

A SYSTEMATIC MAPPING AND GLOBAL PERSPECTIVE OF HERDING BEHAVIOR OF INSTITUTIONAL INVESTORS: A BIBLIOMETRIC ANALYSIS

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Abstract

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The paper systematically identifies and discusses the factors influencing institutional investors' herd behavior. It conducts a systematic review of the literature and bibliometric analysis of 82 papers from 1990 to 2023 using VOSviewer and CiteSpace software. The study categorizes the influential countries, institutions, journals, and articles, and outlines three main research streams: Investment strategies, financial theories, and sentiment and experience. It highlights critical factors of herding behavior in two dimensions: intra-organizational (job and management components) and extra-organizational (information and environmental components). The study serves as a valuable reference for managers and researchers, providing insights to help institutional investors understand and prevent detrimental herd behaviors in the market.

Keywords: Herd Behavior, Institutional Investors, Content Analysis, Bibliometric Analysis, Systematic Literature Review, VOSviewer

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1. INTRODUCTION

Behavioral finance is becoming an important field of investigation in the global business ecosystem's volatility, uncertainty, complexity, and ambiguity (VUCA) environment (Hudson et al., 2020). The literature explores the attention of investors

(Chen & Craig, 2023), herd behavior (Cheng et al., 2022), and investor sentiment (Gao & Zhao, 2023). Herding behavior is one of the prominent topics in behavioral finance (Hwang & Salmon, 2004). Many authors believe that herd behavior causes bubbles and financial crises. During a bubble, asset prices are typically higher than their intrinsic value.

The volume of trading and market fluctuations is at higher levels (Spyrou, 2013). However, if these bubbles are not stable, the price of assets suddenly falls, and the capital market faces a crisis (Mohiuddin et al., 2016). Therefore, large institutions such as hedge funds, mutual funds, pension funds, banks, and private equity companies manage much of the trading volume (Maug & Naik, 2011). Considering the growth of investment in all kinds of funds, paying attention to the investment managers of these funds can be important. In addition, considering the impact of irrational sentiment on institutional investors' decision-making and its effects, there is a great interest in better understanding the herd behavior of institutional investors and the factors influencing such behavior (Hudson et al., 2020).

According to the previous studies conducted during the period of 1990–2023, the researchers have found that a coherent and integrated model of factors affecting the herd behavior of institutional investors has yet to be presented. Hence, with content analysis, this study seeks to identify the factors that influence the herd behavior of institutional investors. Also, this study aims to identify the countries, institutions, journals, and influential topics in the literature on the herd behavior of institutional investors with bibliometric analysis. Bibliometric analysis adds to a more comprehensive understanding of knowledge in a specific field of study (Pana, 2023). Quantitative methods (bibliometric analysis) and qualitative methods (content analysis) highlight the intellectual structure of literature in the research field (Chiaramonte et al., 2023). Consequently, we combined bibliometric analysis with content analysis to answer the following questions:

RQ1: What is the state-of-the-art research on the herding behavior of institutional investors?

RQ2: Which way is the herd behavior of institutional investors moving?

RQ3: What are the influential factors on the herd behavior of institutional investors?

RQ4: What are the promising future research areas?

This study attempts to collect and review the knowledge generated on the herding behavior of institutional investors. In addition, this study can help people who are interested in financial markets to have a better understanding of institutional investors' decisions. It can use this knowledge to improve their performance. In this study, according to the literature review, academic researchers have achieved a better knowledge and understanding of this literature. The study also helps fund managers and policymakers to reduce the risks of this behavior by raising awareness of herd behavior.

The remaining part of the paper is organized as follows: Section 2 presents literature review and method used in this study, in Section 3, the analysis results are explained, in Section 4, the obtained results are discussed. Finally, in Section 5, conclusions and final points are provided.

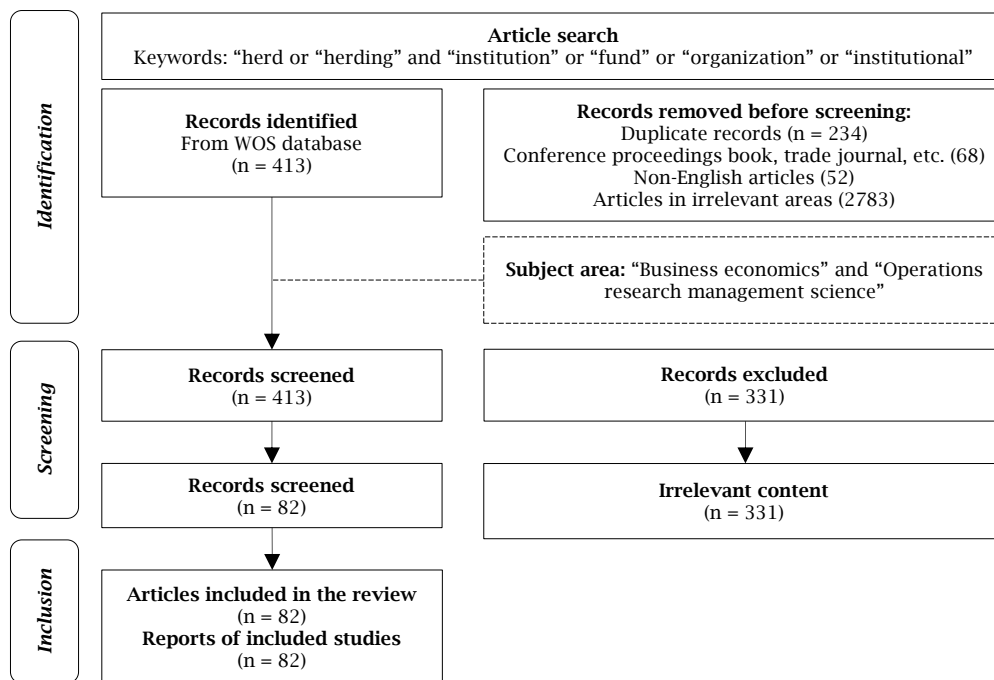
2. LITERATURE REVIEW: PAPER SELECTION METHODOLOGY

Incorporating a literature review is critical for the theoretical foundation of every research project.

However, traditional literature reviews frequently lack rigor and are susceptible to researcher bias (Tranfield et al., 2003). Narrative reviews, while informative, can often contain an element of selection bias. They can sometimes be confusing, especially if similar studies have different results and conclusions. The thorough and unbiased search procedure is one of the fundamental differences between a conventional literature review and a systematic investigation (Tranfield et al., 2003). A systematic review is a precise and transparent approach of several research studies to answer the research question (Pati & Lorusso, 2018). This method should address biases, validity, and lack of repeatability (Mallett et al., 2012). It should also provide a clear overview of the research question (Tsafnat et al., 2014). Systematic review also helps researchers do deep qualitative work (Williams et al., 2021). It also identifies knowledge gaps and highlights contradictions (Mallett et al., 2012). Bibliometric analysis is a renowned and meticulous approach to studying and evaluating substantial scientific knowledge (Donthu et al., 2021), using quantitative analytical techniques and following a review methodology (Ed-Dafali et al., 2023). Researchers particularly support the belief that the review procedures should complement each other (Donthu et al., 2021).

The paper conducts a systematic review of herding behavior among institutional investors from 1990 to 2023. It analyzes the characteristics that lead to herd behavior among institutional investors. The study emphasizes the importance of identifying and selecting keywords and search terms for a systematic review, which involves studying previous research, exchanging opinions among authors and experts, and reaching conclusions collaboratively. We, examine, review, and summarize the literature review in this field and the keywords for finding all research related to herd behavior among institutional investors. The first part is the search process for keywords related to herd behavior, and the second part includes keywords related to funds, institutional investors, and institutions.

So far, many discussions have been about the use and advantages of databases such as Scopus and Web of Science (WOS) (Franceschet, 2010; Harzing & Alakangas, 2016; Martín-Martín et al., 2021). The WOS database has more than 15,000 journals and 50 million articles (Choi et al., 2022). The WOS belongs to the private analytics holding that brings together different databases, which allows us to obtain more truthful and contrasted information (Vizueté-Luciano et al., 2023). Also, The WOS is a digital bibliometric platform internationally recognized among researchers for having high-quality standards (Merigó et al., 2015). Therefore, the WOS will be used to carry out this article since it is the source with the largest number of high-impact journals, even so, it should be noted that there are also other databases, like Google Scholar and Scopus, among others. The data set of this research was collected on July 8, 2023, and the final sample of this research includes 82 articles for the years 1990–2023, which have been selected following the flow chart provided in Figure 1.

Figure 1. Algorithm for selecting the final articles

Source: Authors' elaboration.

To guide our analysis, we embraced the preferred reporting items for systematic reviews and meta-analyses (PRISMA) methodology (Page et al., 2021). This approach encompasses three primary phases — identification, screening, and inclusion. We acquired a sample of 82 papers addressing herding behavior from 1990 to 2023. Figure 2 presents a flow diagram depicting the literature review process, showcasing the database search, and indicating the number of records selected and excluded.

The study conducted a keyword search that yielded 3550 articles, focusing on peer-reviewed documents in English from the WOS using specific keywords. Books and conference articles were excluded, and the research was limited to "Business Economics" and "Operations Research Management Science". The study then filtered articles using the Academic Journal Guide (AJG) to identify authoritative journals. After removing duplicates and reviewing abstracts and full texts, 82 relevant articles were selected. A thorough review process was carried out to ensure consistency and accuracy in selecting articles that aligned with the study's

goals, followed by reviewing and coding the chosen papers.

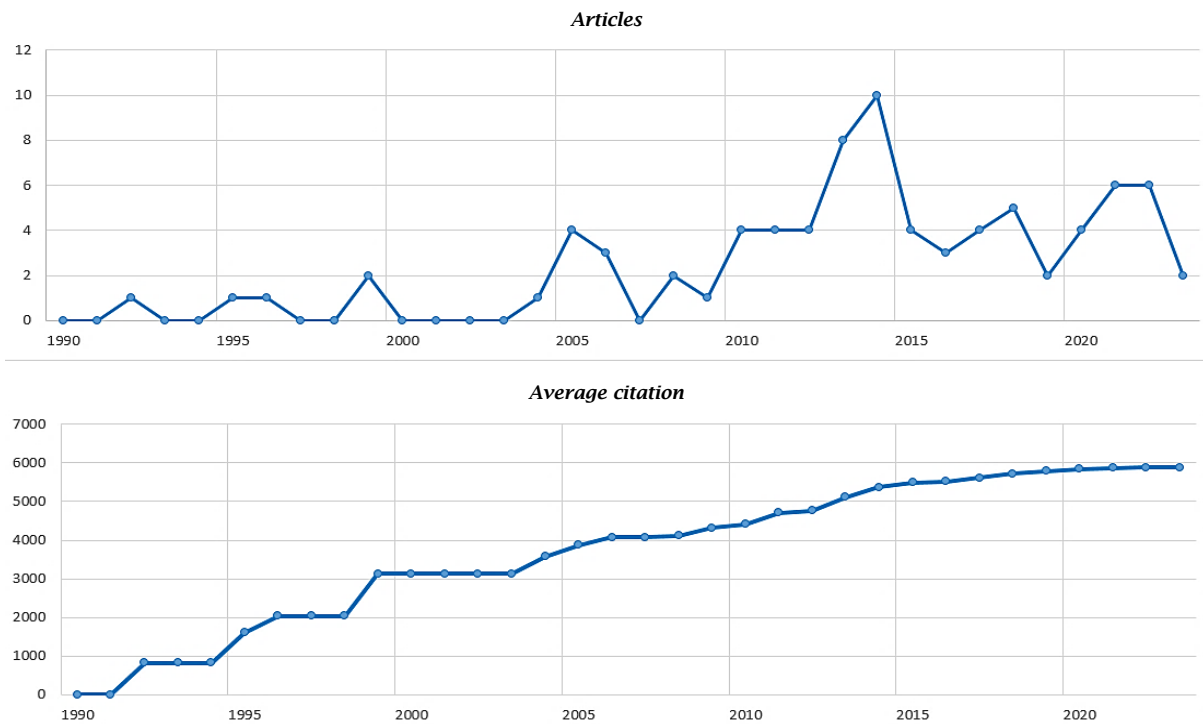
Currently, one of the biggest challenges researchers face is combining massive data from scientific research through analytical methods without any subjective bias. Bibliometrics analysis has been introduced as one of the most reliable study techniques for combining literature (Donthu et al., 2021). Finally, we performed the graphical display and visualization of bibliometric data using the VOSviewer software (van Eck & Waltman, 2010). The analytical outputs are described in maps and tables (Choi et al., 2022). CiteSpace software has also been used for time analysis of keywords (Chen, 2006).

3. ANALYSIS OF SELECTED PAPER'S

3.1. Publication distribution

We have studied herd behavior among institutional investors for more than 33 years. Figure 2 shows that 20 articles were published until 2010, and 62 articles were published after 2010.

Figure 2. Publication distribution of herding behavior of institutional investors



Source: Authors' calculation.

As a result, many publications in this field were published after 2010. However, according to Figure 2, the citation trend of articles before 2010 has experienced the Sharpie trend. Thus, a large amount of literature on the herd behavior of institutional investors was formed before 2010.

3.2. Influential countries

The network of publications of different countries and the relation between them from 1990 to 2023 is

shown in Figure 3. The study visualizes countries' involvement in research collaboration on the topic, with node size representing the number of publications by each country. Communication lines between nodes indicate the level of cooperation, while the linkages reflect the strength of relationships. Colors in the network show the timing of research emergence and collaboration. Out of 23 active countries, the USA, England, and Germany have notably influenced this field of study.

Figure 3. Network of countries

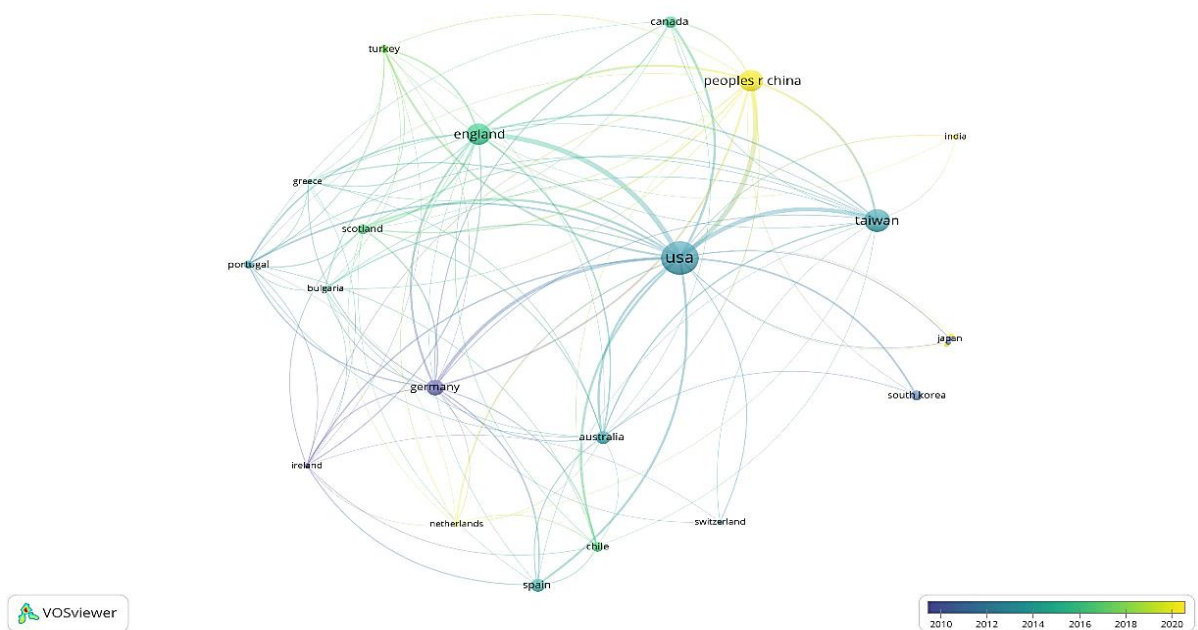
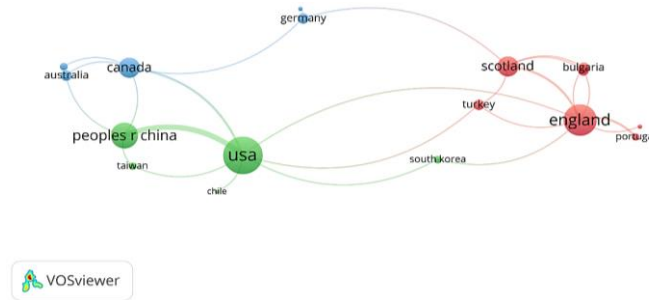


Figure 4 displays a country co-authorship network where the links between nodes represent relationships between countries, and the thickness of the lines indicates the level of cooperation. Different colored clusters are visible, with three main clusters identified. The USA, England and Canada are prominent countries in each cluster.

Countries within the same cluster tend to cooperate more. For example, the USA in the green cluster collaborates more with China or Taiwan, while England in the red cluster prefers cooperation with Portugal and Belgium. The primary research center for the field is in America, followed by China and Taiwan in Asia, and England in Europe.

Figure 4. The country co-authorship network



For further review, Table 1 shows the top ten countries with the most content in the world based on citations. Table 1 shows the number of articles by country, the number of references, and the total link strength.

Table 1. The number of citations for the top ten publishing countries

No.	Country	Documents	Citations	Total link strength
1	USA	28	4016	409
2	England	12	467	183
3	Germany	7	436	110
4	Taiwan	14	375	113
5	Australia	5	149	60
6	China	12	148	137
7	Portugal	2	126	51
8	Ireland	1	87	34
9	Scotland	3	66	66
10	Canada	4	39	37

Source: Authors' calculation.

Table 1 shows that the USA leads in citations and number of articles on herd behavior among institutional investors with 4016 citations and 28 articles. Following the USA, England, and Germany rank second and third with 467 and 436 citations, respectively. The USA is central in the field, linking with 409 other countries and exerting a significant influence on the network.

The American continent with two countries (the USA and Canada) and a total of 32 articles and 4055 citations; the European continent with five

countries (England, Germany, Portugal, Ireland, and Scotland) and 25 articles and 1182 citations; and finally, the Asia-Pacific continent with three countries (Taiwan, Australia, and China), 31 articles, and 672 citations are ranked first to third. Considering the relative equality of the number of articles published in the Americas, Asia, and Europe, and considering the greater share of America in the number of citations, it can be seen that the quality of the publications of the Asia and European continents should be improved compared to the Americas and first-class countries.

3.3. Top institutions in the field of herd behavior of institutional investors

The top institutions in terms of citations in this field and the relationship between them in the years 1990 to 2023 are shown in Figure 5. The minimum number of citations for each institution is ten. Among the 131 existing institutions, 87 institutions were qualified. According to Figure 5, Washington State University is in the center of this picture.

In Figure 5, the top 20 institutions in the world are ranked based on the number of citations to their publications. This figure also highlights the number of publications of each institution. It is necessary to note that, given the cooperation of some institutions and the publication of only one article by these institutions, the number of citations of some institutions is equal.

Figure 5. Top institutions in terms of citations

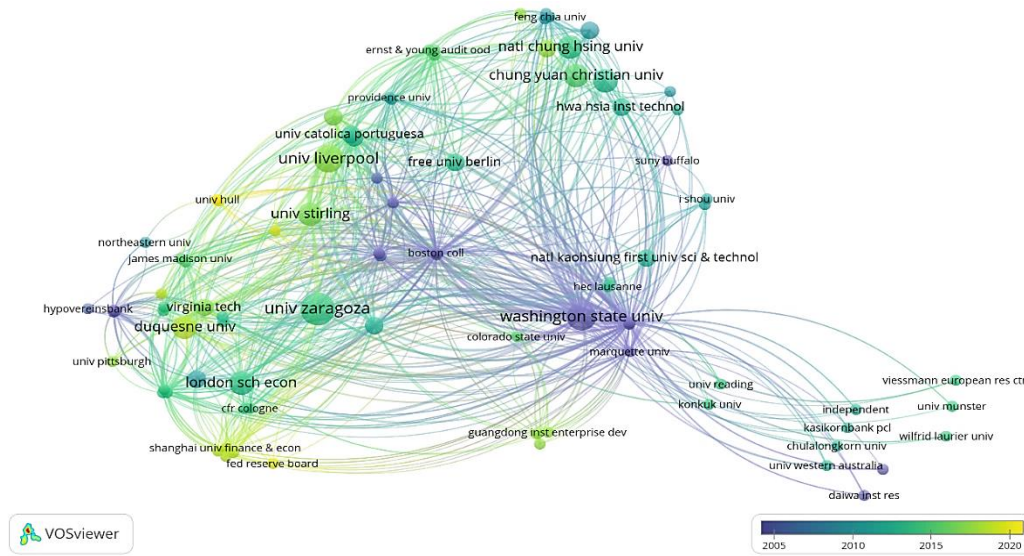


Table 2. Top 20 institutions in terms of citations

No.	Institution	Country	Documents	Citations
1	Washington State University	USA	4	1398
2	Harvard University	USA	1	819
3	University Illinois	USA	1	819
4	Boston College	USA	1	793
5	University Colorado	USA	1	793
6	Marquette University	USA	1	678
7	Massachusetts Institute of Technology (MIT)	USA	1	412
8	National Bureau of Economic Research	USA	1	412
9	University of Chicago	USA	1	412
10	University of Wyoming	USA	2	267
11	London School of Economics and Political Science	England	3	234
12	Leibniz University Hannover	Germany	2	138
13	Georgia State University	USA	1	133
14	University Maryland	USA	1	133
15	University of Texas at Dallas	USA	1	133
16	Catholic University of Portugal	Portugal	2	126
17	University Durham	England	2	126
18	Melbourne Business School	Australia	1	114
19	Free University Berlin	Germany	2	109
20	University of Liverpool	England	4	109

Source: Authors' calculation.

Washington State University ranks first among institutions with four publications and 1398 citations. Out of the top 20 institutions in the field, 13 are based in the USA, with all the top ten institutions located there as well. The USA leads in both citations and institutions, as depicted in

Table 1 and Figure 5. This dominance explains why most top institutions are in the USA. Following the USA, England holds second place with three institutions. Table 3 displays the top ten institutions based on the number of publications.

Table 3. Top ten institutions by the number of documents

No.	Organization	Country	Documents	Citations
1	University of Zaragoza	Spain	5	21
2	University of Liverpool	England	4	109
3	Washington State University	USA	4	1398
4	Chung Yuan Christian University	Taiwan	3	50
5	Duquesne University	USA	3	34
6	London School of Economics and Political Science	England	3	234
7	Ming Chuan University	Taiwan	3	40
8	National Chung Hsing University	China	3	48
9	University Stirling	Scotland	3	66
10	Da Yeh University	Taiwan	2	46

Source: Authors' calculation.

According to Table 3, the University of Zaragoza in Spain is at the top of the table with five articles, and the University of Liverpool in England

and Washington State University in the USA are in second place with four articles. There are three

institutions in Taiwan and two institutions in the USA and England.

The top ten journals with the biggest number of citations on the herding behavior of institutional

investors from 1990 through 2023 are shown in Table 4, and the number of articles published by each journal is also presented.

Table 4. Top ten journals by the number of citations

No.	Journals	Documents	Citations	Total link strength
1	<i>Journal of Finance</i>	4	1248	98
2	<i>Journal of Financial Economics</i>	3	1084	109
3	<i>American Economic Review</i>	1	793	55
4	<i>Review of Financial Studies</i>	2	540	69
5	<i>Quarterly Journal of Economics</i>	1	412	11
6	<i>Journal of Banking & Finance</i>	6	254	78
7	<i>Journal of Business</i>	2	188	40
8	<i>European Financial Management</i>	3	178	42
9	<i>International Review of Financial Analysis</i>	9	172	71
10	<i>Pacific-Basin Finance Journal</i>	7	149	29

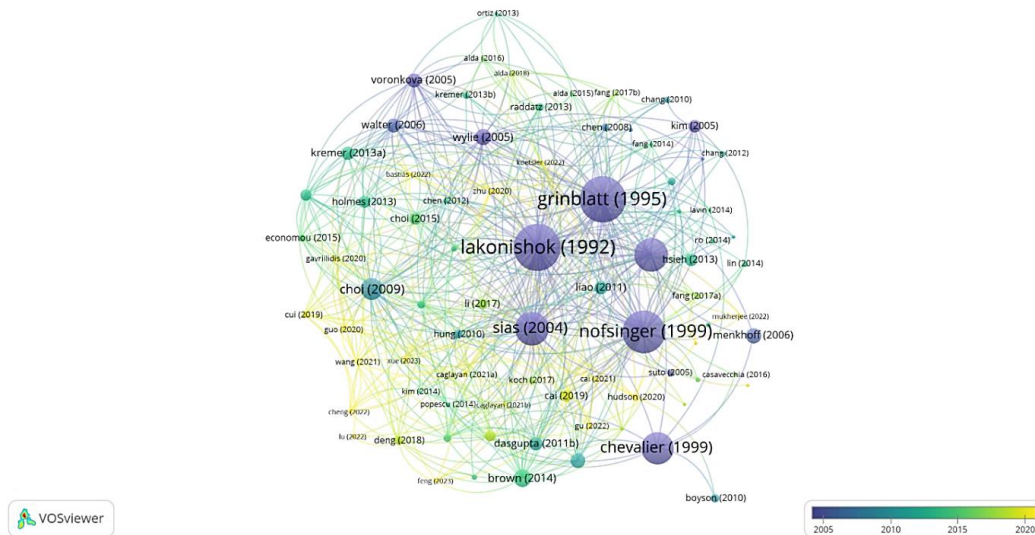
Source: Authors' calculation.

According to Table 4, the “*Journal of Finance*” is the top-ranked journal with 1248 citations, followed by “*Journal of Financial Economics*” and “*American Economic Review*” with 1084 and 793 citations, respectively. The journal “*International Review of Financial Analysis*” has the highest number of published articles, with nine in total. These top journals are all within the realms of business, finance, and economics. Furthermore, a significant portion of journals (59.52%) have published two or fewer articles, while the top ten journals account for 46.34% of the total articles (38 articles).

3.4. Most cited articles

Figure 6 depicts the network of articles in the field, with the size of each circle representing the article’s citation count and the connecting lines indicating relationships between the articles. The most cited article in this area is “The impact of institutional trading on stock prices” by Lakonishok et al. (1992), with 819 citations in the WOS. This article is significant for pioneering experimental tests on herd behavior, introducing the Lakonishok, Shleifer, and Vishny (LSV) criterion as a standard measure in financial literature. Based on data from 769 tax-exempt funds, predominantly pension funds, from 1985 to 1989, the study found limited evidence of fund manager herding behavior.

Figure 6. Articles network



Grinblatt et al. (1995) conducted a study titled “*Momentum investment strategies, portfolio performance, and herding: A study of mutual fund behavior*”, using the LSV criterion introduced by Lakonishok et al. (1992). Their research delved into the impact of herd behavior in mutual funds, revealing that most mutual funds exhibited momentum investing tendencies. Furthermore, mutual funds employing momentum strategies demonstrated significant excess performance.

Additionally, Wylie (2005) analyzed herding behavior among mutual fund managers in the UK, examining the portfolio holdings of 268 UK equity mutual funds. The author also tested the effectiveness of Lakonishok et al.’s (1992) methodology in their studies. Also Sias (2004) in his article titled “*Institutional herding*” provides a dynamic model for herd measurement.

Table 5. Top ten papers based on total citations

No.	Article	Total citations
1	Lakonishok et al. (1992)	819
2	Grinblatt et al. (1995)	793
3	Nofsinger and Sias (1999)	678
4	Sias (2004)	445
5	Falkenstein (1996)	431
6	Chevalier and Ellison (1999)	412
7	Choi and Sias (2009)	201
8	Brown et al. (2014)	133
9	Wylie (2005)	114
10	Menkhoff et al. (2006)	106

Source: Authors' calculation.

Table 5 shows five highly cited articles between 1992-2000, four articles between 2001 and 2010, and one in 2014. Among these ten articles, seven were written by two or three authors (four articles

by three authors and three by two authors). In addition, six articles were written in cooperation between different institutions. This shows that cooperation between authors and different institutions is essential. There is also no international cooperation among the top ten articles, so the need to strengthen international cooperation is felt.

3.5. Influential authors

Figure 7 shows the network of different authors and their relationships. Richard Sias is the most cited author, with 1123 citations, and Vasileios Kallinterakis has the most articles in this field, with five articles.

Figure 7. Network of authors

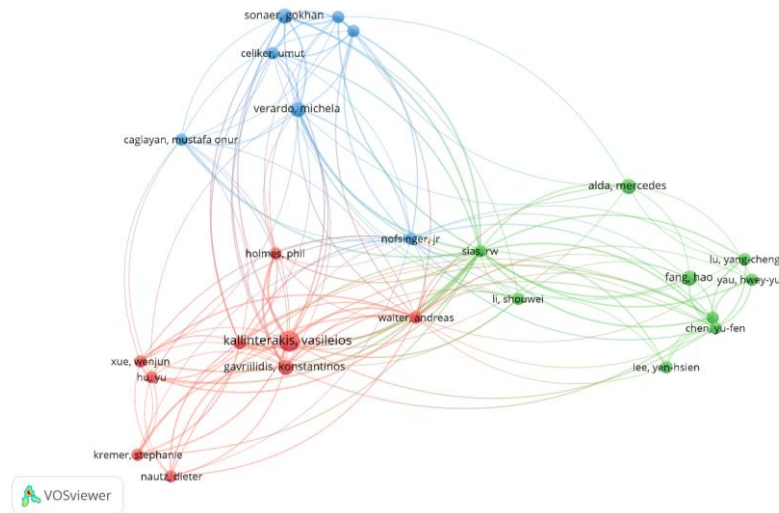
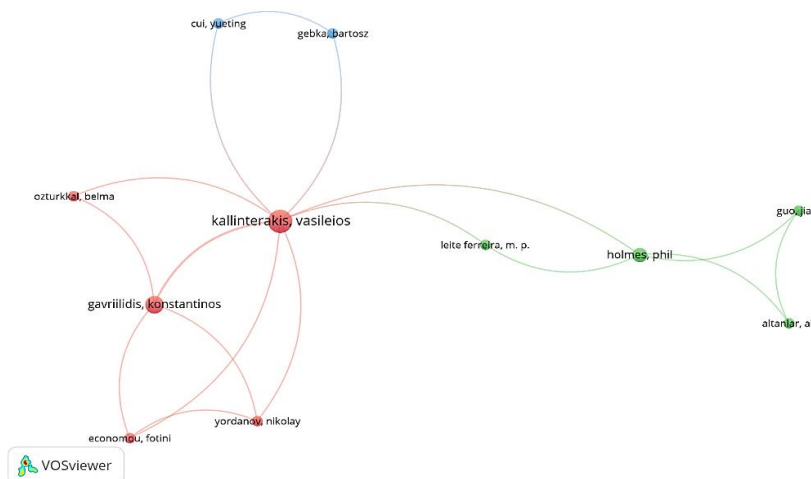


Figure 8 shows the co-author network, which has three clusters of different colors. Vasileios Kallinterakis (England) is associated with all three

clusters, and more than half of the co-authors are from England, which shows that England is a leader in this field.

Figure 8. The co-authorship network keyword/cartographic analysis and trending articles/topics



This section examines keywords through tools like the simultaneity network map, top ten keywords table, density visualization map, and keyword timeline. Analyzing keyword co-occurrence serves multiple purposes, including guiding researchers in understanding a scientific field's research process

and tracking changes within the area. It also helps identify emerging trends and hidden research fields. In this study, 303 keywords were identified from 82 articles, with 218 keywords appearing only once, representing around 72% of all keywords.

Figure 9. Keywords co-occurrence network

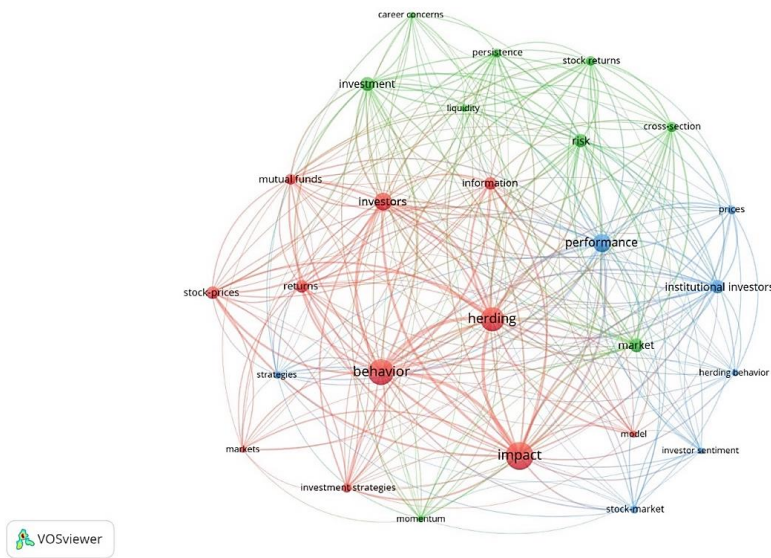


Figure 9 illustrates a keyword network where the node's size represents the influence of a keyword on herding behavior research. Links between nodes indicate keywords that have appeared together. The keywords are grouped into four clusters. "impact" is the most frequent keyword with 53 occurrences, followed by "herding", "behaviour", "performance", and "investor". The keyword "herding" is strongly connected to "information", "performance", "investment strategy", "impact", and "stock price" through thicker lines, suggesting a close relationship among these factors in influencing herd behavior research.

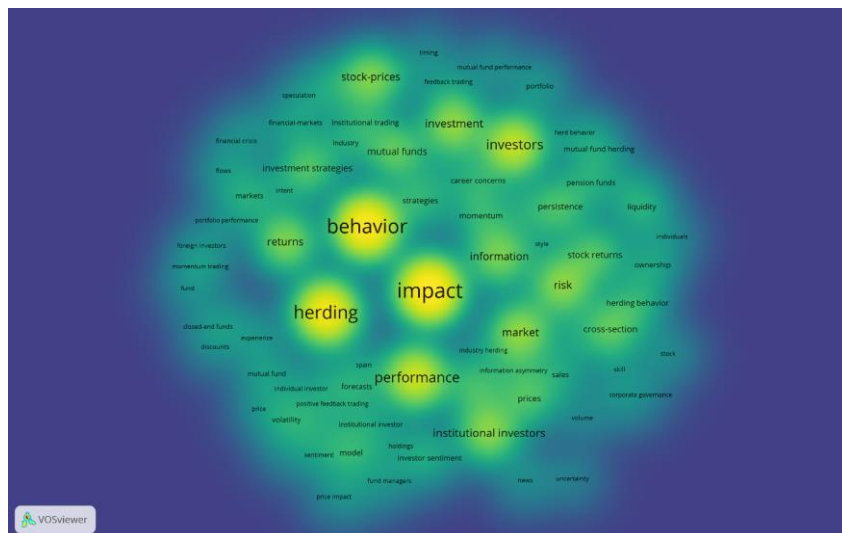
Choi and Skiba (2015) concluded that fundamental information drives herd behavior among institutional investors, and information asymmetry and herding behavior are inverse. For example, institutions are less likely to herd behavior when information asymmetry is high (low level of information transparency). Alda and Ferruz (2016) also show that investment strategies followed by fund managers cause herd behavior. The top 15 keywords are shown in Table 6.

Table 6. Top 15 keywords

No.	Keyword	Occurrences	Total link strength
1	Impact	53	372
2	Behavior	48	361
3	Herding	42	326
4	Performance	29	230
5	Investors	27	217
6	Investment	19	154
7	Market	19	151
8	Institutional investors	18	149
9	Risk	18	141
10	Returns	17	127
11	Information	16	130
12	Stock-prices	16	114
13	Mutual funds	13	101
14	Cross-section	12	104
15	Investment strategies	11	82

For further analysis, density visualization of keyword co-occurrence has been used. The density visualization map is used to understand the overall structure of the network and to draw attention to the most important areas on the map.

Figure 10. Density visualization map

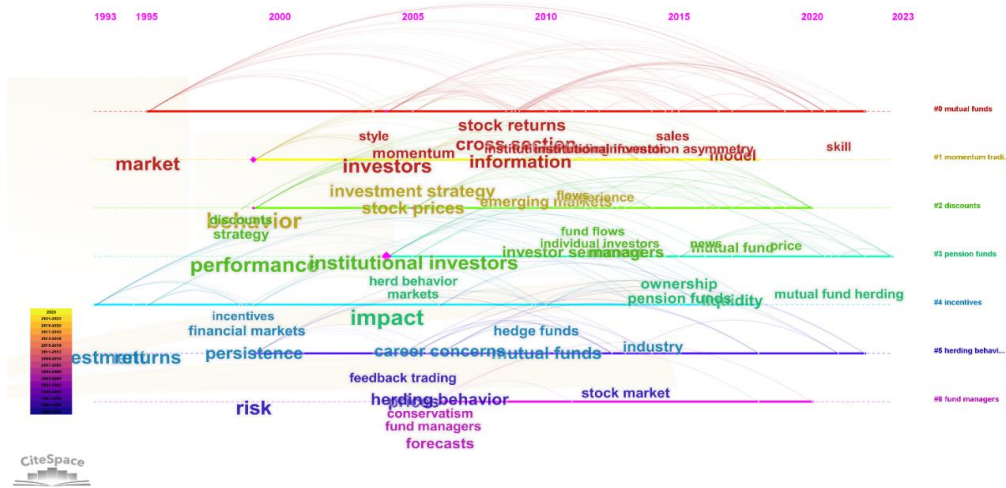


The yellow parts mean that most research is focused on these areas. Therefore, keywords like “impact”, “behaviour”, “herding”, “investor”, and “performance” can be pointed out.

The keyword timeline plotted using CiteSpace software in Figure 11 reveals the evolution of research focus over time. Before 2000, research primarily centered on “strategy”, “performance”, and “risk”. From the early 21st century until 2010,

the focus shifted toward “feedback trading”, “style”, and “investment strategy”. During this period, a major emphasis was placed on investment styles, strategies, and their impact on herd behavior. “Career concerns” emerged as another significant keyword during this time, highlighting the issue of career concerns among fund managers about herd behavior.

Figure 11. Timeline of keywords



Studies conducted after 2010 have shifted focus towards new areas such as “skill”, “ownership”, “model”, and “liquidity”. Notably, keywords like “news” and “sentiment” indicate a growing interest in exploring the impact of emotions and news on the herd behavior of institutional

investors in the post-2010 period. Another significant keyword during this time is “pension fund”, suggesting increased attention towards pension funds within this research domain over the past decade. Table 7 provides an overview of the keywords associated with these recent studies.

Table 7. Overview of keywords

Period	Keyword
Before 2000	Strategy, Performance, Market, Return, Risk, Behavior, Incentives, Persistence
2001–2010	Impact, Feedback Trading, Career Concerns, Information, Cross Section, Hedge Fund, Style, Investment Strategy, Momentum
After 2011	News, Model, Skill, Ownership, Pension Fund, Liquidity, Sentiment

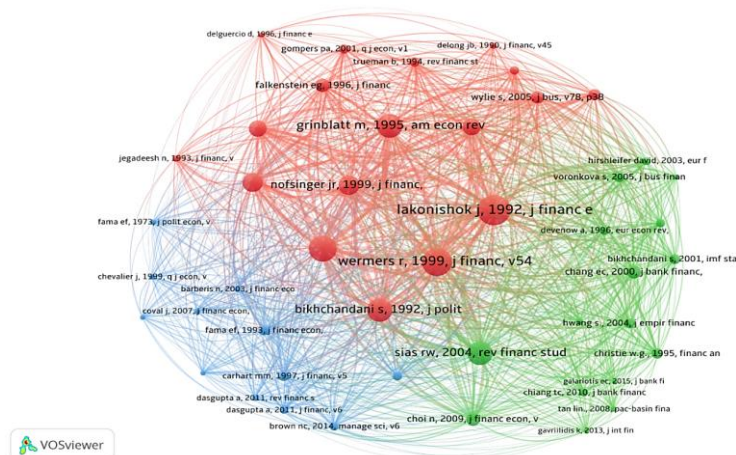
Source: Authors' elaboration.

3.6. The reference co-citation analysis

The reference co-citation network is shown in Figure 12. The minimum number of citations of a cited reference is ten; of 1804 cited references,

46 meet the threshold. The diameter of each circle shows the number of references to that article, and the thickness of the lines between the references indicates the proximity of these references to each other.

Figure 12. Reference co-citation network



According to Figure 12, the article by Lakonishok et al. (1992) entitled “The impact of institutional trading on stock prices” published in the “Journal of Financial Economics” has the largest node. This article can be considered a new approach

to the experimental test of herd behavior, which has become a standard in the experimental literature. Their criterion is LSV, which has been used so far in many studies. Table 8 shows the top ten reference articles.

Table 8. Top ten reference co-citation documents

No.	Cited reference	Year	Citations	Total link strength
1	Lakonishok et al.	1992	70	785
2	Wermers	1999	64	750
3	Scharfstein and Stein	1990	58	660
4	Grinblatt et al.	1995	54	635
5	Bikhchandani et al.	1992	52	654
6	Sias	2004	52	608
7	Nofsinger and Sias	1999	43	470
8	Froot et al.	1992	41	510
9	Banerjee	1992	37	474
10	Hirshleifer et al.	1994	36	465

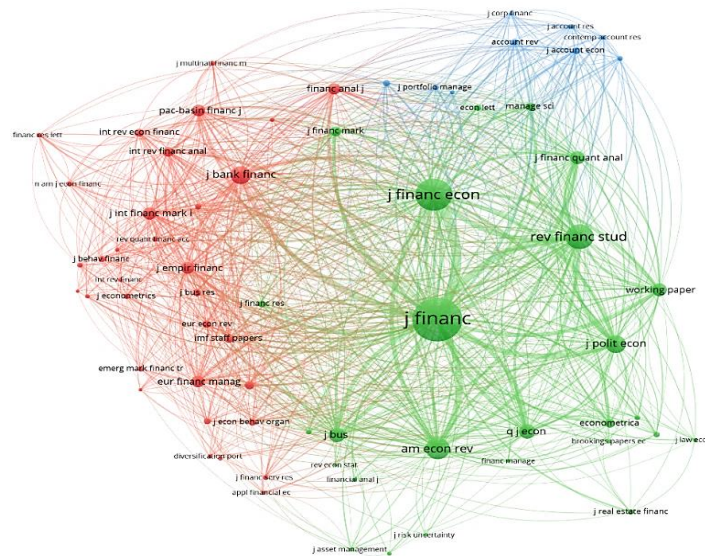
Source: Authors' elaboration.

3.7. The journal co-citation analysis

Figure 13 depicts the co-citation network of journals, involving 68 journals selected with a threshold of five for co-citation analysis. The size of each node in the network reflects the journals'

activity level. The network is divided into three clusters, each represented by a different color. The green cluster predominantly comprises economic journals, the red cluster consists mostly of financial journals, and accounting journals are primarily found at the end of the blue cluster.

Figure 13. The journal co-citation network



The top ten most popular co-citation journals are shown in Table 9. “The Journal of Finance” is ranked first, and “Journal of Financial Economics”

and “The Review of Financial Studies” are ranked second and third.

Table 9. Top ten most co-citation journal

No.	Source	Citations	Total link strength
1	The Journal of Finance	680	20094
2	Journal of Financial Economics	379	13265
3	The Review of Financial Studies	216	8401
4	American Economic Review	162	5633
5	Journal of Political Economy	119	4647
6	The Journal of Banking and Finance	114	4502
7	The Quarterly Journal of Economics	79	3091
8	The Journal of Business	77	2775
9	Journal of Financial and Quantitative Analysis	62	2481
10	Journal of International Financial Markets, Institutions and Money	56	1818

Source: Authors' elaboration.

3.8. Growth of herding behavior of institutional investor's research streams

Analyzing the annual growth of each research stream is crucial. From 1990 to 2023, the growth of each stream is examined by identifying keywords through cartographic analysis using VOSviewer

software. The keywords associated with each stream are outlined in Table 10. Additionally, Table 11 highlights three significant research currents: 1) investment strategies with 35 papers, 2) financial theories with 21 papers, and 3) sentiment with 26 papers.

Table 10. Keywords under each research stream

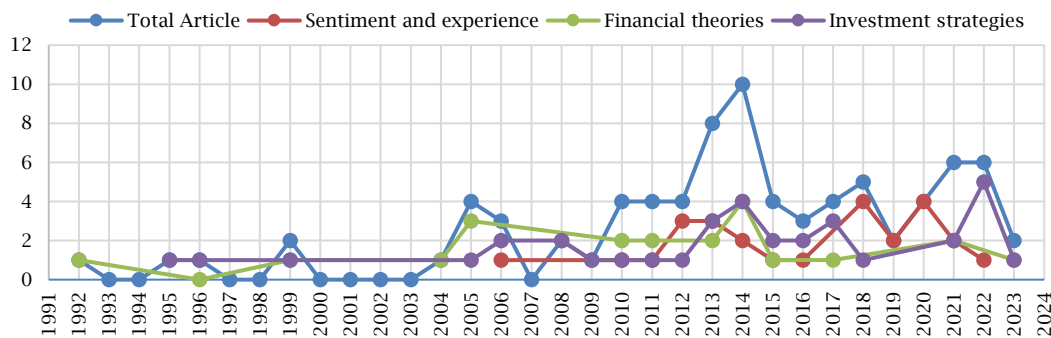
Research streams	Selected keywords
Investment strategies	Behavior, Herding, Impact, Information, Investment Strategies, Investors, Market, Model, Mutual Fund, Return, Stock-prices
Financial theories	Liquidity, Cross-Section, Investment, Career Concerns, Momentum, Persistence, Risk, Stock Return
Sentiment and experience	Herding Behavior, Institutional Investor, Investment Sentiment, Performance, Price, Stock-Market

Source: Authors' elaboration.

We have used cartography analysis to identify each stream's keywords and examine the growth of different research streams in the study period. As shown in Figure 14, the number of studies in

the field of sentiment has started in the last decade. As a result, the increasing attention to research in this field shows the increasing attention and attraction of authors to this field.

Figure 14. Publication trend of institutional herding behavior research within each stream from 1990 to 2023



Source: Authors' elaboration.

4. DISCUSSION

The analysis revealed that the USA, particularly the American continent, leads in both publication volume and citations within this research field. With the USA dominating, it suggests that Asian and European researchers should focus on enhancing the quality of their articles despite publishing an equal number as America. Among the top 20 institutions in this field, 13 are USA-based. Collaboration among authors is crucial, emphasizing the need for international cooperation. The most cited article in this field is by Lakonishok et al. (1992), titled "The impact of institutional trading on stock prices", which introduces the LSV criterion that has become a standard in the experimental literature. The research evolution has shifted from strategy, risk, and performance to newer areas like skill, ownership, and sentiment's impact on institutional investors' herd behavior in the last decade. Notably, there is increasing interest in studying the effect of herd behavior on pension funds. The study identified three research clusters through cartographic analysis: 1) strategies, 2) financial theories, and 3) sentiment and experience.

4.1. Cluster 1. Investment strategies

Investment strategies are one of the causes of herd behavior in financial markets. For example, increased mutual fund reporting is associated with higher herding intensity because it makes using the mimicking approach easier (Deng et al., 2018). On the other hand, certain managers may fail to interpret new or fresh signals and might decide to imitate other managers to avoid potential underperformance (Celiker et al., 2015). Institutional investors may also leave past losers and cover their portfolio with past winners for reasons such as managers' evaluation, which is referred to as window dressing (Lakonishok et al., 1991). As a result, institutional investors may also follow similar investment styles, so if many investors follow one or more styles, they can lead to herd behavior (Bennett et al., 2003).

4.2. Cluster 2. Financial theories

Evaluation of managers' performance is another reason that can lead to herd behavior. Because managers' performance is evaluated against their counterparts, managers may ignore their information and deal with others (Maug & Naik, 2011).

In addition to the ability, the reputation of managers can also lead to herd behavior. According to this theory, managers, if different from the crowd, see their reputation at risk, and therefore, they try to protect their reputation by imitating each other's trades (Popescu & Xu, 2014). Furthermore, managers with poor reputations are hesitant to deviate from the crowd, owing to concerns about their potential job opportunities (Chevalier & Ellison, 1999). Therefore, it can be said that the factors of reputation, both in acquiring it and maintaining it, as well as job attitudes, including managers' performance evaluations and concerns about losing their jobs, make institutional investors follow the crowd. Differences in environments where institutional investors are faced (such as legal requirements, holding periods, and competition) can also lead to herd behavior (Del Guercio, 1996). Also, herd behavior is stronger in periods of high uncertainty (such as high volatility and macroeconomic uncertainty). In addition, institutional investors may also react to exogenous signals, such as other analysts' recommendations or dividend changes, causing herd behavior (Lakonishok et al., 1992).

4.3. Cluster 3. Sentiment and experience

Sentiment is another key factor in decision-making (Schwarz, 2000), which has drawn researchers' interest in herd behavior (Hudson et al., 2020; Liao et al., 2011). Hudson et al. (2020) concluded that, depending on the arrangement and portfolio of the investor, herding behavior in investment funds may take various forms and vary based on the investor's emotions. In addition to emotions, herd behavior can be substantially affected by temperament as well (Gavrilidis et al., 2020). Menkhoff et al. (2006) concluded that herding decreases with experience. They also reported that as fund managers gain expertise, their propensity to take risks decreases, which may help explain why less experienced managers have produced greater returns. We then categorized these influencing factors under the title of personality factors. Therefore, it can be said that these factors that originate from the background of the managers, as well as their emotions, can be categorized as management factors that potentially affect the formation of herd behavior. The summary of each cluster can be seen in Table 11.

Table 11a. Summary of key papers: Cluster 1. Investment strategies

<i>Authors (year)</i>	<i>Objective/research question</i>	<i>Technique</i>	<i>Methodology</i>	<i>Main findings</i>
Grinblatt et al. (1995)	<ul style="list-style-type: none"> Analyze the extent to which mutual funds purchase stocks based on their past returns and the extent to which they exhibit "herding" behavior. 	<ol style="list-style-type: none"> Versions of the level of measurement (LOM) Time-series procedure 	Quantitative	<ul style="list-style-type: none"> Herding and momentum investing average levels were statistically significant. The propensity of funds to purchase previous winners and exhibit herd behavior varied significantly. The performance of a fund and its propensity to follow the herd were not highly correlated.
Nofsinger and Sias (1999)	<ul style="list-style-type: none"> This study compares the importance of herding behavior among institutional and individual investors. 	Sorting procedure designed	Quantitative	<ul style="list-style-type: none"> In comparison to individual investors, institutional investors demonstrate a higher propensity for positive-feedback trading, or institutional herding has a stronger impact on prices.
Choi and Sias (2009)	<ul style="list-style-type: none"> Do institutional investors follow each other into and out of the same industries? 	Sias (2004)	Quantitative	<ul style="list-style-type: none"> The findings show that institutional investors frequently prefer to collectively enter and quit the same industries in a coordinated manner, which is strong proof of institutional industry herding. Industry herding is partially explained by institutions moving toward stocks with comparable sizes and book-to-market ratios, but this is not the whole explanation.
Voronkova and Bohl (2005)	<ul style="list-style-type: none"> This study investigates the trading behavior of pension funds and its effects on price formation in the Polish stock market. The paper examines the extent of herding and positive feedback trading displayed by pension funds in this regulatory environment. 	<ol style="list-style-type: none"> LSV model Jones et al.'s (1999) approach 	Quantitative	<ul style="list-style-type: none"> Investors in Polish pension funds frequently exhibit herding behavior. Polish pension fund managers frequently use positive feedback trading mechanisms.
Fang, Shen, et al. (2017)	<ul style="list-style-type: none"> The paper investigates the factors contributing to foreign institutional investor (FII) herding in the Taiwan stock exchange, as well as its association with stock characteristics. 	The panel smooth transition regression (PSTR) model	Quantitative	<ul style="list-style-type: none"> During negative phases, FIIs focus on their largest net purchases, whereas during positive phases, they focus on winners and small-cap companies. In bullish and negative markets, stock characteristics related to FII cascading differ. During bull markets, FIIs focus their cascades on their highest net purchases, shifting to positive cascades during bad situations.

Table 11b. Summary of key papers: Cluster 2. Financial theories

<i>Authors (year)</i>	<i>Objective/research question</i>	<i>Technique</i>	<i>Methodology</i>	<i>Main findings</i>
Lakonishok et al. (1992)	<ul style="list-style-type: none"> This study examines the impact of a money manager's trading activity, specifically herding behavior, on stock prices. 	A new method for herd measurement	Quantitative	<ul style="list-style-type: none"> In smaller stocks, findings show only weak evidence of herding behavior, but positive-feedback trading is slightly significantly more strongly supported. Market-wide herding is not ruled out by the results, particularly in market-timing tactics. Individual stock herding may be visible at shorter time intervals (e.g., daily or weekly).
Sias (2004)	<ul style="list-style-type: none"> Investigating the participation of institutional investors in herd behavior. 	Cross-sectional temporal dependence	Quantitative	Provide a dynamic model for herd measurement.
Wylie (2005)	<ul style="list-style-type: none"> Examines the measurement accuracy and herding test among UK mutual fund managers. 	LSV model	Quantitative	<ul style="list-style-type: none"> The biggest and smallest individual UK stocks both showed little fund manager herding. After periods of high excess returns, UK mutual fund managers frequently herd investors away from huge stocks.
Holmes et al. (2013)	<ul style="list-style-type: none"> It examines why institutions herd. 	Sias (2004)	Quantitative	<ul style="list-style-type: none"> The herding behavior is intentional. The findings are consistent with the hypothesis that interactions between the herd and the storefront affect budget allocation as well as decisions about purchases and sales.
Jiao and Ye (2014)	<ul style="list-style-type: none"> This study investigates mutual fund herding in response to hedge fund herding and its potential impact on stock prices. 	LSV model	Quantitative	<ul style="list-style-type: none"> Mutual fund herding and hedge fund herding from the previous quarter have a strong positive relationship. Stock prices are significantly destabilized by informational cascades and mutual funds' propensity to overreact to hedge fund herding.

Table 11c. Summary of key papers: Cluster 3. Sentiment and experience

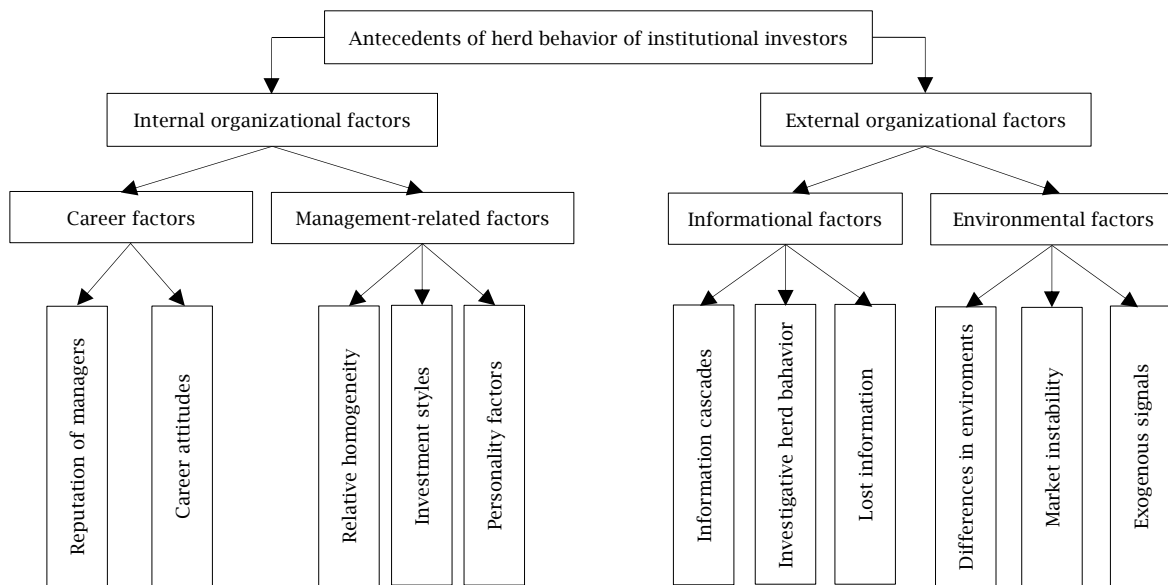
<i>Authors (year)</i>	<i>Objective/research question</i>	<i>Technique</i>	<i>Methodology</i>	<i>Main findings</i>
Brown et al. (2014)	<ul style="list-style-type: none"> This study aims to differentiate the effect of modifications to analyst recommendations on stock prices from the effect of institutional herding. 	LSV model	Quantitative	<ul style="list-style-type: none"> Mutual funds have a tendency to organize into purchasing herds for the stock when there are consensus upgrades. On the other hand, even greater herds of funds typically sell the company in response to consensus downgrades. In comparison to earlier research periods, the impact of mutual fund herding on stock prices has increased dramatically in recent years.
Menkhoff et al. (2006)	<ul style="list-style-type: none"> This study looks at the relationship between fund manager's experience and their levels of risk-taking, herding behavior, and overconfidence. 	A questionnaire-based survey	Quantitative	<ul style="list-style-type: none"> There is conflicting evidence regarding risk-taking and overconfidence. More experienced fund managers are likely to make better investing judgments because they are more aware of the true volatility of asset prices.
Liao et al. (2011)	<ul style="list-style-type: none"> This study examines the relationship between investor sentiment and the extent to which fund managers trade stocks in an environment of herding. 	1. LSV model 2. Factor analysis approach	Quantitative	<ul style="list-style-type: none"> Fund managers prefer to herd out of stocks with high past investor sentiment rather than into stocks with high prior sentiment. Managers participate in herding behavior as a result of their analysis of comparable sentiment-related information.
Hudson et al. (2020)	<ul style="list-style-type: none"> The purpose of this study is to find evidence of institutional investor herding behavior and to look into the impact of investor emotion on such behavior. 	1. Bivariate generalized autoregressive conditional heteroskedasticity (GARCH) method	Quantitative	<ul style="list-style-type: none"> The results show that fund managers exhibit herding behavior when it comes to size, value, and market portfolio characteristics in both open-end and closed-end funds. Herding behavior among UK fund managers may have causes other than market fundamentals, size, value, and macroeconomic motives.
Gavriilidis et al. (2020)	<ul style="list-style-type: none"> This study investigated the relationship between institutional herding behavior based on mode and a number of factors, such as the weekend effect, holiday effect, Ramadan, and sunshine. 	Sias (2004)	Quantitative	<ul style="list-style-type: none"> As the number of active funds per stock rises, especially on the buy-side, herding becomes more noticeable. The herding behaviors of fund managers are not affected by the mood.

Source: Authors' elaboration.

In the second part of the study, 82 articles were analyzed systematically, involving a three-step coding process. The research data, primarily adapted from previous studies, was supplemented with additional relevant research not covered by the review protocol. The relatively small number of documents analyzed in this review allowed for a more in-depth analysis of each, leading to more accurate, valid, and generalizable results than traditional reviews. The authors advocate for small sample sizes in systematic literature review studies when the topic has potential significance in the field. The selection criteria ensured that all included research was highly relevant and relevant and

published in WOS journals. The papers were categorized based on predetermined standards, including author(s), publication year, journal title, research objectives, theories and models used, main findings, and recommendations for future research. The bibliometric paper aims to explain the systematic review process, identify research gaps, and identify key factors influencing institutional investors' herding behavior from 1990 to 2023. Based on textual data analysis, two main dimensions, four components, and 11 indicators were identified as significant factors affecting institutional investors' herding behavior. The results of the coding process are depicted in Figure 15.

Figure 15. Integrative framework of herd behavior of institutional investors



Source: Authors' elaboration.

4.4. Implications

4.4.1. Management implications

The findings of this research show that at the intra-organizational level, creating a culture of independent thinking helps institutional investors to use different views and opinions and make principled and logical decisions. The requirement to create this culture is to empower institutional investors' information (Alhaj-Yaseen & Rao, 2019). Investors are being guided in finding accurate and trustworthy information, which is crucial for making rational decisions free from emotions. Teaching skills such as searching, evaluating, and extracting information is essential. At an external level, both institutional investors and macro-level decision-makers should work towards minimizing harmful herd behaviors that distort asset prices from their intrinsic value. Increasing market transparency by providing comprehensive, reliable, and accessible information can effectively prevent herd behavior, enabling investors to make better-informed trading decisions (Wang & Huang, 2019). Enhancing information disclosure quality reduces investor conflicts and promotes transparency. Monitoring markets and implementing effective rules by regulatory bodies can also help prevent herd

behavior in markets (Liu et al., 2023). Market instability, influenced by political conditions, significantly affects investment. While it's challenging to prevent market instability completely, investors can mitigate its impact by enhancing their understanding of market forecasting and risk management and diversifying their investments.

4.2.1. Theoretical implications

The present research systematically identifies, summarizes, describes, and discusses the larger body of literature on institutional investors' herding behavior. So far, several studies have investigated why the formation of herd behavior or factors affecting herd behavior (Bikhchandani & Sharma, 2001; Economou et al., 2015), but still, a comprehensive model has not been presented about the factors influencing herd behavior of institutional investors. It provides a comprehensive model summarizing key factors influencing institutional investors' herding behavior, distinguishing between internal (reputation, job attitude) and external (informational, environmental) factors. This categorization can offer a new angle for researchers to analyze these factors more accurately and inspire further studies.

5. CONCLUSION

This study aims to explore the factors influencing herd behavior among institutional investors and categorize these factors. It highlights that while imitation among institutional investors can sometimes lead to market price efficiency, it can also result in trading based on popularity rather than intrinsic value. Herd behavior might stem from insufficient information processing or following others' trading patterns, leading to artificial demand and poor decision-making. Group thinking can have detrimental effects, including financial bubbles. While some argue herd behavior can enhance market efficiency, most view it as irrational and detrimental. The study emphasizes the importance of independent thinking, thorough analysis, and avoiding blindly following others' actions for institutional investors.

Although we have tried to study herd behavior among institutional investors comprehensively, this study may have some limitations. One of these limitations is the choice of keyword range and search strategy. Future research can achieve different results with different keywords and strategies. In addition, this study has only focused on the WOS database, which can be used for future research from other databases such as Scopus or a combination of databases. In addition, this research has considered only original articles in English; therefore, the review of conference articles and books, as well as the review of other languages, may have different results.

The study further identified several research gaps using a systematic bibliometric analysis. Future research should examine why and when institutions engage in herding behavior, considering factors like information asymmetry, transparency, and market conditions that may influence intentional vs unintentional herding and its impact on informational efficiency. The effect of information disclosure from major economies on herding decisions globally warrants investigation. Monitoring

systems and regulatory frameworks across different markets should be studied to understand their role in herding. Analyzing how financial crises alter portfolio manager behavior could reveal temporal or structural changes in investor herding. Frontier markets provide an interesting context to study herding given their unique characteristics. Agency costs and their relationship to herding also merit examination. Investigating mutual fund style herding's impact on factor crowding, portfolio performance and risk would be valuable. Finally, studying how organizational culture, stress management and other management strategies relate to institutional herding could yield important insights. Gavriilidis et al. (2020) investigated mood effects for the first time using a series of mood indicators, such as the weekend effect, holiday effect, Ramadan effect, and sunshine effect, in the Turkish market among institutional investors. Therefore, other mood factors, such as other weather conditions and other effects, can be investigated in future studies. In addition, this factor can be tested in other markets. In general, extensive research has been done on the herd behavior of institutional investors in emerging and developed markets. Still, more research must be done on frontier markets (markets with low trading volume and transparency) (Economou et al., 2015). Therefore, paying attention to frontier markets and especially comparing these markets with emerging and developed markets gives us a lot of information about the herd behavior of institutional investors. Hudson et al. (2020) concluded the sentimental factors affecting the herd behavior of managers of open-end and closed-end funds are different due to the difference in their structures. According to these findings, other market funds can be investigated and also investigated in a deeper way using Carhart's (1997) momentum, Fama and French's (2015) profitability robust minus weak (RMW), and investment conservative minus aggressive (CMA) model, and other models.

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