, and institutions;
- analysis of top cited journals and co-occurrence of keywords.

SEARCH CRITERIA

The final search criteria are summarised in Table 1.

Table 1: Data Selection and Search Criteria

Sr.		
1.	**Search Date**	11-04-2022
2.	**Database Used**	Web of Science
3.	**Search Keyword**	"Behavioural Finance" and "Individual Investor" or "retail investor"
4.	**Subject Area**	Include "Business Finance", "Business", and "Management"
5.	**Language**	'English' only
6.	**Tools Used**	MS Excel and VOS Viewer 1.6.17.1.exe

Source: Constructed by authors

THE RESULTS OF BIBLIOMETRIC RESEARCH

This section will discuss annual trends, affiliation statistics, contributing organisations, journal quality analysis of significant writers, citation analysis and keywords.
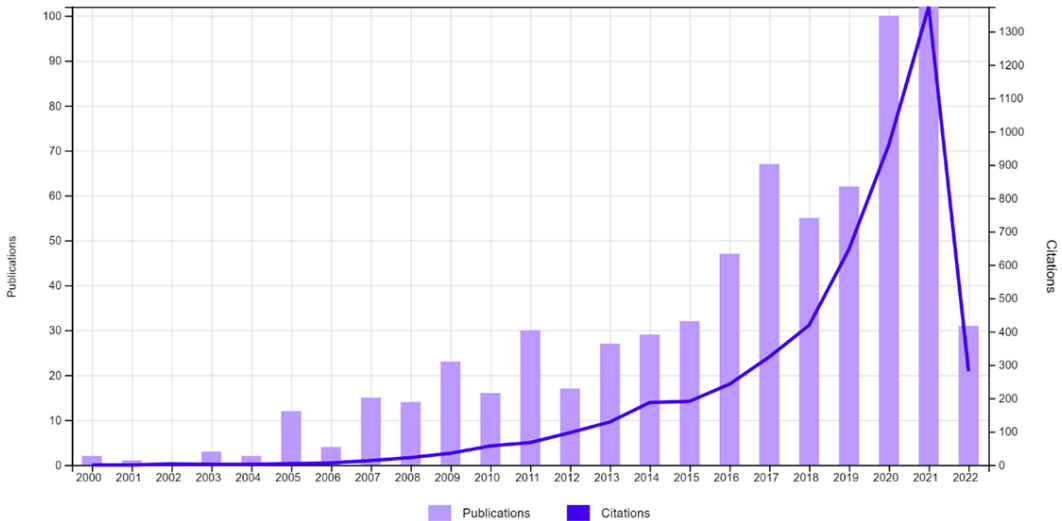

Figure 1: Chronological Publication and Citation Trend of Behavioural Finance Papers
Source: Constructed by authors

Figure 1 shows the rise of behavioural finance papers. The figure shows how many research papers were published from 2000 to 2022, from 2 in 2000 to more than 100 in 2021. There were few publications between 2000-2006. This topic has gained researchers' curiosity. As can be seen, since 2013 more papers have been published annually. In 2020-2021, there were 100 publications, while in the first three months of 2022, 30 papers had already been published. The topic remains research promising.

A REVIEW OF THE LITERATURE OF THE 10 MOST CITED PUBLICATIONS (TABLE 2)

Table 2: Systematic Review of 10 Most Cited Articles

Sr. No.	Author	Title of Document	Journal	Method Used	Citations	Findings
1.	Barber et al. (2009)	Systematic Noise	Journal of Financial Markets	Cross-sectional regression and correlation analysis	157	Investors' investment decisions are affected by psychological biases, and they prefer to trade in a systematic way.
2.	Vismara (2018)	Information Cascades Among Investors in Equity Crowdfunding	Entrepreneurship Theory and Practice	Econometric analysis and regression	151	Information cascades play a vital role in investment decision making as it acts as a herding behaviour. Early investors with their public profiles such as social networks attract late investors.
3.	Dimpfl and Jank (2016)	Can Internet Search Queries Help to Predict Stock Market Volatility?	European Financial Management	Vector autoregressive and autocorrelation, and Granger causality test	137	There are more search queries by retail investors in a strong market, followed by higher volatility that forms a base for future stock volatility prediction.
4.	Subrahmanyam (2008)	Behavioural Finance: A Review and Synthesis	European Financial Management	Systematic literature review of stock returns, trading activities and corporate finance	117	In the current study, stock returns, trading activity, and corporate finance have been explored together with rationality, over-confidence and cognitive ability of CEO and individual investors.
5.	Wen et al. (2019)	Retail Investor Attention and Stock Price Crash Risk: Evidence from China	International Review of Financial Analysis	Multivariate regression	95	There is a negative relationship between retail investor attention and firm-level crash risk.

(continued)

Table 2: Systematic Review of 10 Most Cited Articles *(continued)*

Sr. No.	Author	Title of Document	Journal	Method Used	Citations	Findings
6.	Cohen *et al.* (2011)	Retail Investors' Perceptions of the Decision-Usefulness of Economic Performance, Governance, and Corporate Social Responsibility Disclosures	*Behavioural Research in Accounting*	Multivariate analysis	94	Economic performance information is the factor on which retail investors are more focused, followed by governance, CSR information.
7.	Nicolosi *et al.* (2009)	Do Individual Investors Learn from their Trading Experience?	*Journal of Financial Markets*	Times-series regression and Probit regression	94	Individual investors behave rationally while making investment decisions; therefore the quality of their decisions also depends upon their trading experiences.
8.	Avramov *et al.* (2009)	Credit Ratings and the Cross-Section of Stock Returns	*Journal of Financial Markets*	Cross-sectional regressions	88	Mispricing, illiquidity, and short sells created by individual investors may lead to credit risk effect.
9.	Xin Ding *et al.* (2010)	The Impact of Service System Design and Flow Experience on Customer Satisfaction in Online Financial Services	*Journal of Service Research*	Confirmatory factor analysis, Descriptive Statistics, Reliability, Correlations, and Discriminant Validity	77	Reliability, easy to understand, quicker response, availability, ease to use, etc., are the elements of consumer satisfaction opting for online financial services.
10.	Talwar *et al.* (2021)	Has financial attitude impacted the trading activity of retail investors during the COVID-19 pandemic?	*Journal of Retailing and Consumer Services*	Structure equation modelling	60	Having high interest in financial issues has a great and positive impression on the financial trading behaviour of the retail investor.

Source: Constructed by authors

Andreas Oehler, Chris Brooks, Matthias Horn, Stefan Wendt and Xiong Xiong are the top five authors who have the highest number of publications. Table 3 depicts the number of publications per author, together with number of citations and average citation. The author with the greatest number of publications is Andreas Oehler who has 7 publications with 51 citations and a 7.3 average citation result. Stefan Wendt has 41 citations on 5 publications and has highest average citation of 8. Similarly, in a comparison of institutions and countries, the University of Western Australia has 142 citations on 8 publications and 17.7 average citations, Canada has 284 citations on 23 publications with the highest average citations of 12.3 compared to the USA that has 2,036 citations on 175 documents with average citations of 11.6.

Table 3: Top 10 Publications, Citation and Average Citation by Author, Institution and Country

Author	TP	TC	Avg.	Institution	TP	TC	Avg.	Country	TP	TC	Avg.
Oehler, Andreas	7	51	7.3	Tianjin University	10	26	2.6	USA	175	2031	11.6
Brooks, Chris	7	29	4.1	University Warwick	8	56	7.0	India	85	346	4.0
Horn, Matthias	6	41	6.8	University Western Australia	8	142	17.7	England	78	643	8.2
Wendt, Stefan	5	40	8.0	University Liverpool	7	63	9.0	Peoples R China	69	549	7.9
Xiong, Xiong	5	14	2.8	Indiana University	6	75	12.5	Australia	56	377	6.7
Tan, Siow-Hooi	5	18	3.6	Massey University	6	55	9.2	Germany	52	484	9.3
Khan, Mohammad Tariqul Islam	5	18	3.6	University Sydney	6	51	8.5	Canada	23	284	12.3
Tauni, Muhammad Zubair	4	47	11.7	Natl University Singapore	6	45	7.5	Malaysia	22	109	4.9
Money, Kevin	4	26	6.5	Bamberg University	6	35	5.8	France	19	197	10.3
Lepone, Grace	4	23	5.7	Multimedia University	6	18	3.0	Taiwan	19	121	6.3

Note: TP = Total number of Publications, TC = Total number of Citations
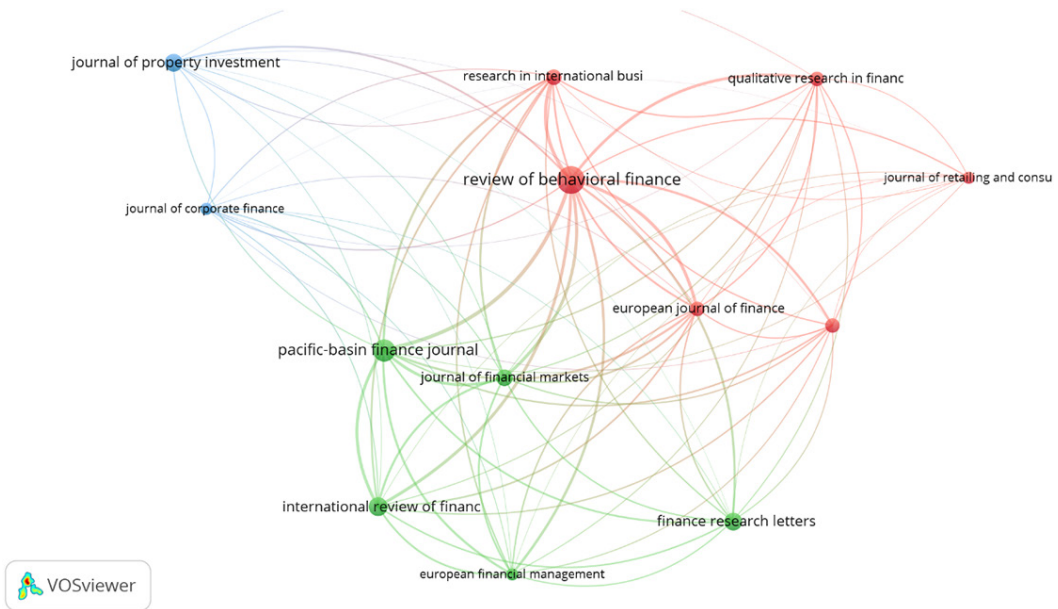*Source:* Constructed by authors

Figure 2: Bibliographic Coupling of Sources
Source: Constructed by authors

In this bibliographic coupling of source there are three clusters (Figure 2). In the selection of source material the criteria are a minimum 10; documents of the source and only those documents that have at least 25 citations are considered for the network analysis. A total of 13 documents meet the threshold and three clusters have been formed. The red cluster has six journals: the *Review of Behavioral Finance*, *Qualitative Research in Financial Markets*, *Research in International Business and Finance*, *European Journal of Finance*, *Journal of Retailing and Consumer Services*, and *Managerial Finance*. The green cluster has five journals: *European Financial Management*, *Finance Research Letters*, *International Review of Financial Analysis*, *Journal of Financial Markets* and *Pacific-Basin Finance Journal*. The blue cluster has two journals: *Journal of Corporate Finance* and the *Journal of Property Investment and Finance*. Table 4 shows that the *Review of Behavioral Finance* and the *Pacific-Basin Finance Journal* have the highest number of publications at 49 together with 185 citations and 32 with 267 citations, respectively; they have a high link strength at 6,636 and 4,540, respectively. Table 4 also shows that that the journal

European Financial Management has the highest number of citations at 310 with only 10 articles, and has the highest average, 31. This is followed by the *Journal of Financial Markets* with 561 citations on 19 articles, with an average of 29.5.

Table 4: Analysis of Top Cited Journals

Journal	TP	TC	Avg. Citation Per Document	Total Link Strength
Review of Behavioral Finance	49	185	3.7	6,636
Pacific-Basin Finance Journal	32	267	8.3	4,540
International Review of Financial Analysis	24	246	10.2	3,236
Journal of Property Investment & Finance	21	102	4.8	734
Finance Research Letters	21	117	5.5	1,803
Journal of Financial Markets	19	561	29.5	3,328
Research in International Business and Finance	17	138	8.1	3,135
European Journal of Finance	15	50	3.3	2,850
Managerial Finance	14	77	5.5	1,670
Qualitative Research in Financial Markets	13	94	7.2	1,738
Journal of Corporate Finance	11	192	17.4	817
European Financial Management	10	310	31.0	2,325
Journal of Retailing and Consumer Services	10	168	16.8	450

Note: TP = Total number of Publication; TC = Total number of Citations
Source: Constructed by authors

Table 4 depicts the list of the top 13 active journals with the highest number of publications, citations and average citations in the area of retail investors' investment decisions. The table shows that the *Review of Behavioral Finance* has 49 publications with a total of 185 citations, 3.7 average citations, and 6,636 total link strength. This is followed by the *Pacific-Basin Finance Journal* and the *International Review of Financial Analysis* with 32 publications, 267 citations, 8.3 average citations, and 4,540 total link strength, and 24 publications, 246 citations, 10.2 average citations, with total link strength of 3,236. The *Journal of Financial Markets* has the highest citations of 561 on 19 publications, and has the highest average citations per publication, 29.5, with total link strength of 3,328.
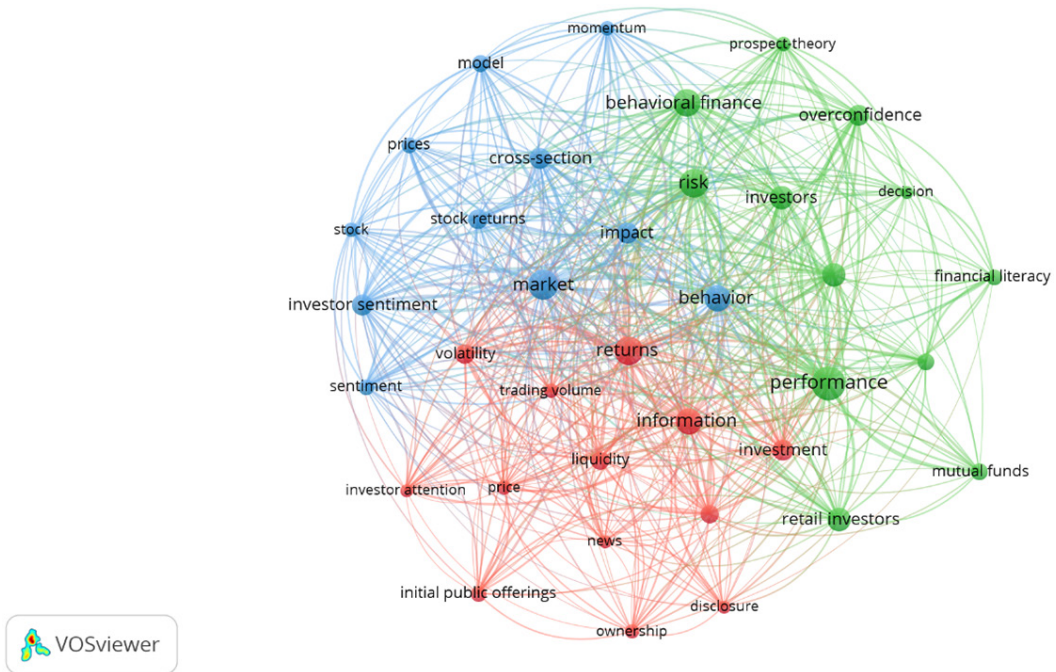
Figure 3: Co-occurence of Keywords
Source: Constructed by authors

As shown in Figure 3, three clusters have been formed.

Cluster 1 is red and has 13 items: "return", "information", "volatility", "investment", "initial public offerings", "institutional investor", "investor intentions", "disclosure", "liquidity", "news", "ownership", "price", "trading volume". The keyword "return" has the highest number of occurrences (85), followed by "information" and "volatility" with 75 and 42 occurrences, respectively. This section communicates that return related news, stock volatility, and information disclosure by institutions may affect trading decisions.

Cluster 2 is green and has 12 items; "behavioural finance", "decision", "determinants", "financial literacy", "individual investor", "investor", "mutual funds", "overconfidence", "performance", "prospect theory," "retail investor", "risk". "Performance" has the highest occurrence (119), this is followed by "risk" and "behaviour finance" with 90 and 78 occurrences, respectively. Performance of the retail investor is highly associated with risk and behavioural elements such as irrationality, overconfidence, biases, etc.

Cluster 3 is blue and has 11 items; "behaviour", "cross-section", "impact", "investor sentiments", "market", "model", "momentum", "price", "sentiments", "stock", "stock returns". In this cluster, "market" is the most significant keyword with 94 occurrences, followed by "behaviour"

and "impact" with 71 and 48 occurrences, respectively. Articles in this cluster show the impact of investor behaviour and investor sentiments on the finance market.

CONCLUSIONS

The purpose of this research was to provide a bibliometric investigation of the relationship between behavioural finance and the decision-making of retail shareholders. Because of this, a list of authors and publications, and the most popular journals were compiled in a search. To meet the given goals, the search was conducted in accordance with the provided criteria. A total of 691 articles were included in the sample. Data were gathered for articles between 2000 and 2022, and the number of studies in this sector has been increasing; a considerable increase can be seen from 2013 onward. As a result, with 157 citations, Barber (2009) was the most widely mentioned study in the Web of Science. In addition, it was discovered that the *Review of Behavioral Finance* had the highest number of papers within the sample, while the United States is the nation with highest number of publications. Reviewing the literature reveals that the investment decisions of retail investors are influenced by a variety of psychological and behavioural factors, which may also affect market performance. The firm's economic performance, its experience, and the company's available information have a bigger influence on investment decisions.

Combining research on the investing decision-making of retail investors and behavioural finance has revealed several additional connected research areas for the future. In the future, the decision-making of retail investors can be analysed using the concepts of financial literacy and investment literacy for a more comprehensive examination. Additionally, research can be undertaken on institutional investors, mutual fund users, and other investors, as this study is limited to retail investors alone. Future research could investigate the several tools and technologies used by retail investors to obtain stock and price information.

The research is not without flaws. First, the current literature search was conducted solely using the Web of Science database. Future research could expand the search breadth by utilising multiple bibliometric databases. This survey only includes retail investors. Future researchers can expand the research field by investigating additional investors. This assessment focuses solely on journal articles and disregards other forms of writing, such as books, conference papers, and research reports. These various forms of literature may provide exciting discoveries that offer significant insights.

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