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Retractions in Indian Business Research: A Closer Look at Trends, Reasons and Impacts of Retracted Articles

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ABSTRACT

This study examines trends in retracted Indian business research articles from 2014 to 2023, focusing on various aspects such as the number of retractions, geographical distribution, associated journals and publishers, retraction timelines, reasons for retraction, and the citation impact before and after retraction. Using Scientometric tools, 79 retracted articles were analysed from the Retraction Watch and Scopus databases. The findings reveal a rising trend in retractions, predominantly due to fake peer reviews and plagiarism. Tamil Nadu recorded the highest number of retractions (n=44), with the *"Journal of Ambient Intelligence and Humanized Computing"* standing out with 17 retractions. Springer emerged as the leading publisher, accounting for 41 retractions. Most retractions occurred within a year of publication, and the articles continue to receive citations even after being retracted. The findings of this study will be beneficial for academic institutions, journal editors, and policymakers aiming to enhance research integrity and mitigate unethical practices in scholarly publishing.

Keywords: Indian business research; Research integrity; Scientific misconduct; Retraction watch; Scientometrics

1. INTRODUCTION

Scientific research is an indispensable pillar of human progress and societal advancement in the contemporary era[1,2]. Advancements in medicine, information technology, telecommunications, and sustainability are just a few examples of how scientific inquiry has revolutionised our society[3]. The importance of scientific research is equally profound in business and commerce. In the rapidly evolving scenario of Indian business research, the emergence of scholarly articles is essential in shaping the academic discourse and influencing strategic decision-making and sustainable growth. However, the rapid growth of scholarly communication raises concerns about scientific integrity and research misconduct[4,5]. Researchers have previously argued that research integrity and misconduct concerns are caused by predatory journals, which exploit the foundation of conducting and reporting research truthfully[6,7]. Furthermore, the research community is facing a challenge since the frequency of retractions of papers that originate from paper mills is rising[8].

Scientific misconduct is defined as fraud, fabrication, falsification and plagiarism in proposing, performing, or reviewing research or in reporting research results[9-12]. Fabrication involves the creation of false data or results in research[13,14]. Research falsification occurs when researchers manipulate research materials, equipment, or processes or alter or omit data or results that do not accurately reflect the research[9,15,16]. Plagiarism, in particular, has become a growing concern in the scientific community, and it is viewed as stealing another person's ideas, methods, results, or words without giving proper attribution[17-19]. It is considered a serious ethical violation and can have severe consequences for individuals in the academic community. These critical issues in academia need to be properly addressed. Hence, the University Grants Commission (U.G.C.) in India has issued regulations *"Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions Regulations, 2018"*, which provides detailed plagiarism-related guidelines for thesis and dissertations as well as academic and research publications[20]. As per these regulations, documents with 0-10 % similarity face no penalties. Documents over 60 % similar have the highest penalties, including cancellations of program registration. For academic papers, the manuscript will be withdrawn, the author denied two successive annual increments and barred from supervising new students for three years[20].

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Scientific misconduct and inaccuracies in business research can have far-reaching negative consequences for academics and stakeholders. It damages trust in academic research, harms the reputation of academicians, and slows progress by spreading incorrect information. Moreover, flawed research can lead to poor decisions, financial losses, and ineffective strategies for stakeholders such as businessmen, policymakers, and investors. If the information is wrong, resources may be wasted, or essential problems might not be solved. In the long run, this harms both the quality of academic work and the practical benefits of business research.

1.1 Theoretical Background and Previous Studies

Integrity in research refers to conducting oneself ethically, which involves conducting research in a trustworthy manner[21]. It requires a firm commitment to accuracy, transparency, and ethical behavior[22]. When researchers engage in dishonest behaviour, the knowledge that can be applied to make critical societal decisions can be contaminated. Policies can be misguided if data is manipulated or falsified. Therefore, Journals and academic organisations take these kinds of integrity violations very seriously because they damage the reputation of the researcher and the larger scientific community. The Committee on Publication Ethics (COPE) offers priceless rules for research misconduct that guide editors, publishers, and researchers alike, stressing the importance of ethical behaviour in academic pursuits. COPE emphasizes how crucial it is to conduct research with honesty, integrity, and transparency at every stage, from data collection to publishing[23]. One of the most essential instructions offered by COPE is the guideline for article retraction. A firm commitment to these ethical principles ensures that research findings remain credible and that society can trust academic work to inform policy and decision-making. Researchers, editors, and institutions all play a critical role in upholding research integrity by adhering to guidelines like those set forth by COPE. By doing so, they safeguard the quality and reliability of knowledge that directly impacts industries, policies, and the advancement of society as a whole.

Retraction constitutes a corrective action, ensuring that false or fraudulent conclusions are removed from the scientific literature. Additionally, it maintains the credibility and integrity of the academic publication process by making it evident that unethical behaviour will not be tolerated. Most retractions in scientific papers are due to misconduct[24], and 24.46 % of all retractions in the European Union are due to falsification, fabrication, and plagiarism[25]. Over the last two decades, retractions have increased from less than 100 yearly before 2000 to almost 1,000 in 2014[26]. It has increased significantly in the life and clinical sciences field[27] and medicine[28,30]. Besides, there are now nearly 43,000 articles retracted from the Retraction Watch database[31]. More than 10,000 research papers were retracted in 2023[32]. In India, retractions have increased 2.5 times between 2020 and 2022, which is more than the number recorded between 2017 and 2019[33].

In recent years, we have witnessed significant growth in the study of retraction of research articles, such as in the humanities and social sciences[30-36], where the primary reasons for retraction were data fabrication and plagiarism. The reasons for the retraction of computer science articles were problems with data[37]. Health and medical sciences was the dominant area in which most of the retracted research was evaluated, and it was found that the primary reasons were ethical issues, duplication of the image, fake peer review, investigation by company/institution, and issues about data[38-45]. Engineering and technology research was retracted primarily due to plagiarism, fake peer reviews, article duplication, author and journal/publisher investigations[46-49], etc. No study related to retracted business research has been found globally or in India so far. However, retracted articles associated with Indian authors and institutions have been evaluated in general[50-52] and in particular subjects, such as biomedical literature[53]. Retraction due to duplication, plagiarism, fake data, and legal reasons/ threats were the predominant reasons for retraction. In the evolving landscape of Indian business research, investigating the serious issues associated with article retraction is crucial. Hence, this study embarks on a comprehensive exploration of the trends of article retraction within Indian business research. Additionally, this study analyzes the reasons, duration, journals and publishers associated with the retracted articles and impacts of articles to inform future researchers and stakeholders related to the field.

2. RESEARCH QUESTIONS

RQ1. What was the trend in the retraction of Indian business research articles during the last decade (2014-2023)? When were the retracted articles published?

RQ2. Why are Indian business research articles being retracted?

RQ3. How long did it take for an article to be retracted?

RQ4. What are the top journals and publishers associated with retracted articles?

RQ5. What are the patterns of citation impact of articles before and after retraction?

3. DATA AND METHODOLOGY

This study employed Scientometric tools to evaluate retracted Indian business research articles from various perspectives, such as retraction trends, countries, journals

and publishers associated with the articles, reasons for retraction, and time taken for article retractions. Additionally, the current study identified trends in the growth of citations of articles before and after the retraction. Scientometric tools are suitable for quantitative research evaluation, which deals with performance measurement and science mapping[54-56]. Performance analysis examines the activities of researchers, countries, organizations, and departments and their impacts. This study helps to identify the output of researchers, affiliations, journals and publishers whose scientific productions have been retracted. Likewise, science mapping analyses provide insights into a scientific field's cognitive structure, evolution, and leading scientific players[57], including citation analysis[56,58].

3.1 Data Collection

In order to gather the bibliographical data of retracted Indian business research articles between 2014 and 2023, an agreement was signed with the parent organization of the *Retraction Watch database* (*The Center for Scientific Integrity*). As per the mutual agreement signed, the database provided the dataset of retracted articles in an M.S. Excel file. The *Retraction Watch* database was developed in 2010 to promote scientific research transparency and accountability[31]. It is a valuable database for the scientific community that tracks and catalogues scholarly publication retractions. After thorough scrutinization, this study selected 78 bibliographical records of retracted Indian business research articles from the dataset provided by the *Retraction Watch*.

Additionally, the study was queried in the Scopus database using search terms "retracted article" AND "business research" OR "commerce" OR "trade" OR "marketing", and the results were examined. One retracted article not listed in *Retraction Watch* was found and considered for the analysis. The study also consulted the Graphical User Interface/User Interface (GUI/UI) of *the Retraction Watch* database (retractiondatabase.org) to cross-check the results. A total of 134 retracted articles were found, and all were scrutinised individually. However, since most of these articles were unrelated to business research, they were excluded from the study. After a thorough evaluation, 78 relevant articles were selected, all of which were already listed in the dataset provided by the *Retraction Watch* database under the agreement. In addition, citations of the retracted articles were meticulously gathered from the Scopus database to analyze the impacts of the retracted articles (Fig. 1).

3.2 Data Processing and Analysis

M.S. Excel was used to process and clean the collected data. Tables and figures are generated using M.S. Excel, WPS Sheets and Tableau. The parameters used for this analysis are number of retracted articles, journals, publishers, states/U.T.s associated with retracted articles, year of original publications and retractions, and reasons for articles' retraction.

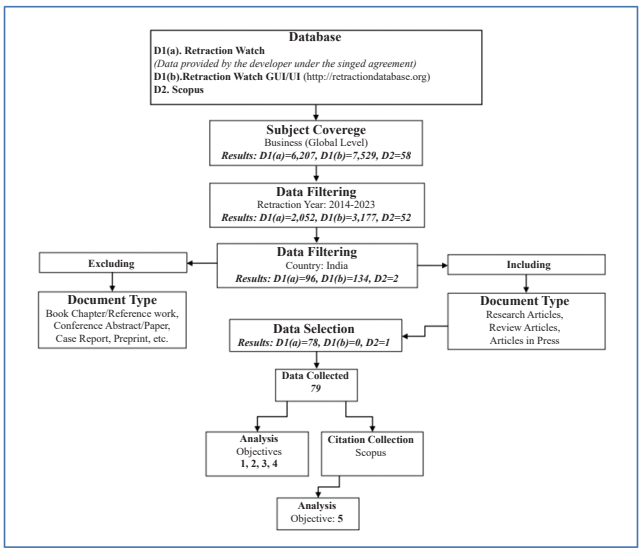

Figure 1. Workflow process of data collection from two databases (retraction watch and scopus).

4. ANALYSIS AND RESULTS

4.1 Year-wise Distribution of Publications and Retraction Trends

Figure 2 illustrates the year-wise distribution of article retraction trends in Indian business research, which reveals a fluctuating pattern over the past decade. In 2014 and 2015, there were only two retractions each, indicating a relatively stable period. 2016 recorded no retractions. However, a significant spike in retractions occurred in 2018, with a notable increase to 10 retractions. The trend continued with fluctuations in subsequent years, reaching a peak in 2022 with an alarming 35 retractions. The year 2023 saw a slight decrease to 8 retractions.

Furthermore, the fig. shows the publication year of the articles retracted between 2014 and 2023. 2009 witnessed only one publication, whereas from 2010 to 2013, no publication was recorded. Most articles were published in 2020, followed by 2021 and 2018. The year 2022 saw a slight decrease to 2 publications, and no article was published in 2023 that retracted during the study period (2014-2023).

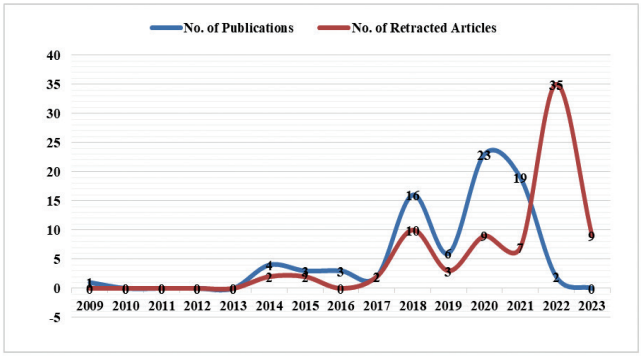

Figure 2. Year-wise distribution and retraction trends of Indian business research (2014-23). The blue -coloured trend line shows the year-wise distribution of publications, and the red-coloured trend line shows the trend of retraction.

4.2 State/Union Territory (U.T.)-wise Distribution of Article Retractions

Fig. 3 shows that the South Indian state of Tamil Nadu emerges as a prominent outlier with 44 retracted articles during the study period, highlighting a significant issue within the state's academic community. Uttarakhand, Maharashtra, and Telangana also exhibit a higher-than-average count of 8, 6 and 6 retractions each. Likewise, Karnataka and Kerala follow closely with 5 retractions each, indicating potential challenges in the quality assurance mechanisms within these regions. On the other hand, states like Bihar, Delhi, Jharkhand, Meghalaya, Puducherry, and Punjab have relatively lower numbers of retractions (1 each). At the same time, some larger states like Uttar Pradesh and West Bengal show moderate counts (4 each). Jammu & Kashmir has 3 retractions, while other states/U.T.s like Andhra Pradesh, Gujarat, Haryana, Madhya Pradesh, Rajasthan, and Telangana fall in between with 2 retractions each. The results highlight the importance of scrutinizing academic publication practices and quality assurance measures on a regional level, shedding light on potential issues that may require targeted interventions to uphold the integrity of academic enquiry in Indian business research.

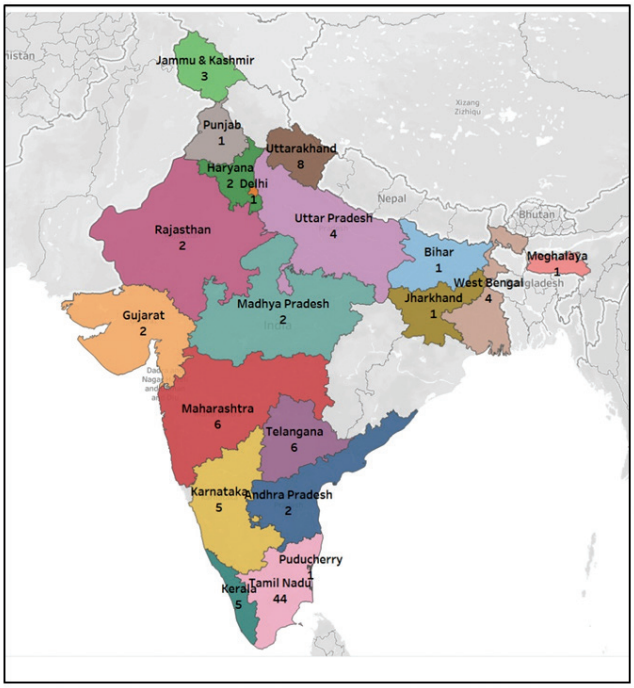

Figure 3. State/Union territory-wise distribution of articles retraction. The map is generated in Tableau and primarily highlights the Indian States/U.T.s with articles retractions.

4.3 Duration of Article Retractions

Most of the retractions of Indian business research articles occurred within the first two years, with 21 articles retracted in less than 1 year and 31 after 1 year (Fig. 4). This suggests a heightened scrutiny or correction within the immediate aftermath of publication. However, a gradual decline is observed in the number of retractions as the years progress, with only a handful of retractions occurring in the subsequent years (15 articles at 2 years, 3 articles at 3 years, 7 articles at 4 years, 1 article at 5 years, and 1 article at 6 years). This decline may indicate stabilization in the reliability of research findings over time or a decreasing likelihood of discovering issues meriting retraction as the research ages. The results highlight the importance of early post-publication vigilance and the decreasing probabilities of retractions in the later stages, emphasizing the significance of robust and rigorous peer-review processes in the initial publication phases.

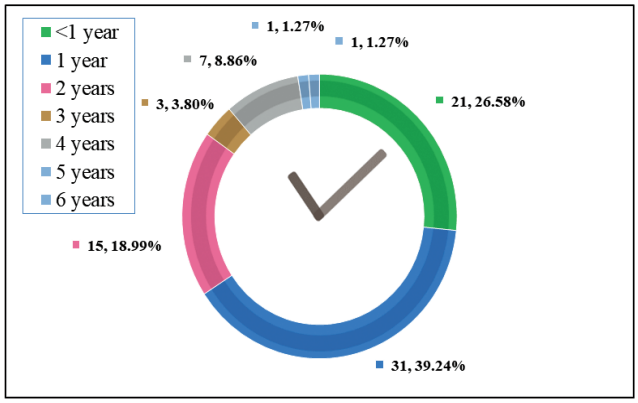

Figure 4. Duration on Indian business research article retractions.

4.4 Reasons for Article Retractions

The reasons behind Indian business research article retractions from 2014 to 2023 are broadly categorised into three categories, i.e., *issues in whole structure* (includes- data/methodology/analysis/results issues), *issues related to the publication process* (including- authorship issues, fake peer review, investigation by third party, issues about referencing/attribution), and the scientific misconduct (includes- plagiarism, duplicate of article/images) in the study (Fig. 5). Notably, issues about the overall structure of the articles, such as problems in data, methodology, analysis, and results, account for a significant proportion with a count of 11 instances. Authorship issues emerge as a minor concern, constituting only 1 case of retraction. On the other hand, issues related to the publication process present a more complex scenario. Fake peer review emerges as a significant problem, leading to 30 retractions, indicating vulnerability in the peer review system. Third-party investigations show 5 instances, emphasizing the need for external scrutiny in maintaining research integrity. Problems related to referencing and attribution contributes 8 cases to the retraction count. Scientific misconduct, a critical aspect, is exemplified by plagiarism, accounting for 16 retractions and the duplication of articles or images leading to 8 retractions. The results of this analysis indicate the necessity for stringent editorial processes, robust peer review mechanisms, and heightened awareness among researchers to curb the prevalence of these issues in Indian business research.

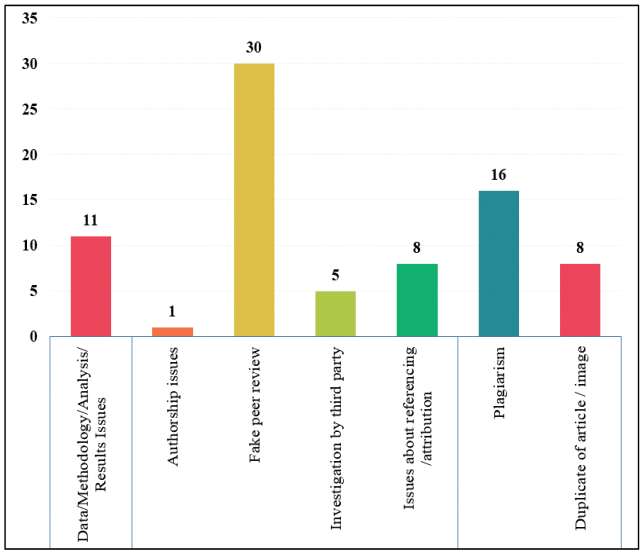

Figure 5. Reasons for Indian business research article retractions.

4.5 Top Journals Associated with Retracted Articles

Table 1 shows the top journals associated with retracted Indian business research articles from 2014 to 2023. The "Journal of Ambient Intelligence and Humanised Computing", published by Springer Nature, stands out with the highest number of retractions, accounting for 21.52 % of the total cases. This raises concerns about the quality control and review processes employed by Springer Nature for articles in this particular journal. Elsevier's "Aggression and Violent Behavior" follows with a retraction rate of 5.06 %, suggesting a comparatively lower occurrence but still significant. The "International Journal of Mechanical and Production Engineering Research and Development", associated with Transstellar Journal Publications and Research Consultancy Private Limited, also records a 5.06 % retraction rate. High Cite Score journals reported the highest number of retraction cases, demonstrating that they never compromise unreliable research findings. Additionally, the results highlight the need for scrutiny in the peer-review process of journals to maintain the integrity of Indian business research articles and the credibility of scholarly publications.

4.6 Publishers Associated with Retracted Articles

Figure 6 illustrates the list of publishers associated with retracted Indian business research articles. Springer emerges with the highest number of retractions, totalling 41, indicating a substantial commitment to maintaining the integrity of its publications. Following Springer, Elsevier has retracted 11 articles, highlighting its dedication to upholding rigorous standards. SAGE Publications, Taylor and Francis, and Emerald similarly commit to 5 and 4 retractions, respectively. Several publishers, such as Trans Stellar, Hindawi, and Wiley, have also retracted articles, although in smaller numbers. The retraction rates across diverse publishers highlight the collective duty to ensure scientific accuracy. Lower retraction counts by some publishers may reflect better quality control or smaller publication volumes (2014-23). These findings highlight the need for transparency and accountability in maintaining research credibility.

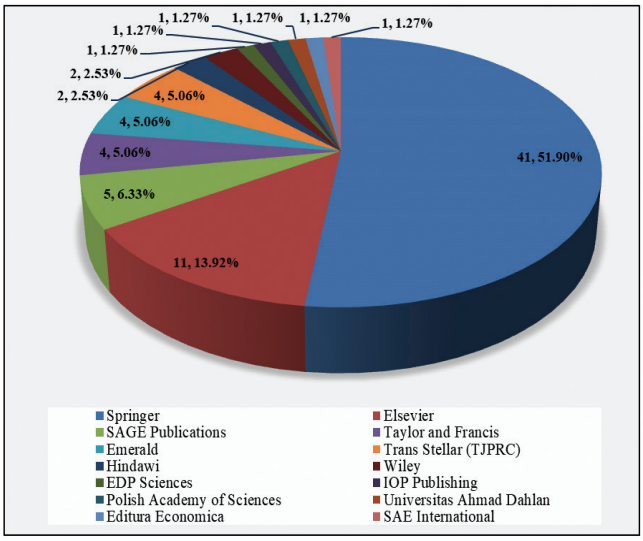

Figure 6. Top publishers who issued article retractions.

Table 1. Top journals that issued article retractions

Journal	ISSN/ E-ISSN	Publisher	Cite score (2022)	N.R.A.
Journal of Ambient Intelligence and Humanized Computing	1868-5137/1868-5145	Springer Nature	9.6	17 (21.52%)
Aggression and Violent Behavior	1359-1789/1873-6335	Elsevier	8.9	4 (5.06%)
International Journal of Mechanical and Production Engineering Research and Development *	2249-6890/2249-8001	TJPRC	0.7	4 (5.06%)
Cluster Computing	1386-7857	Springer Nature	7.0	2 (2.53%)
Neural Computing and Applications	0941-0643/1433-3058	Springer Nature	10.0	2 (2.53%)
Wireless Personal Communications	0929-6212/1572-834X	Springer Nature	4.5	2 (2.53%)
Arabian Journal for Science and Engineering	2193-567XE/2191-4281	Springer Nature	5.2	2 (2.53%)
International Journal of Systems Assurance Engineering and Management	0975-6809/0976-4348	Springer Nature	3.0	2 (2.53%)

NRA=Number of retracted articles, Asterisk (*)=Discontinued by Scopus

4.7 Citation Impact of Retracted Articles

The analysis reveals that before retraction, several articles had minimal or zero citations (Fig. 7). However, a notable citation increase is observed for specific articles after retraction. Article 10 experienced a substantial surge from 0 to 103 citations, indicating an unexpected post-retraction interest or attention. In contrast, some articles maintained low citation counts after retraction, such as Article 2, Article 5, and 11. Article 23, which initially had a high number of citations (68) before retraction, saw a decrease to 25 citations afterwards. The result also showcases instances where retraction appears to have a mitigating effect on citations, as seen in Articles 36, 70, 71, and 72, which had notable pre-retraction citations but received none post-retraction.

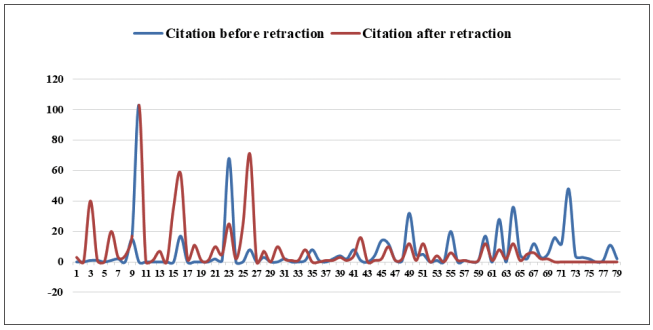

Figure 7. Trends in the citation of retracted articles. the blue trend line indicates the preretraction citations and the red trend line suggests the post-retraction citation of articles.

5. DISCUSSION

The analysis of the retracted articles in Indian business research reveals a fluctuating pattern over the past decade, emphasizing the need for a closer examination of factors contributing to these surges, suggesting a critical evaluation of the quality and integrity of research during those periods. The geographical distribution of article retractions highlights the importance of regional scrutiny in research publication practices. Further, the analysis of the duration of the article retraction highlights the importance of early post-publication vigilance. Most importantly, the reasons for retractions, including issues in the whole structure of an article (data/methodology/analysis/results) and problems in the publication process, highlight the necessity for stringent editorial processes and heightened awareness among researchers. This analysis revealed that the Indian business research was retracted primarily due to fake peer review and plagiarism issues. These issues are also concerns about many of the previous studies conducted in other disciplines[59-63]. Whereas biomedical literature from Indian authors and retractions in Indian science is primarily due to plagiarism and fake data[52,53], and cancer research was primarily retracted due to duplicate publishing[64].

Likewise, the top journals and publishers associated with retractions raise concerns about quality control and review processes, emphasizing the need for scrutiny in the peer-review process to maintain the integrity of Indian business research. The study found that Springer and Elsevier are the top publishers that retract the most articles. Retraction rates may vary across different publishers and are influenced by various factors. However, as we have seen among the various publishers, Springer and Elsevier always stand out as top publishers that retract articles as they are well-established and widely recognised academic publishers. It is their priority, as well as any others, to maintain the integrity of scientific literature[53,62].

Moreover, the unpredictable nature of the impact of post-retraction citations highlights the complexity of evaluating the consequences of retractions on academic literature. Before retraction, some articles had garnered citations, although varying degrees. However, what stands out is the continued citation of specific retracted articles even after the retraction. This phenomenon raises questions about the reasons behind such persistent citations. Another possibility is that some researchers may cite the retracted articles for critical analysis, discuss the reasons for retraction, acknowledge the limitations of the work, or cite for the construction of a theoretical framework in their studies. However, when you cite retracted articles, it needs to be legitimate, and it must be very clearly noted in the text of your manuscript that the paper cited has been retracted. You should only cite a retracted article if you feel that it's absolutely necessary to your manuscript[66]. Even though, the scholarly community must remain vigilant about the accuracy of their citations and adopt best practices to ensure the integrity of scientific discourse. On that matter, China has taken the initiative to audit research misconduct to improve the country's scientific environment[67]. Apart from that, the information on the retraction of articles needs to be highlighted or appropriately marked to avoid citing those works in other research. Many retracted articles remained available even after post-retraction without being marked as retracted[68]. Hence, the findings of this study call for targeted interventions, transparent editorial processes, and increased awareness to uphold the integrity of Indian business research.

6. CONCLUSION

This comprehensive analysis of retraction trends in Indian business research over the past decade provides valuable insights and raises important implications for the field. Moreover, the analysis also benefits LIS professionals by improving the management and curation of academic resources, ensuring they include only reliable and accurate information. It helps develop targeted awareness programs on research integrity and guides researchers in avoiding retracted or flawed sources. These findings are crucial for enhancing research support services, enabling librarians to provide better assistance and ensuring researchers base their work on high-quality, trustworthy information.

However, this analysis's findings suggest a closer examination of the factors contributing to spikes in retractions in specific years, prompting critical evaluations

of research quality and ethical concerns. Raising citations after retraction is a severe concern for future research findings, which may require targeted interventions and proper scrutiny of the results. Extensive contextual citation analysis can reveal the context of citations of retracted articles, including which parts of the retracted paper were cited in other research. Future studies should focus more deeply on the factors contributing to spikes in retractions, explore regional variations in research integrity, and continue to enhance the robustness of peer-review processes to uphold the quality and reliability of business research in India. This study only covers retractions from 2014-23 indexed in *Retraction Watch* and *Scopus*, leaving room for further research in related areas. Future research can utilize comprehensive data from various databases like Web of Science, Google Scholar, Dimensions, etc., that may provide different results.

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