

# Parikalpana

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# Mapping Green Marketing Research: A Detailed Bibliometric Analysis from the Scopus Database

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## Abstract

This study presents a bibliometric analysis of green marketing research from 1990 to 2022, highlighting the field's growth in response to rising environmental concerns. Using the Scopus database, the research identifies significant themes, key authors, and trends within green marketing studies. Biblioshiny and VOS viewer tools were employed to visualize publication trends, author networks, keyword co-occurrences, and citation patterns, offering a comprehensive overview of the field's evolution. Findings show a notable rise in green marketing publications, with key contributing authors, influential journals, and major thematic areas emerging. Keyword analysis reveals a shift from general environmental themes to specific strategies, underscoring the field's maturation. This study emphasizes the need for continued exploration in green marketing, suggesting directions for future research and practical implications for sustainable business practices.

**Keywords:** Bibliometric Analysis, Ecological Marketing, Environmentally Friendly Marketing, Green Advertising, Marketing Sustainability, Scopus Database.

## 1. Introduction

Green marketing has gained substantial attention in the previous couple of decades as ecological issues have evolved into increasingly prominent in public discourse and corporate strategy. The concept centres on the promotion of products and services based on their ecological advantages, aiming to reduce the environmental footprint and enhance sustainable development. This approach not only addresses consumers' growing ecological concerns but also serves as a strategic tool for companies to differentiate themselves in a competitive market (Polonsky, 1994; Wang, Liu, & Pérez, 2023). The importance of green marketing extends beyond consumer satisfaction to include regulatory compliance and corporate social responsibility (CSR). Businesses adopting green marketing practices often see enhanced brand loyalty and improved

public perception, leading to long-term profitability and sustainability (Fosu, Fosu, Akyina, & Asiedu, 2024; Majeed, Aslam, Murtaza, Attila, & Molnár, 2022). As Kumar Kar & Harichandan (2022) point out, the role of green marketing in influencing consumer behaviour is crucial for advancing environmental objectives and fostering sustainable consumption patterns. The topic of bibliometric analysis has recently grown in prominence as a potent method for mapping the development and organization of academic disciplines. Bibliometric studies shed light on the evolution and change of scientific fields by examining trends in collaboration, citation networks, and publication patterns (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011). This method enables researchers to identify influential works, key contributors, and emerging themes, thereby guiding future research directions and informing policy decisions (Fachada, Rebelo, Lourenço, Dimas, & Martins, 2022; Harzing & Alakangas, 2016). In the context of green marketing, bibliometric analysis is particularly useful for understanding how the field has evolved in response to changing environmental concerns and business practices. By examining the body of literature from 1990 to 2022, this study aims to highlight the major milestones and trends in research on environmentally friendly marketing, providing a comprehensive overview of its intellectual landscape (Saleem, Khattak, Ur Rehman, & Ashiq, 2021).

### 1.1 The Study's Objectives and Scope

This study aims to offer thorough research on environmentally conscious advertising, which is known as green marketing, from 1990 to 2022, shedding light on the field's development, influential figures, and new developments. By analysing the annual number of publications, the study identifies the growing interest and significance of green marketing over time (Naeem, Karim, Rabbani, Bashar, & Kumar, 2023; Wang et al., 2023). Utilizing three-field plots, the research maps the relationships between prominent authors, key research themes, and contributing countries, illustrating the interdisciplinary and international scope of the field (Chu et al., 2022). The study also examines the top 20 most cited and most impactful journals, providing insights into the primary sources of influential research. Furthermore, it identifies the most cited documents and authors, showcasing seminal contributions and leading figures in green marketing. An analysis of the author's impact by H-index and relevant affiliations underscores the productivity and institutional support within the field. Trend topics and keyword co-occurrence networks highlight the evolving themes and focus areas, while a co-authorship country map emphasizes the global collaboration in green marketing research. Lastly, the thematic map categorizes research themes based on their development and relevance, providing a strategic overview of the field's current state and future directions (Chu et al., 2022; Cobo et al., 2011; Wang et al., 2023).

## 2. Literature Review

The term "green marketing" describes an approach to advertising goods and services that highlight their positive impact on the environment. Modifying products, implementing sustainable production methods, using environmentally friendly packaging, and adjusting advertising strategies to emphasize items' positive impact on the environment are all part of this extensive list of things to do. Sustainability in consumer practices and the promotion of ecologically friendly products are the cornerstones of "green marketing," the overarching objective of which is to lessen humankind's destructive influence on the natural world (Javaid, Haleem, Singh, Suman, & Rab, 2021; Kumar Kar & Harichandan, 2022). With the growing awareness of environmental challenges and the significance of sustainability among both firms and consumers, green marketing has transitioned from a specialist strategy to a mainstream marketing technique.

## 2.1 Previous Studies on Green Marketing Evolution

Green marketing research has significantly evolved over the years, reflecting broader societal shifts toward environmental sustainability. Early research primarily focused on understanding consumer behaviour and the initial responses to green marketing strategies (Kumar Kar & Harichandan, 2022). Over time, the scope of research expanded to include more complex analyses of marketing strategies, consumer attitudes, and the impact of regulatory frameworks (Javaid et al., 2021). Naeem et al. (2023) carried out an extensive bibliometric study of sustainable and green finance, which sheds light on the present and future of environmentally conscious advertising. Their study highlights the increasing integration of sustainability in financial markets and the evolving role of green marketing in promoting sustainable investment practices (Naeem et al., 2023). A rising focus on sustainability in the financial industry is indicated by the examination of important trends and patterns in green marketing research. Liu, Wang, and Pérez (2023) analysed green marketing research papers published between 1991 and 2021 using bibliometric methods. Their study identified key trends, influential articles, and prominent authors in the field, demonstrating the growing importance of green marketing in academic and practical contexts. They found that green marketing research has become more sophisticated, with a greater focus on empirical studies and theoretical development. This study also emphasized the role of green marketing in driving consumer behaviour towards more sustainable choices. Saleem et al. (2021) conducted an extensive bibliometric review of ecological marketing studies spanning 1977–2020. Their analysis shows that there has been a marked uptick in green marketing papers, with an emphasis on multidisciplinary studies that include aspects of ecology, economics, and management. The study also highlighted the geographic distribution of research, showing that green marketing has gained prominence worldwide. This comprehensive analysis underscores the importance of green marketing in addressing global environmental challenges (Saleem et al., 2021). Chu et al., (2022) discuss current tendencies in studies examining the relationship between CSR and ecological sustainability. Their bibliometric analysis reveals the interconnectedness of CSR and green marketing, emphasizing how businesses integrate environmental sustainability into their core strategies to enhance their competitive advantage and corporate reputation. This study provides insights into the synergies between green marketing and CSR, highlighting the importance of a holistic approach to sustainability.

## 2.2 Methodological Approaches in Bibliometric Analysis

The goal of bibliometric analysis is to find associations, trends, and patterns in a particular field of study by quantitatively examining the scholarly literature. The goal of this method is to trace the development of themes, evaluate the influence of publications and writers, and create a mental map of the intellectual architecture of research domains. The authors Cobo et al. (2011) came up with a way to use bibliometric tools to track the development of a subject of study and show how it has changed over time. Their research showed how bibliometric methods could give a holistic picture of a field's growth and trends by applying this approach to fuzzy sets theory. As part of their strategy, they employ science mapping techniques to chart the evolution of different fields of study. A bibliometric study of the Journal of Business Research spanning 45 years was carried out by Donthu, Kumar, & Pattnaik (2020). Their research demonstrated how business research has developed and what this means for environmentally conscious advertising by using a number of bibliometric characteristics to single out seminal papers, writers, and topics. Longitudinal analyses, as this study shows, are crucial for tracking changes and trends in a certain area of study. An analysis of bibliometric methods used in the field of

management and organizational science was conducted by Zupic & Čater (2015). In order to better comprehend the intellectual landscape and direct future research, their study offered a comprehensive review of the various bibliometric methodologies and their uses. Methods for mapping the structure and dynamics of research fields that were important to their review included bibliographic coupling, citation analysis, and co-citation analysis.

### 2.3 Technological Tools and Databases

The use of technological tools and databases is crucial for conducting comprehensive bibliometric analyses. By streamlining the collection, processing, and analysis of massive amounts of scholarly literature, these tools have allowed academics to gain invaluable insights into the evolution and current trends in the field. Harzing and Alakanga (2016) compared Google Scholar, Scopus, and the Web of Science, focusing on their coverage, ease of use, and citation analysis capabilities. They compared these databases across disciplines and, over time, drew attention to their advantages and disadvantages. The findings suggest that while all three databases have their advantages, researchers should consider the specific needs of their study when choosing a database for bibliometric analysis. As an alternative to the Web of Science, Norris & Oppenheim (2007) examined other resources that cover literature in the social sciences. Their study evaluated various databases, including Google Scholar and Scopus, in terms of their coverage, citation analysis features, and overall utility for bibliometric research. The results indicate that while the Web of Science remains a valuable resource, other databases offer complementary benefits that can enhance the comprehensiveness and accuracy of bibliometric analyses. Moreover, the evolution of green marketing research reflects broader societal and academic trends toward sustainability and environmental responsibility. As consumer awareness and regulatory pressures increase, businesses are increasingly adopting green marketing strategies to meet these demands and differentiate themselves in the marketplace (Mehraj et al., 2023). The integration of green marketing with CSR and sustainable finance further highlights the interconnectedness of these fields and their collective impact on promoting sustainability (Chu et al., 2022; Saleem et al., 2021). The literature on green marketing has evolved from early explorations of consumer behaviour to more complex analyses of marketing strategies, regulatory impacts, and interdisciplinary research. Bibliometric analyses provide valuable insights into the trends and development of this field, highlighting the increasing importance of sustainability in marketing and business practices. As green marketing continues to grow, future research should focus on addressing emerging challenges, exploring new opportunities, and further integrating sustainability into marketing strategies and business models. By understanding the evolution of green marketing through bibliometric analysis, researchers and practitioners can better navigate the complexities of this field and contribute to the advancement of sustainable marketing practices.

## 3. Research Gap

Despite the significant growth in the field of green marketing, there remain several notable research gaps that require further exploration. Saleem et al. (2021) draw attention to the fact that further comprehensive research on the effects of environmentally conscious marketing tactics on customer actions and devotion to brands is required. Similarly, Liu, Wang, and Pérez (2023) call for research that examines the effectiveness of green marketing initiatives across different cultural contexts, as existing studies predominantly focus on Western markets. Naem, Karim, and Rabbani (2023) emphasize the scarcity of research on the integration of technological advancements, like AI and large-scale data sets analytics, in enhancing green

marketing practices. Chu et al. (2022) criticize the absence of all-encompassing models that evaluate the total effect of green marketing on the long-term viability and bottom line of businesses. Methodologically, there is a need for more sophisticated bibliometric analyses, as suggested by Cobo et al. (2011) and Zupic & Čater (2015), to better understand the evolution and intellectual structure of green marketing research. Additionally, Harzing & Alakangas (2016) and Norris & Oppenheim (2007) note the underutilization of advanced bibliometric tools and databases, which can provide deeper insights into research trends and collaborations in this field. In addition to enhancing the scholarly discourse, addressing these gaps will also give businesses insights that can be put into practice in order to adopt more environmentally responsible marketing methods.

## 4. Methodology

The present investigation makes use of bibliometric analysis, which is a quantitative and statistical instrument employed for the purpose of identifying patterns and trends within the green marketing literature that can be found in the Scopus database. This technique is commonly applied to analyse publication trends across a range of publications of a scholarly nature, such as journal articles, book chapters, and papers presented at conferences. The objective is to deliver an in-depth analysis of the present state and evolution of green marketing from 1990 onwards. Bibliometric analysis, part of library science, is highly effective for document assessment, allowing for qualitative evaluations of previously published materials (Alsmadi et al., 2023; Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021). This method facilitates easy access to study summaries over specific periods. The approach is beneficial as it visually represents past studies with the use of quantitative techniques and reliable databases derived from esteemed databases (Zemigala, 2019), aiding in understanding pre-existing knowledge. For the academic community, bibliometric analysis is invaluable as it explores the internal connections within the existing literature (Liu, Cui, & Nie, 2023).

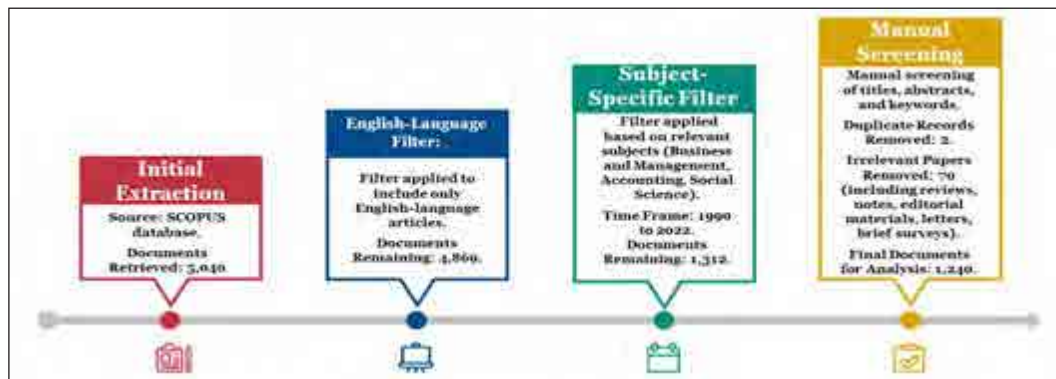
In the past, conducting bibliometric analyses was not feasible. However, advances in information technology and the widespread availability of online data have now made such studies possible. Various applications are now available to perform bibliometric analyses. This research sought to investigate the growth of green marketing within the current literature by employing bibliometric analysis. Our goals were to (1) determine which research is the most credible, (2) analyse different study themes, and (3) provide possible avenues for future research in this field.

### 4.1 The Sources of Data Collection and Their Screening

It is obvious that not all reliable databases can be included in the selection process. This is due to the fact that it would be impractical to conduct bibliometric analysis on a large number of databases at the same time. Any variety of databases can yield relevant documents for study. Subject-specific databases include AGRICOLA, ERIC, PubMed, and MEDLINE, while Scopus and WOS are multidisciplinary (Thomas, 2021). Our study used SCOPUS because of its extensive journal history, accurate indexing, and high-quality articles (Pranckutė, 2021). The choice to utilize SCOPUS was made due to its extensive coverage from 1969 to the present, encompassing a wide range of high-quality publications on various subjects. As of July 26, 2023, SCOPUS boasts an impressive collection of over 90.6 million content items. Authors' names, publication dates, abstracts, citations, and publishers' information are all part of the SCOPUS database, which is essential for bibliographic research (Alsmadi et al., 2023). Even if WOS is popular and reliable, bibliometric software like Bibliometric R packages and VOSviewer can

only evaluate one data file from a database, making SCOPUS the better choice for this research. Moreover, how you choose your keywords has a significant impact on the accuracy of your search. The study's focus—"green marketing," "sustainable marketing," "ecological marketing," and "environmental marketing" was the only set of search phrases allowed to assure data integrity and acquire real publications. Based on Fahimnia, Sarkis, & Davarzani (2015), every SCOPUS article with search phrases in the "title," "abstract," and "keywords" sections without any restrictions on the order of appearance was included in this research.

**Figure 1: Step in Data Selection and Filtering Process**



Source: Author's Compilation

## 4.2 Search Criteria and Keywords

To find relevant data, Scopus was searched using certain keywords and parameters. The keywords used included "green marketing," "sustainable marketing," "environmental marketing," and "eco-friendly marketing." To ensure that only relevant literature within the designated timeframe was included, the search was limited to publications published between 1990 and 2022. The search criteria also included filtering for research articles, reviews, and conference papers, ensuring a comprehensive dataset.

## 4.3 Analytical Tools and Techniques

The analysis was conducted using bibliometric tools and techniques to ensure a rigorous examination of the collected data. Two primary tools were used: Biblioshiny for Bibliometrix in R version 4.2.2 and VOSviewer version 1.6.18. Biblioshiny is a free and open-source program that serves as an online interface for the extensive bibliometric analysis suite Bibliometrics. It allows for an interactive and flexible analysis of the bibliometric data, facilitating the creation of various metrics and visualizations. One program that can help in building and viewing bibliometric networks is VOSviewer. It is particularly useful for visualizing co-authorship, co-citation, and keyword co-occurrence networks, providing an intuitive understanding of the relationships and trends in the research data.

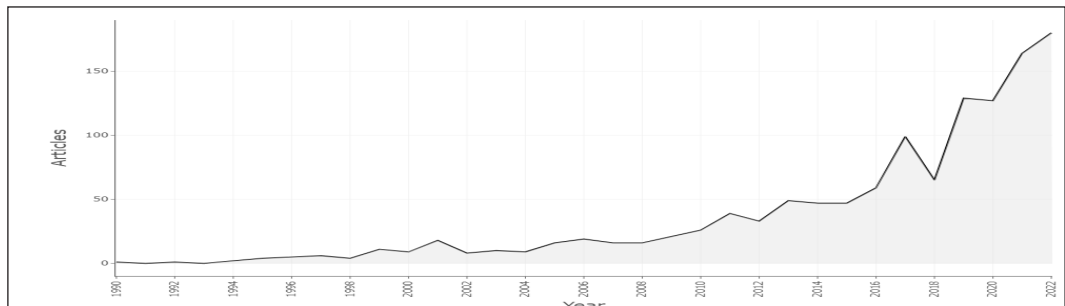
## 5. Data Analysis and Findings

### 5.1. Quantity of articles published

The yearly number of publications pertaining to green marketing from 1990 to 2022, as generated using Biblioshiny for Bibliometrix in R software, is shown in Figure 2. The graph

reveals a notable trend in the volume of research over this period. Initially, from 1990 to around 2005, the number of publications remained relatively low and stable, indicating limited scholarly attention to green marketing. However, a gradual increase can be observed from 2006 onwards, reflecting growing awareness and interest in environmental sustainability within the marketing field. The trend shows a significant rise in publications starting from 2012, with a marked acceleration after 2015. This surge suggests a substantial increase in research activity and academic interest in green marketing, aligning with global trends emphasizing sustainability. The peak in recent years highlights the integration of green marketing practices in various industries and the importance of sustainability in contemporary marketing strategies.

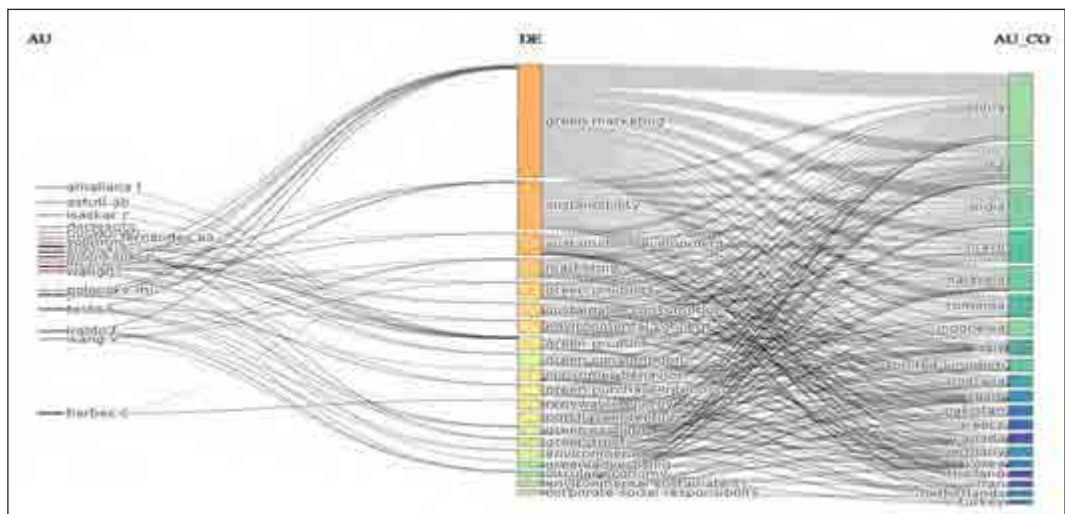
**Figure 2: Number of Scientific Publications Annually**



Source: Compiled by the author by Biblioshiny

## 5.2. Three Field Plots

**Figure 3: The Sankey Plot**



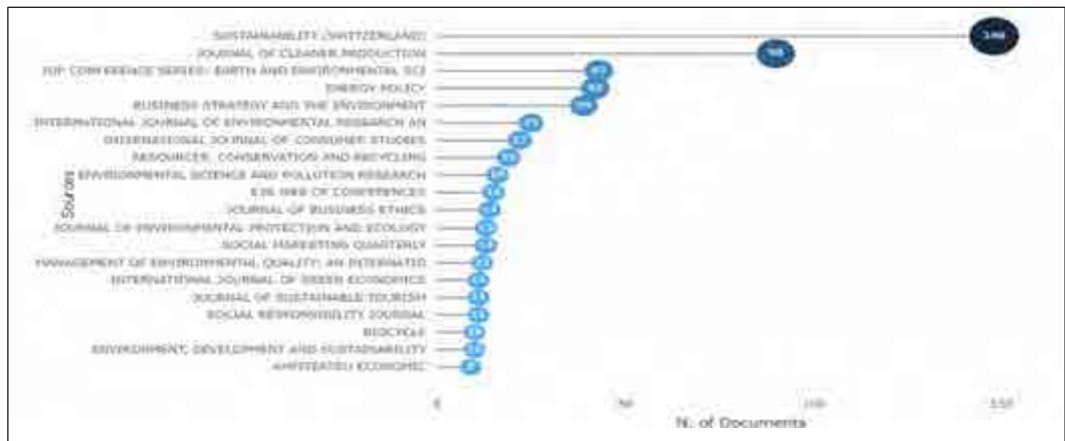
Source: Compiled by the author by Biblioshiny

The three-field plot in figure 3 visualizes the intricate connections between authors (AU), keywords or research themes (DE), and countries (AU\_CO) within the green marketing research domain. The left column lists influential authors such as Herbes C, Polonsky MJ, Wang X, and Iraldo F, each connected via lines to the central column that represents the primary research themes they have addressed, including “green marketing,” “sustainability,” “sustainable

development,” “green products,” and “sustainable consumption.” The right column showcases the countries actively contributing to green marketing research, with significant representation from China, the USA, India, Brazil, and Malaysia. The lines linking keywords to countries illustrate the geographical distribution and focus areas of this research, underscoring the global interest and collaborative nature of green marketing studies. This plot effectively highlights how specific authors and countries are interlinked through common research themes, emphasizing the interdisciplinary and international scope of green marketing research.

### 5.3. Top 20 Highest-cited sources

Figure 4: Highest-cited sources



Source: Compiled by the author by Biblioshiny

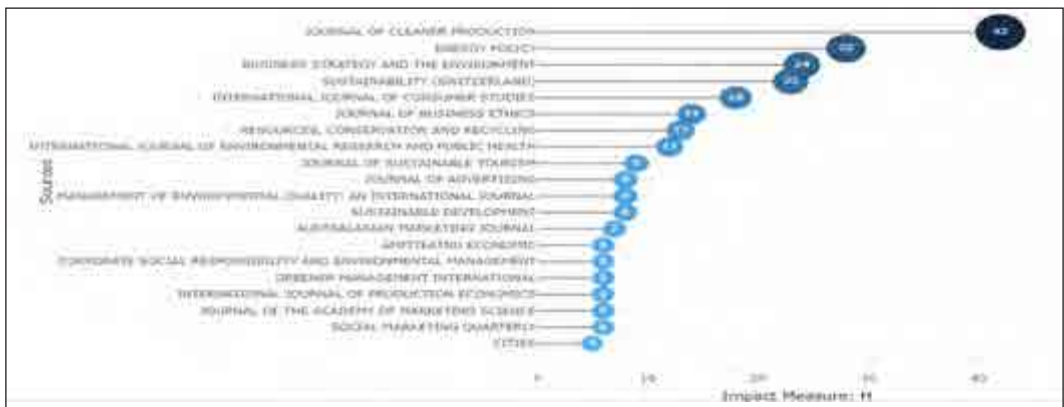
Figure 4 illustrates the number of documents published on green marketing across various academic sources. The quantity of documents is shown on the x-axis, and academic sources like journals and conference series are listed on the y-axis. The chart reveals that “Sustainability (Switzerland)” is the leading source with 148 documents, followed by the “Journal of Cleaner Production” with 90 documents, and the “IOP Conference Series: Earth and Environmental Science” with 43 documents. Other notable sources include “Energy Policy,” with 42 documents and “Business Strategy and the Environment”, with 39 documents. Several journals, such as the “International Journal of Environmental Research and Public Health,” “International Journal of Consumer Studies,” and “Resources, Conservation, and Recycling,” have published between 19 and 25 documents each. Additionally, sources like the “Journal of Business Ethics,” “Journal of Environmental Protection and Ecology,” and “Social Marketing Quarterly” have around 13 to 15 documents each. Journals with fewer contributions (around 9 to 12 documents) include the “Management of Environmental Quality: An International Journal,” “Journal of Sustainable Tourism,” “Social Responsibility Journal,” and “Amfiteatru Economic.” This distribution highlights the significant contributions of various journals to green marketing research, showcasing the interdisciplinary nature of the field and its broad academic interest.

### 5.4 Leading 20 Impactful Publications

Figure 5 shows the impact of various academic sources on green marketing research, measured using the H-index. The H-index, which takes into account both the productivity and the impact of citations, is shown on the x-axis. Journals and conference proceedings are examples of academic sources that are listed on the y-axis. The “Journal of Cleaner Production” leads with

the highest H-index of 42, indicating its significant influence in the field. Following it, “Energy Policy” has an H-index of 28, and “Business Strategy and the Environment” has an H-index of 24. Other notable journals include “Sustainability (Switzerland)” with an H-index of 23, the “International Journal of Consumer Studies” with 18, and the “Journal of Business Ethics” with 14. Journals such as “Resources, Conservation and Recycling,” “International Journal of Environmental Research and Public Health,” and “Journal of Sustainable Tourism” have H-index values of 13, 12, and 9, respectively. The figure also includes sources like “The Journal of Advertising,” “Management of Environmental Quality: An International Journal,” “Sustainable Development,” and “Australasian Marketing Journal,” each contributing significantly to the field with H-index values ranging from 6 to 8. The chart effectively highlights the journals that have made substantial contributions to green marketing research through impactful and widely cited publications.

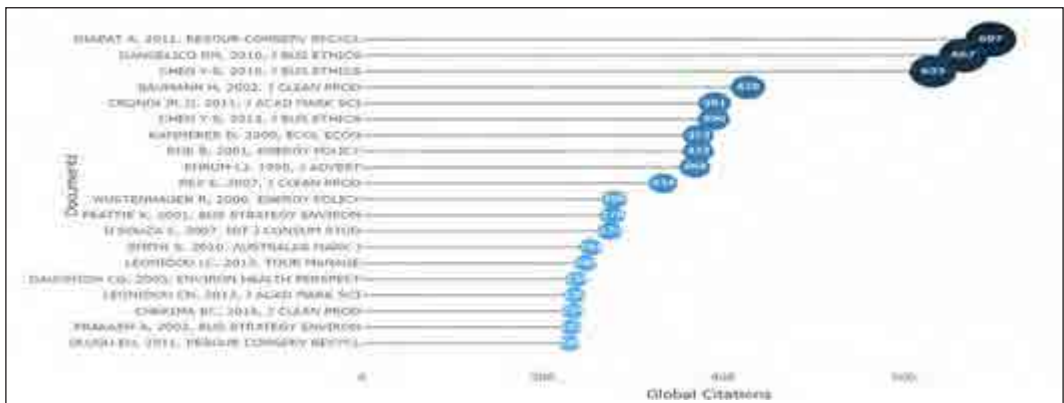
**Figure 5: Leading 20 Impactful Publications**



Source: Compiled by the author by Biblioshiny

### 5.5 Highest-cited documents

**Figure 6: Highest-cited documents**



Source: Compiled by the author by Biblioshiny

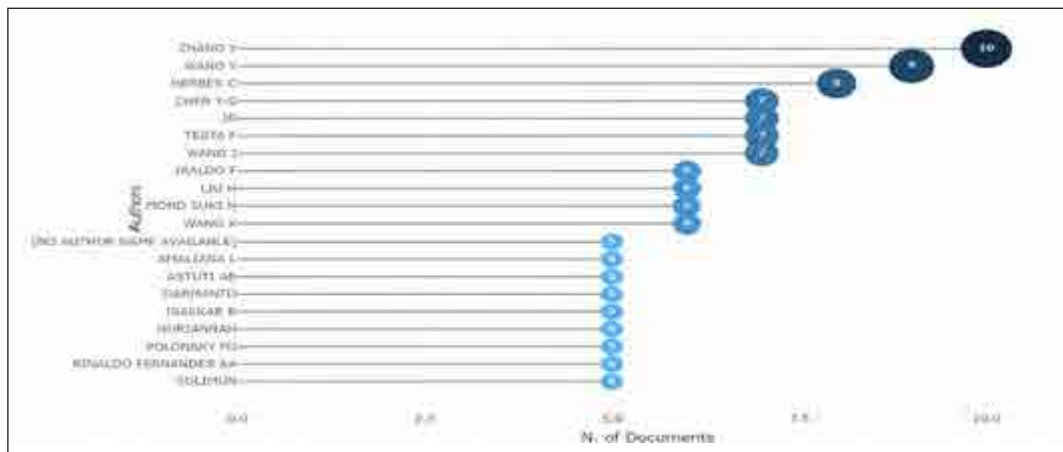
Figure 6 shows the total amount of citations that important papers in green marketing have gotten worldwide. On one side, we have the total number of citations worldwide; on the other,

we have a list of all the papers, with their first authors, publication years, and journals listed on the y-axis. This chart highlights the most influential publications based on their citation counts. The document by Diabat A. (2011) published in “Resources Conservation and Recycling” leads with the highest number of citations, totalling 697. It is followed by Dangelico RM. (2010) and Chen Y-S. (2010), both published in “Journal of Business Ethics,” with 667 and 633 citations, respectively. Another highly cited document by Baumann H. (2002) in the “Journal of Cleaner Production” has received 428 citations. Notable contributions include Cronin JR. (2011) in “Journal of the Academy of Marketing Science” with 391 citations, Chen Y-S. (2013) again in “Journal of Business Ethics” with 390 citations, and Kammerer D. (2009) in “Ecological Economics” with 373 citations. The figure also lists significant works by Roe B. (2001) in “Energy Policy,” Shrum LJ. (1995) in “Journal of Advertising,” and Rex E. (2007) in “Journal of Cleaner Production,” each with citations ranging from 373 to 369.

The chart demonstrates the prominence and impact of specific publications within the green marketing research community, showcasing how these key documents have influenced subsequent research and contributed to the development of the field. The high citation counts indicate the relevance and importance of these studies in advancing the understanding of green marketing practices and their implications.

### 5.6 Highest-cited authors

Figure 7: Highest-cited authors

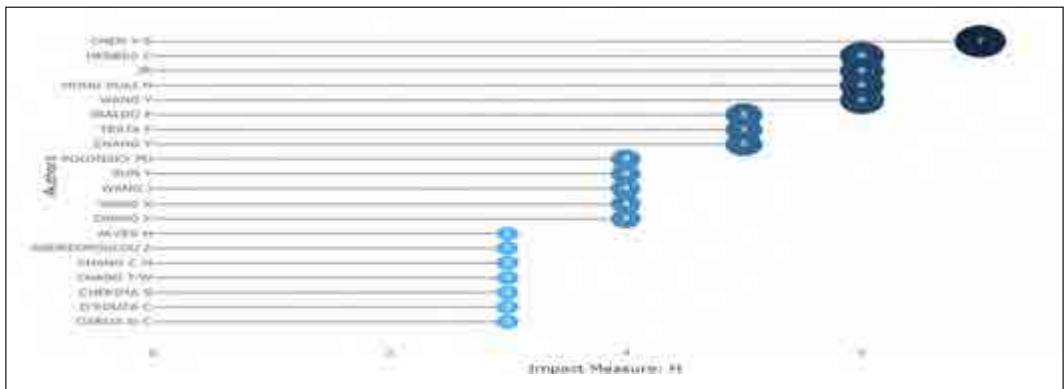


Source: Compiled by the author by Biblioshiny

The x-axis in Figure 7 shows the total number of publications by the most prolific authors in the area of green marketing, while the y-axis lists the authors’ names. Zhang Y leads with 10 published documents, followed by Wang Y with 9 and Herbes C with 8, indicating their significant contributions to green marketing research. Other notable authors include Chen Y-S, JR, and Testa F, each with 7 documents, and Wang J, Iraldo F, Liu H, Mohd Suki N, and Wang X, each with 6 documents, reflecting their active involvement in the field. Additionally, several authors, including those listed as Amaliana L, Astuti AB, Darmanto, Isaskar R, Nurjannah, Polonsky MJ, Rinaldo Fernandes AA, and Solimun, have each published 5 documents, contributing to the breadth of research in this area. This distribution highlights the collaborative and expansive nature of green marketing research with a robust and active research community.

### 5.7 Leading Author Influence by H

Figure 8: Leading Author Influence by H

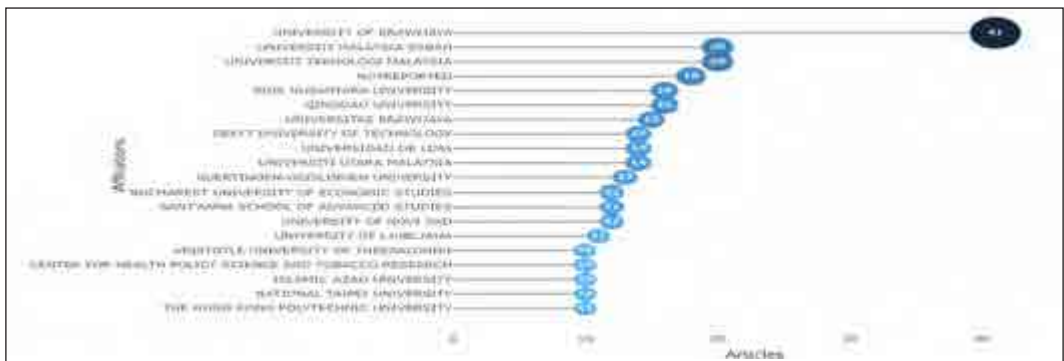


Source: Compiled by the author by Biblioshiny

Figure 8 shows the H-index as a measure of the influence of different writers on green marketing. The y-axis shows the authors, while the x-axis shows the H-index. A high H-index of 7 for Chen Y-S indicates that their work is very influential and frequently cited. Following closely are Herbes C, JR, Mohd Suki N, and Wang Y, each with an H-index of 6, reflecting their considerable contributions to the field. Authors like Iraldo F, Testa F, and Zhang Y have an H-index of 5, highlighting their influential research. Polonsky MJ, Sun Y, Wang J, Wang X, and Zhang X each have an H-index of 4, demonstrating their impactful work. Other notable contributors include Andreopoulou Z, Chang C-H, Chang T-W, Chekima S, D’Souza C, and Dabija D-C, each with an H-index of 3, indicating their significant yet relatively lower influence compared to the top contributors. This chart underscores the varying levels of impact among key researchers in green marketing, showcasing a range of influential scholars who have shaped the field.

### 5.8 Ranks of Most Important Affiliates

Figure 9: Ranks of Most Important Affiliates



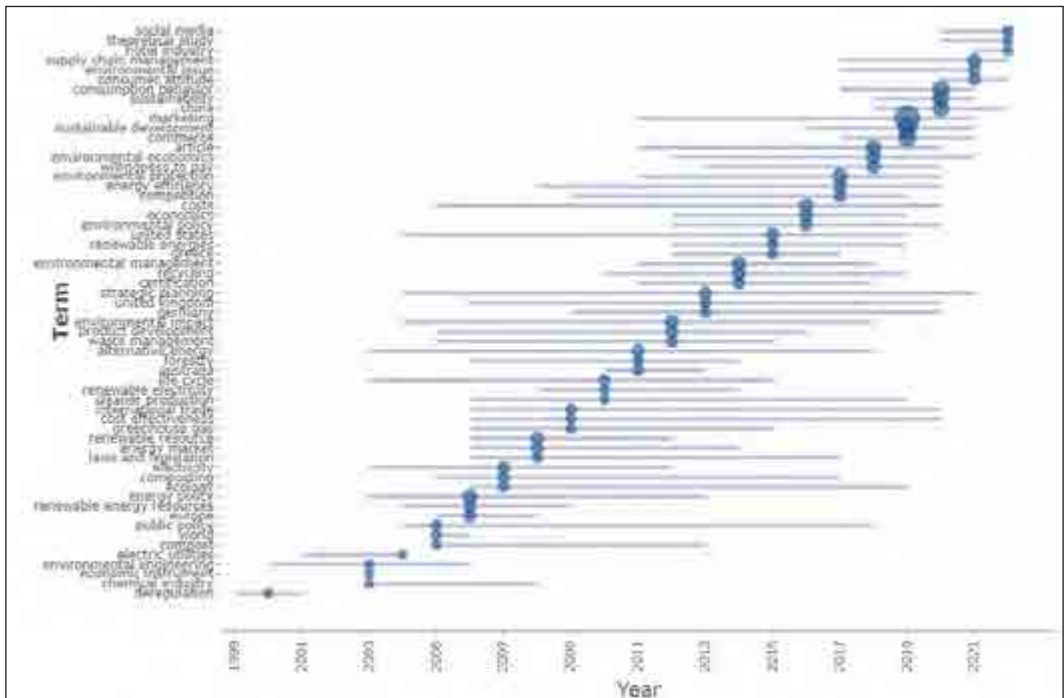
Source: Compiled by the author by Biblioshiny

Figure 9 depicts the number of articles published on green marketing by various academic affiliations. The x-axis represents the number of articles, while the y-axis lists the institutions. The “University of Brawijaya” leads with 41 articles, indicating its significant contribution

to green marketing research. Both “Universiti Malaysia Sabah” and “Universiti Teknologi Malaysia” follow with 20 articles each, showing their active involvement in this field. Other notable institutions include “Northeastern University” with 18 articles, “Bina Nusantara University” and “Qingdao University” with 16 articles each, and “Universitas Brawijaya” with 15 articles. Institutions such as “Delft University of Technology,” “Universidad de Lima,” and “Universiti Utara Malaysia” have each published 14 articles highlighting their contributions. Further down the list, “Nuertingen-Geislingen University” has 13 articles, while “Bucharest University of Economic Studies” and “Sant’Anna School of Advanced Studies” have 12 articles each. “University of Novi Sad” has 11 articles, and institutions like “University of Ljubljana,” “Aristotle University of Thessaloniki,” and others, including “Center for Health Policy Science and Tobacco Research,” “Islamic Azad University,” “National Taipei University,” and “The Hong Kong Polytechnic University,” each have 10 articles. This chart underscores the diverse and widespread academic interest in green marketing research across various global institutions.

**5.9 Attractive topics**

**Figure 10: Most Popular and Attractive Topics**



Source: Compiled by the author by Biblioshiny

Figure 10 illustrates the evolution and emergence of various terms related to green marketing research from 1999 to 2022. The x-axis represents the years, while the y-axis lists the terms. The presence and prominence of each term over time are depicted by horizontal lines, with larger dots indicating periods of higher relevance or citation frequency. Key terms like “sustainability,” “renewable energy,” and “environmental management” have shown continuous relevance over the years. Earlier in the timeline, terms such as “environmental policy,” “chemical industry,” and “deregulation” were more prominent, reflecting the initial focus areas in green marketing research. As time progresses, newer terms like “social media,” “theoretical study,” and “supply

chain management” emerge, highlighting the expanding scope and interdisciplinary nature of the field. The increasing density and variety of terms in the later years indicate a growing and diversifying interest in green marketing topics, driven by evolving environmental concerns and technological advancements. This chart effectively visualizes the dynamic trends and shifts in research focus within the green marketing domain over more than two decades.

### 5.10 Relevant Terms

**Figure 11: Interconnected network of author-keyword pairs**



Source: Compiled by the author by Vos viewer

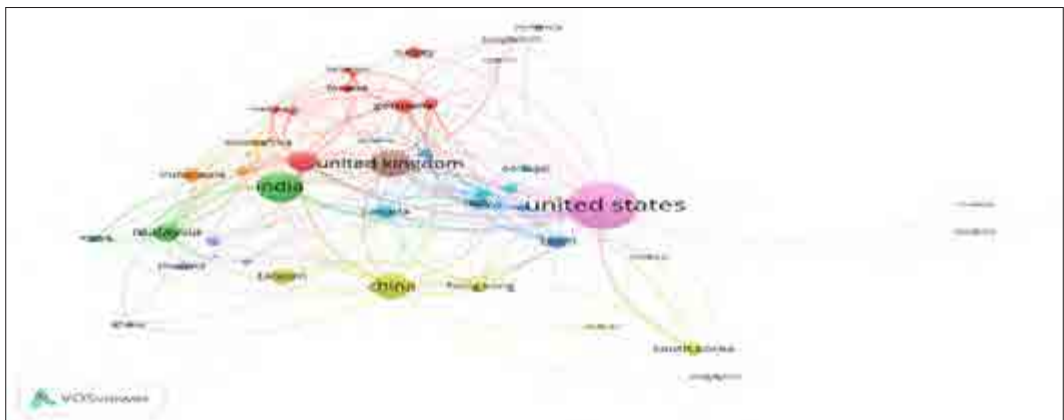
Figure 11 is a network visualization created using VOSviewer, depicting the co-occurrence of keywords in green marketing research. The central and most prominent term is “green marketing,” connected to a wide array of related terms such as “sustainable development,” “green product,” “consumer behaviour,” “environmental concern,” and “green advertising.” This network illustrates the interdisciplinary nature of green marketing, linking it to various domains, including “social marketing,” “renewable energy,” “environmental performance,” and “greenwashing.” The size and proximity of the nodes indicate the frequency and strength of co-occurrence, with larger nodes and thicker lines representing more significant relationships. This visualization highlights the breadth of green marketing research, emphasizing key areas of focus and emerging trends such as “sustainable consumption,” “green consumerism,” and “corporate social responsibility” (Chu et al., 2022; Naeem et al., 2023; Wang et al., 2023). The interconnectedness of these terms underscores the multifaceted approach required to address environmental sustainability through marketing strategies, reflecting the diverse research efforts in this field (Cobo et al., 2011; Saleem et al., 2021).

### 5.11 Geographical Map of Co-Authorship

Figure 12 is a network visualization generated using VOSviewer, illustrating the international collaboration in green marketing research based on country co-authorship. The nodes represent countries, and the size of each node indicates the volume of publications, while the lines connecting the nodes signify co-authorship links between researchers from different countries.

The United States emerges as the central hub with the most extensive network, highlighting its leading role in global green marketing research. Significant collaborations are evident between the United States and other major contributors such as the United Kingdom, China, India, and Germany. Other notable countries with substantial contributions and collaborations include Malaysia, Spain, South Korea, and Canada. This interconnected network underscores the global and collaborative nature of green marketing research, reflecting the diverse geographic involvement and the importance of international partnerships in advancing this field (Chu et al., 2022; Saleem et al., 2021). Regional clusters of collaboration are also shown in the visualization. These clusters include countries in Europe (such as the UK, Germany, and Italy) and Asia (such as China, Malaysia, and India), and they emphasize the extensive academic interest and joint efforts in promoting sustainability through green marketing practices (Cobo et al., 2011; Wang et al., 2023).

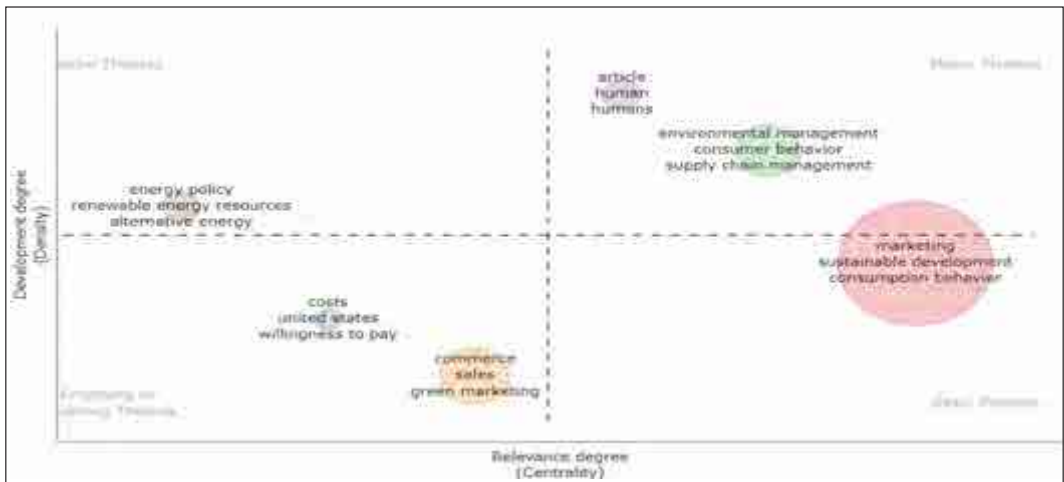
**Figure 12: Collaborative work**



Source: Compiled by the author by Vos viewer

**5.12 Thematic Content**

**Figure 13: Maps with Themes**



Source: Compiled by the author by Biblioshiny

In Figure 13, a strategic diagram that organizes the themes of green marketing research according to their centrality and density, showing how they have evolved over time. Each of the four corners represents a distinct topic category: basic, emerging/declining, niche, and motor. In the upper right quadrant, motor themes such as “environmental management,” “consumer behaviour,” and “supply chain management” indicate well-developed and highly relevant areas driving green marketing research (Chu et al., 2022). The lower right quadrant contains basic themes like “marketing,” “sustainable development,” and “consumption behaviour,” which are fundamental and central to the field but may not be as densely developed (Wang et al., 2023). Located in the top left quadrant, niche subjects like “energy policy,” “renewable energy resources,” and “alternative energy” are expertly crafted but not front and centre (Saleem et al., 2021). Some topics that are growing in popularity or going out of style may be seen in the lower left quadrant. These include “costs,” “United States,” “willingness to pay,” and “green marketing” (Cobo et al., 2011). The research landscape in green marketing is comprehensively illustrated in this strategic diagram, which also highlights new trends and important areas of attention.

## 6. Results

An examination of annual publications on green marketing from 1990 to 2022, depicted in Figure 2, shows a significant upward trend. From a relatively low and stable number of publications in the early 1990s to the mid-2000s, there has been a notable increase in the volume of research starting from 2006. This surge became more pronounced after 2015, reflecting a growing academic and practical interest in green marketing. The peak in recent years highlights the expanding importance of sustainability and environmental considerations in marketing strategies. Figure 3 illustrates the relationships between prominent authors, key research themes, and contributing countries. Major authors such as Herbes C, Polonsky MJ, and Wang X are linked to crucial themes like “green marketing,” “sustainability,” and “sustainable development.” Significant contributions come from countries like China, the USA, India, and Malaysia, indicating a global collaborative effort in green marketing research. This interconnectedness underscores the interdisciplinary and international scope of the field. As shown in Figure 4, the leading sources in green marketing research include “Sustainability (Switzerland),” with 148 publications and the “Journal of Cleaner Production”, with 90 publications. These journals play a significant role in disseminating research findings. Other notable sources are “IOP Conference Series: Earth and Environmental Science” and “Energy Policy,” reflecting the interdisciplinary nature of the research that spans environmental science, business strategy, and policy. The bar chart illustrating the H-index of top journals in Figure 5 highlights the impact of various journals based on their citation metrics. The “Journal of Cleaner Production” leads with an H-index of 42, followed by “Energy Policy” with an H-index of 28 and “Business Strategy and the Environment” with an H-index of 24. This metric indicates the influence and citation frequency of these journals, showcasing their significant contributions to the field of green marketing. The analysis of global citations in Figure 6 reveals the most cited documents in green marketing research. The paper by Diabat A. (2011) in “Resources Conservation and Recycling” leads with 697 citations, followed by works from Dangelico RM. (2010) and Chen Y-S. (2010) in “Journal of Business Ethics.” These highly cited documents reflect seminal contributions that have significantly shaped the research landscape in green marketing. Figure 7 highlights the most cited authors in green marketing research. Prominent authors include Diabat A., Dangelico RM, and Chen Y-S, whose works have been extensively cited in the literature. These citations reflect the impact and influence of their research in advancing the field of green marketing.

Figure 8 highlights the impact of various authors based on the H-index, with Chen Y-S leading at an H-index of 8. Following closely are Herbes C, JR, Mohd Suki N, and Wang Y, each with an H-index of 7. This metric indicates these authors' influence and the frequency of citations of their work, showcasing their significant contributions to the field of green marketing. Figure 9 identifies the "University of Brawijaya" as the leading institution with 41 publications, followed by "Universiti Malaysia Sabah" and "Universiti Teknologi Malaysia," each with 20 publications. This demonstrates strong institutional support and research output in green marketing, particularly in Asia. Other institutions, such as "Northeastern University" and "Bina Nusantara University," also show significant contributions. The trend topics visualized in Figure 10 show the evolution and emergence of various terms related to green marketing research from 1999 to 2022. Key terms like "sustainability," "renewable energy," and "environmental management" have shown continuous relevance over the years. The increasing density and variety of terms in the later years indicate a growing and diversifying interest in green marketing topics, driven by evolving environmental concerns and technological advancements. The network visualization of keyword co-occurrence in Figure 11 places "green marketing" at the centre, connected to a broad array of related topics such as "sustainable development," "green product," "consumer behaviour," and "environmental concern." This dense network highlights the interdisciplinary nature of green marketing research and the integration of various environmental and marketing concepts, showcasing the depth and breadth of the field. The network visualization of international collaboration (Figure 12) highlights the interconnectedness of research efforts across different countries. The United States, as the central hub, shows extensive collaboration with other leading countries such as the United Kingdom, China, India, and Germany. This network visualization emphasizes the importance of international partnerships in advancing green marketing research, reflecting a globally coordinated effort to address sustainability challenges. The strategic diagram in Figure 13 categorizes research themes based on their development and relevance. Motor themes like "environmental management," "consumer behaviour," and "supply chain management" are well-developed and central, driving the field forward. Basic themes such as "marketing," "sustainable development," and "consumption behaviour" are fundamental and central to green marketing research. Niche themes like "energy policy" and "renewable energy resources" are highly developed but less central, indicating specialized areas of focus. Emerging or declining themes, including "costs" and "willingness to pay," represent areas of fluctuating relevance, highlighting potential areas for future research.

## 7. Conclusion

The comprehensive analysis of green marketing research from 1990 to 2022 reveals a dynamic and growing field characterized by increasing publication volume, extensive international collaboration, and interdisciplinary integration. Key research themes have evolved, reflecting broader societal and environmental trends. Prominent authors, influential publications, and leading academic institutions have significantly contributed to the development and dissemination of knowledge in this area. The strategic importance of motor and basic themes underscores the foundational role of sustainability in contemporary marketing practices. The research highlights the significant contributions of top journals, authors, and institutions, showcasing a robust and collaborative research environment. The evolving trends and emerging themes indicate that green marketing is not only expanding but also adapting to new environmental challenges and technological advancements, further solidifying its relevance and impact in the global research community.

## 8. Limitations and the Need for More Research

Despite the thorough analysis, this study has certain limitations. The reliance on the Scopus database may exclude relevant research indexed in other databases, potentially limiting the scope of the analysis. Additionally, focusing on publication volume and citation metrics may not fully capture the qualitative impact of the research. Future studies should consider a more diverse range of data sources and qualitative assessments to provide a more holistic view of green marketing research. There is also a need for more research on emerging themes, particularly in regions and contexts that are currently underrepresented, to address global sustainability challenges comprehensively. Expanding the scope of interdisciplinary research and fostering greater international collaboration will be crucial in advancing the field of green marketing and promoting sustainable development worldwide. Further exploration into niche and emerging themes can uncover new insights and strategies to tackle evolving environmental issues, ensuring that green marketing continues to adapt and remain relevant in addressing global sustainability goals.

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# Servant Leadership and Organisational Performance: A Bibliometric Analysis

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## ABSTRACT

*Servant leadership and its contribution to organizational goals are clinching acclaim, as manifested through the escalation in the number of documents, peculiarly over the last decennium, provoking compulsion for a healthier understanding in the relationships, interconnections, linkages, and overlaps in these research areas. In lieu of accruing power, servant leadership intensify on serving others which may stretch out to fellow employees, partners, customers, and community unconfined. This paper pursues the expected results by an exploration in the academic literature through a bibliometric analysis using Bibliometrix package of R and VosViewer visualization along with Sci Space for content analysis. This study propels light on the theoretical structure between the two research domains and their evolution, interaction, cluster identification, key word analysis, co-authorship, concurrence, bibliometric coupling, author impact, trend topics, world collaboration etc. There was a moderate involvement of continents and authors, who usually wrote in groups or alliances and in large groups with an escalation of publication in 2023. Leadership and Organisational Development Journal and Frontiers in Psychology published this area of research more frequently, and remarkable authors in this research domain are Liden RC and Van Dierendonck D. This study confirms the linkage between servant leadership and organisational performance through clustering and content analysis. Researches with inconsistent topics, distinct areas of research from various disciplines and vibrant in approaches are unveiled through this study. The results of the study emphasises that the two research domains (servant leadership and organisational performance) are progressing into exceptionally multidisciplinary in approach, with hybridised creative concepts.*

**Key words:** *Bibliometric Analysis, Employee Performance, Job Performance, Organizational Performance, Servant Leadership*

## Introduction

Leaders who prioritize serving the greater good by serving their own team and organisation, is the backbone of servant leadership advocated by Robert Greenleaf, pioneer in this field (Greenleaf, R. K. 1998). He developed this theory after he went through a novel *Journey to the East* by Harmen Hesse. In servant leadership, employees are encouraged to give preference to organisation through their commitment and engagement. Interestingly, growth, well-being, and empowerment of employees are the prioritisation of this leadership that foster an inclusive environment that motivates employees to thrive in their authentic self. This theory has been

modelled and proposed (Buchen, I. H. 1998) as a prospect of comprehensive transformation of higher education with five dimensions including identity, leadership, reciprocity, commitment, and the future. Furthermore, empathy, listening, awareness, healing, conceptualisation, persuasion, stewardship, foresight, building community, and commitment (Spears, L. C. 2010) are spotted as characteristics of servant leadership. The recent escalation in the documents of the area under research elucidates the growing interest in the topic. This study explores the academic literature revolving around linkages between servant leadership and organisational performance through a bibliometric perspective using Bibliometrix package of R and Vos Viewer visualisation along with Sci Space (Zhang, K., & Aslan, A. B. 2021) based on a sample of scientific publications indexed in Scopus Databases. This paper unveils conceptual structures, current trends, common background, and trending challenges within the research domains, throwing light on the interplay of servant leadership and the organisational performance. This research attempts to map influential authors, journals, and publications using author analysis, source analysis and citation analysis (Annarita, Trotta., et. al 2024) exploring the conceptual structure, evolution, and interplay between their research fields. This paper will be guided by the following research questions.

- 1) Where is the overview of research development in the field of servant leadership in Scopus database?
- 2) Identify influential authors, journals, and publications exploring the conceptual structure, evolution, and interplay between there research fields?
- 3) Is there any linkage between servant leadership and organisational performance?
- 4) What are the current trends, common background, and trending topics and challenges within the research domains?

### **Methods and Search Strategy**

Bibliometric technique (Donthu, N., 2021) is used to analyse research database macroscopically (Van Nunen, K., 2018) and scientifically (Ellegard, O., 2018) to analyse and build indicators on dynamics as well as evolution of scientific and technical information on research domain selected. It helps to elucidate past data by combining statistical and mathematical model and move forward in scientific knowledge and to build on statistical aspects related to research domain selected for the study from global knowledge management (Gu, Y., 2004). Results are often used to rank applications for academic position, measure performance of journals, institutions, countries, and to assist funding organisation (Ugolini et. al., 2015) as well as policy makers to allocate resources for research. This section deals with search strategy adopted for the study, data cleaning and formatting, initial analysis, evolution of data, and details of data analysis. This section deals with stages of analysis based on key words, research strings, inclusion criteria, limit data criteria etc of the study. A bibliometric analysis (Ellegaard, O., et. al 2015) blended with content analysis (Harwood, T. G., et. al., 2003) was used in this study to explore the linkage between servant leadership (Annarita, Trotta., et. al 2024) and organisational performance. Bibliometric (Aria., Cuccurullo, 2017) package of R, including the graphical interface biblioshiny (Najam, Usama., et. al., 2020) along with Vos Viewer (Trotta, A., et. al 2024) visualisation network, and Sci Space (Zhang, K., & Aslan, A. B. 2021) for content analysis were used to establish linkage between servant leadership and organisational performance. The research is based on data retrieved from ‘Scopus’ database, as it is covering large percentage of academic literature (Mongeon, P., et. al 2016) and due to its enormous usage in research (Zhu, J., et. al 2020). Keywords were picked out meticulously based on

authors previous experience of research on the topic, core citations of the field, and previous literature reviews. After a scrupulous content reading and discussions with academicians, a manual selection (Annarita, Trotta., et. al 2024) of eligible key words were adopted. This process clearly defined the research boundaries fulfilling entire research area covering two research domains, servant leadership and organisational performance. Initial search was within the article title, abstract, and keywords based on the key word “servant leadership” (by 19<sup>th</sup> Feb 2024) and the results showed 1717 databases. Then the search was narrowed down (Norizah Mustamil et. al., 2020, Annarita, Trotta., et. al 2024) to ‘organisational goals’ AND ‘employee performance’ AND ‘organisational performance’ AND limit to ‘English only’ pegging down the results to 495 databases. The time span of the study was from 2005 to 2023 which covers 19 years of research data. A double step research strategy using bibliometric analysis (Trotta, A., et. al 2024) and a content analysis (Harwood, T. G., et. al., 2003) based on the research domains were adopted for this study. Quantity, quality, and structural indicators of bibliometric study (Merigó, J. M., et. al 2015) was used to extract the results. Quantity indicators (Norizah Mustamil et. al., 2020) were used for productivity of authors, journals, countries with respect to number of publications. Quality indicators were used for checking frequency of author, article or journal cited in other publications. Structural indicators were used to establish connectivity, association, and relationship among the publications. Sci Space was used for content analysis to create a table (Table 6) to establish linkage between servant leadership and organisational performance, and a personal human confirmation was also undertaken to ensure accuracy of the content. Scopus database was the only source used for this study with the keyword servant leadership and organisational performance, as the data sets were varied in nature and a higher amount of works (1717) were consolidated. Data from bibliometric databases usually detects errors (Cobo et. al., 2011), and it requires manual corrections through reading of abstracts and exclusion. Exclusion criteria (Gumus, S., et. al., 2020, Ferasso et. al 2020) helped to reduce studies unrelated to the research keywords. Finally, 495 documents remained in the database for a deeper analysis, and the exclusion criteria was significant and normal (Figuerola-Rodriguez et. al., 2019; Galvagno & Giaccone, 2019; Gumus, et. al., 2019; Keathley-Herring et. al., 2016, Tigre, F B., et. al., 2023)in bibliometric analysis.

### **Basic Information of Data**

This section deals with basic information (Najam, U., et. al 2020) of the data, evolution, and escalation in publication based on bibliometric perspective. Basic information of data (Table 1) extracted from Scopus with the help of bibliometrix R package includes 495 data sets covering a time span of (19 years- as Scopus data starts in 2005) 2005-2024 based on the key word ‘servant leadership’ and ‘organisational performance’. During the time span there was an annual growth rate of 9.39% in research which is below normal demanding further research and development in research supported by previous researches (Najam, U., et. al 2020) in servant leadership. First article based on the keyword was found in the year 1978 (Najam, Usama., et. al., 2020) on SSCI (Social Science Citation Index) database, but the results based on Scopus database shows that researches based on the keywords (servant leadership and organisational performance) had its beginning in 2005 (Table 1, Figure 1) and up to 2013 there were few publications with frequent ups and downs supporting the previous findings (Najam, Usama., et. al., 2020) that up to 2009 the publications based on servant leadership was less than 10 percent and got the momentum in 2010. Exploration into the evolution of the research based on keyword servant leadership and organisational performance a timeline analysis was conducted during the time span (2005-2024) based on Scopus database of 495 documents. Time line was identified with

drastic variation in publications (Najam, U., et. al 2020) prompting the researcher to classify them into two, stage 1 and 2 viz. pioneer studies and development studies (Table 2).

### **Data Analysis**

Data analysis is discussed in two sections based on bibliometric analysis and network analysis (Tigre, F B., et. al., 2023). Biblioshini in R package was used for bibliometric analysis as it is used for bibliometric studies in the discipline of management and organisations (Zupic & Cater, 2015). VOSviewer (Van Eck & Waltman, 2010) was used for network analysis to provide visualisation and detailed analysis. The visualisation of similarities (VOS) algorithm easily provides similarities co-occurrence and co-citations. Sci Space was used for extracting the core results (along with human confirmation) of the study to establish linkage between research domains.

### **A. Bibliometric analysis**

#### ***Leading publishing journals***

To better understand the linkages between the two research domains; research areas and type of journals that published the topic on research was analysed. Most relevant sources of publication (Figure 4) elucidate that Leadership and Organisational Development Journal (21) (Norizah Mustamil et. al., 2020) and Frontiers in Psychology (19) published this area of research domain more frequently. Journal of Business Ethics (13) and Leadership Quarterly (10) published succeeding in number. Local impact of sources by H index (Figure 5) also shows the similar results with h index 15 for Leadership and Organisational Development Journal, h index 10 for Journal of Business Ethics and Leadership Quarterly and h index 9 for Frontiers of Psychology.

#### ***Influential authors and affiliation statistics***

Remarkable authors (Norizah Mustamil et. al., 2020) in the keyword 'servant leadership' (Table 3) elucidates Liden RC (University of Illinois, Chicago) as first with h index 9, g index 11 and total citations summing up to 2108. Van Dierendonck D (Erasmus Research Institute of Management, Netherlands) is in second position with h index 8, g index 9 and 2121 total citations. In terms of productivity over time, Nubert M J (Baylor University) has covered whole time span of the study. Liden RC (University of Illinois, Chicago) and Eva N (Monash Business School, Australia) are identified as invested in 3 publications in a year. Most influential institutions were identified using bibliometric coupling based on institutions as unit of analysis (Table 4) and the results reveals that Monash University and Renmin University of China ranks first with 18 publications, Baylor University and University of Castilla La Mancha ranks second with 16 publications contradicting (Norizah Mustamil et. al., 2020) with the previous results.

#### ***Influential countries***

Influential countries (Vedula, S. B., ET. AL., 2024) analysed using R software corroborates, the most cited countries being USA ranking first (Norizah Mustamil et. al., 2020) with 5813 total citations, China ranking second with 1931 total citations and Nether lands ranking third in position with 1427 total citations (Figure 6). China ranks first and USA turned second in single country publications (Figure 7) and multiple country publications in the corresponding author collaboration. A network of collaboration in co-authorship between countries is established through bibliometrix R package. Interestingly, India is occupying sixth in position based on research domain under study and co-authorship has not yet spotted through the map demanding future research possibilities based on the research domain in single as well as country collaboration.

### *Globally cited papers*

Globally cited papers in 'servant leadership' has been identified by bibliometrix R package as Avolio BJ (University of Nebraska, Lincoln, Nebraska 2009) with normalised TC 3.56 and 1460 total citations and secondly Van Dierendonck D (Erasmus Research Institute of Management, Netherlands 2011) with normalised TC 2.79 and 1080 total citations. A co-citation network (Table 5) established using R package identifies Van Dierendonck D (Erasmus Research Institute of Management, Netherlands) as first in cluster one and three, and Greenleaf R K as first in cluster two bestowing pioneer ship in co-citations.

## **B. Network analysis of publications**

### *Cooccurrence analysis*

Cartographic analysis creates rule-based map symbology to assist various map purposes and scales avoiding data duplication. It can create comprehensive representation of distribution, connection, combination, quality, and quantity of special entities. Text analysis, visualisation and network mapping can be powerfully presented using VOSviewer which is an open software mostly utilised in bibliometric analysis. Concurrence of keywords were analysed using Vos Viewer (Trotta, A., et. al 2024, Yu Y, Li Y, Zhang Z, Gu Z, Zhong H, Zha Q, Yang L, Zhu C, Chen E. 2020) software, considering a minimum of 2 co-occurrence of 1573 keywords meeting the (Figure 8) threshold of 385. For each 385 keywords, the total strength of the co-occurrence links with highest total link strength are selected and 22 small clusters were identified using normalisation method and merging of small clusters thereafter. Analysis regarding co-occurrence of authorship over time with the help of VOSviewer (Trotta, A., et. al 2024) shows how many countries invested (Figure 9) in the topics as pioneers and latterly. The total strength of the co-authorship links with other countries and with greatest total link strength disclosed that USA being the pioneer and latterly Jordan, Bangladesh, Vietnam, Indonesia, Chile, and Pakistan have invested in the research area. Impressively, India has been spotted with fewer studies in the research area inspiring the scholars to move on with further studies with an interdisciplinary approach.

### *Co-citation analysis*

Co-citation analysis creates knowledge mapping which is effective and efficient in bibliometric analysis. Frequency with which two documents are cited together by other documents were identified (Figure 10) using R package as it is the most commonly (Ding et. al., 2001) used method in bibliometric analysis. Co-citation is the similarity in relationship between two cited publications and it can create clusters to identify key literature for interdisciplinary trends within institutions. Two publications cited together in one article (Small, 1973) were identified through this process. Author co-citation analysis provides insights on how writers connect ideas in between published works (Chen et. al., 2010). Van Dierendonck D and Greenleaf R K were identified as authors with more co-citations. Lesser dense co-citations were also identified pointing to the stimulation of interdisciplinary (Hernández, et. al., 2020) researches.

### *Cluster analysis*

Clustering in R package is based on an unsupervised learning technique, where databases are partitioned in several groups called clusters purely on similarity. After segmentation, numerous clusters are identified, sharing common features. In the process of data mining and analysis, clustering is utilised to recognise similar data sets for bibliometric analysis. Three clusters

(leadership-human-human experiment-*red*, leadership-article-human-*blue*, adult-China-female-*green*) were identified from the keywords with the greatest total link strength by (Figure 11) cluster coupling in R package. *Red* cluster has an impact of 2.314 with frequency 65 and centrality 0.340. *Blue* cluster has an impact of 2.271 with frequency 161 and centrality 0.443. *Green* cluster has an impact of 3.658 with frequency 24 and centrality 0.268. Thematic map reveals clusters (Santos, B.B., et. al., 2024) with the keywords for the time span of 19 years using co-occurrence network. X axis represents the centrality showing importance of a theme. Centrality is the interaction degree of network clusters when compared with others. Y axis (Figure 12) represents the density of the cluster and density is the measure of the strength of the cluster network or a measure of a theme development.

## Results and Discussion

A bibliometric analysis (Ellegaard, O., et. al 2015) blended with content analysis (Harwood, T. G., et. al., 2003) was used in this study to explore the linkage between servant leadership (Annarita, Trotta., et. al 2024) and organisational performance with the help of Sci Space (Zhang, K, & Aslan, A. B. 2021). To establish linkage between these two keywords, 22 literature reviews were sorted out from 495 Scopus database and a table was created with the help of Sci Space (Table 6) to elucidate the insights of the reviews directly or indirectly connected to the keyword and a human confirmation thereafter. Findings reveals varied studies based on these keywords establishing linkage directly or indirectly, and establishing boundaries and bridges in the areas of research. The key words of this study were found to be in its early stages of development prompting for researches based on these keywords in future. An exploration into mediators and moderators connecting these key words can also be an inspiration for further development. This study was conducted to explore linkage between servant leadership and organisational performance based on a time span of 2005-2024. Scopus database of 495 documents were used with the help of R package and VOSviewer for a bibliometric analysis. This study elucidates that there was an annual growth rate of 9.39% in research which is below normal demanding further research and development in research with an average document age of 4.36 exhibiting gradual rise in the number of publications per year. There was a moderate involvement of countries and authors, who usually wrote in companionship and in large groups. The impact of topic observed is high, with a large time span between 2005-2024. The most cited countries are USA and China with total citations and vice versa in single country publications and multiple country publications. Escalation of publication was spotted in 2023 and the starting point of a steady and consistent growth of documents were in the year 2013 onwards. Leadership and Organisational Development Journal and Frontiers in Psychology published this area of research more frequently, succeeded by Journal of Business Ethics and Leadership Quarterly. The results of keyword analysis elucidates that the most protuberant keyword associated with many institutions that includes numerous countries and authors are 'servant leadership' and 'leadership.' Remarkable authors in this research domain are Liden RC and Van Dierendonck D. Globally cited papers are authored by Avolio BJ (2009) and Van Dierendonck D (2011). A co-citation network identifies Van Dierendonck D as the pioneer in cluster one and three, and Greenleaf R K as pioneer in cluster two bestowing classic results in co-citations. Cartographic analysis revealed 22 small clusters using normalisation method with merging of small clusters and thereafter clusters coupling identified three main clusters, red, blue, and green. Co-authorship cartography elucidates USA being the pioneer and latterly Jordan, Bangladesh, Vietnam, Indonesia, Chile, and Pakistan have invested in the research area. Co-citation coupling corroborates Van Dierendonck D and Greenleaf R K were as authors

with more co-citations. Thematic map clusters identified four quadrant theme development in the research domain. The results of the study emphasises that the two research domains are progressing into exceptionally multidisciplinary in approach, with hybridised creative concepts. This study confirms the linkage between servant leadership and organisational performance through green cluster with its infancy. Linkage between servant leadership and organisational performance are open to exploratory and descriptive analysis. Creative and interesting linkages can be established between three clusters based on the findings of this study providing scope for further research. Servant leadership can be linked with health care in red cluster, service performance in green cluster, interconnection with work engagement, connectivity to job performance, linkage to job satisfaction, enhancement to employee creativity, enrichment of trust, promotion of psychological wellbeing, relation to employee happiness, inspiration for work engagement etc. which can help motivating new theory development, establishment of moderators and mediators and scale development in these keywords. India is occupying sixth in position in the research domain and co-authorship has not yet spotted through the Country collaboration map demanding future research possibilities based on the research domain in single as well as country collaboration.

**Conceptualisation on servant leadership and organisational performance**

After an in-depth review of literature of latest articles based on most cited authors, influential journals, and a bibliometric analysis, some of the challenges, research gaps and emerging new themes were identified to encourage further research and development in the research domains. A brief conceptualisation is presented in the figure (Figure 13) elucidating the connections established between servant leadership and organisational performance. Findings of the present study corroborates that research in the keywords servant leadership and organisational performance is in the development stage requiring more interventions to establish leadership styles.

**TABLES**

**Table 1 : Main Information of the data base**

MAIN INFORMATION ABOUT DATA	
Timespan	2005:2024
Sources (Journals, Books, etc)	273
Documents	495
Annual Growth Rate %	9.39
Document Average Age	4.36
Average citations per doc	34.53
References	33770
DOCUMENT CONTENTS	
Keywords Plus (ID)	465
Author's Keywords (DE)	1222
AUTHORS	
Authors	1175
Authors of single-authored docs	55

AUTHORS COLLABORATION	
Single-authored docs	63
Co-Authors per Doc	3.06
International co-authorships %	30.3
DOCUMENT TYPES	
Article	424
Book	8
Book chapter	33
Conference paper	8
Note	1
Review	21

Source: (Bibliometrix R package)

**Table 2 : Evolution of the data base**

Year	No of results	Percentage	Stages of development
2005	4	0.81	Stage 1: Pioneer studies
2006	1	0.20	
2008	1	0.20	
2009	4	0.81	
2010	4	0.81	
2011	4	0.81	
2012	2	0.40	
2013	12	2.42	
2014	14	2.83	
2015	20	4.04	
2016	29	5.86	Stage 2: Development studies
2017	15	3.03	
2018	35	7.07	
2019	42	8.48	
2020	51	10.30	
2021	67	13.54	
2022	76	15.35	
2023	92	18.59	
2024	22	4.44	

Source: (Bibliometrix R package)

**Table 3 : Influential authors**

Element	h_index	g_index	m_index	TC	NP	PY_start
LIDEN RC	9	11	0.643	2108	11	2011
VAN DIERENDONCK D	8	9	0.533	2121	9	2010

EVA N	7	7	0.778	877	7	2016
NEUBERT MJ	6	8	0.353	1002	8	2008
SENDJAYA S	6	7	0.545	1033	7	2014
WANG Z	6	8	0.667	186	8	2016
RUIZ-PALOMINO P	5	6	0.5	102	6	2015
ABORAMADAN M	4	5	1	87	5	2021
BANDE B	4	5	0.4	202	5	2015
HUNTER EM	4	4	0.333	450	4	2013

Source: (Bibliometrix R package)

**Table 4 : University Affiliations**

Affiliation	Articles
MONASH UNIVERSITY	18
RENMIN UNIVERSITY OF CHINA	18
BAYLOR UNIVERSITY	16
UNIVERSITY OF CASTILLA-LA MANCHA	16
BEIJING JIAOTONG UNIVERSITY	15
UNIVERSITI UTARA MALAYSIA	14
UNIVERSITAS NEGERI MALANG	13
UNIVERSITY OF SCIENCE AND TECHNOLOGY OF CHINA	13
COMSATS UNIVERSITY ISLAMABAD	12
ERASMUS UNIVERSITY	10

Source: (Bibliometrix R package)

**Table 5 : Globally cited papers**

Paper	DOI	Total Citations	TC per Year	Normalized TC
AVOLIO BJ, 2009, ANNU REV PSYCHOL	10.1146/annurev.psych.60.110707.163621	1460	91.25	3.56
VAN DIERENDONCK D, 2011, J MANAGE	10.1177/0149206310380462	1080	77.14	2.79
EVA N, 2019, LEADERSH Q	10.1016/j.leaqua.2018.07.004	610	101.67	13.47
LIDEN RC, 2014, ACAD MANAGE J	10.5465/amj.2013.0034	559	50.82	5.42
NEUBERT MJ, 2008, J APPL PSYCHOL	10.1037/a0012695	537	31.59	1
BARBUTO JR. JE, 2006, GROUP ORGAN MANAGE	10.1177/1059601106287091	526	27.68	1
PARRIS DL, 2013, J BUS ETHICS	10.1007/s10551-012-1322-6	475	39.58	5.33
HU J, 2011, J APPL PSYCHOL	10.1037/a0022465	355	25.36	0.92

LIDEN RC, 2015, LEADERSH Q	10.1016/j.leaqua.2014.12.002	329	32.9	5.63
HUNTER EM, 2013, LEADERSH Q	10.1016/j.leaqua.2012.12.001	301	25.08	3.38

Source: (Bibliometrix R package)

**Table 6 : Literature reviews based on linkage between servant leadership and organisational performance**

No	Linkage	Author's	Year	Reviews/Insights
1	Servant Leadership on Organization Productivity:	Ahmad, El, Zein., et. al	2021	Significant impact on employee performance, employee retention, employee satisfaction, and putting subordinates first.
2	Servant leadership on job performance through work engagement	A, M, Febrianti., et. al	2022	Relationship between servant leadership, work engagement, and job performance
3	Servant Leadership and Work Engagement Mediating Role of Trust in Leader Sustainability	Fatme, El, et. al	2022	Impact of servant leadership on organizational performance, role of servant leaders in improving work engagement
4	Servant leadership on organisation excellence through employee competence	Irfan, M., et. al	2022	Employee competence is a mediator and they can influence positively in organisational excellence
5	Organizational Commitment, Servant Leadership, And Empowerment on Employee Performance with Organizational Citizenship Behaviour	Iswahyudi., et. al	2022	Servant leadership has a positive effect on employee performance, which in turn affects organizational performance through mediator OCB
6	Servant leadership and employee performance	Marto, Silalahi., et. al	2022	Servant leadership has a significant and positive impact on employee performance but not on organisational performance
7	Servant leadership and green performance through green human resource practices and green servant leadership	Mansoor, A., et. al	2022	Combined impact of HR practices and green strategies promotes green performance through green servant leadership as a mediator
8	Servant leadership and organisational performance: mediator is organisational culture	Alipio, R.A.L., et. al	2023	Confirms the influence of servant leadership in the performance of the organisation
9	Servant leadership on employees' outcomes	Alvuk, D., et. al	2023	Positive correlation between servant leadership and work engagement, negative correlation between SL and turnover intention
10	Servant Leadership and Work Performance	Arshad, R., et. al	2023	Servant leadership motivates self-efficacy, justice, and organisational commitment to warrant employees work performance

11	Environmentally-specific servant leadership on organisational green performance	Hou, H., et. al	2023	Environmentally-specific servant leadership has a positive influence on organizational green performance
12	Servant Leadership on Employees' Collective Strategic Vision and Organisational Innovation performance	Ren, L., et. al	2023	Positive effect of servant leadership on employees' collective strategic vision-organisational innovation performance-organisational innovation performance.
13	Servant Leadership, Followers Job Satisfaction, Empowerment, and Performance	Sina, Eslamdoust., et. al	2023	Servant leadership, job satisfaction, empowerment, and the moderating effect of gender on these factors.
14	Influence of new leadership styles on employee performance	Susita, D., et. al	2023	Employee job performance is positively and directly influenced by courtesy and sportsmanship
15	Servant Leadership and Knowledge employee performance	Ghlichlee, et. al	2024	Conductive to employee innovative behaviours leading to high knowledge employee performance
16	Servant Leadership and Emotional intelligence and adaptive performance	Balti, M, et. al	2024	Direct influence on managers and indirect influence on employees
17	Servant leadership and job satisfaction	Gil, A.J., et. al	2024	Servant leadership has a positive and significant relation to job satisfaction
18	Servant leadership and employee emotional intelligence and individual adaptive performance	Balti, M., et. al	2024	Emotional intelligence and servant leadership climate has influence on individual adaptive performance
19	Servant leadership in health care	Demeke, G.W, et. al	2024	Servant leadership has a positive relationship organisational outcome in health care sector
20	Servant Leaders' strategic vision on the development of Service Organisations	Srouf, B., et. al	2024	Correlation between servant leadership and strategic vision in the development of service sector organisations
21	Servant leadership-entrepreneurial bricolage to competitive advantage-sustainability performance	Abukari, A. J., et. al	2024	Positive moderator of entrepreneurial bricolage and competitive advantage
22	Servant leadership in higher education	Nawaz, A., et. al	2024	Positive association between servant leadership and innovative performance

(Source: Compiled by author using Sci Space)

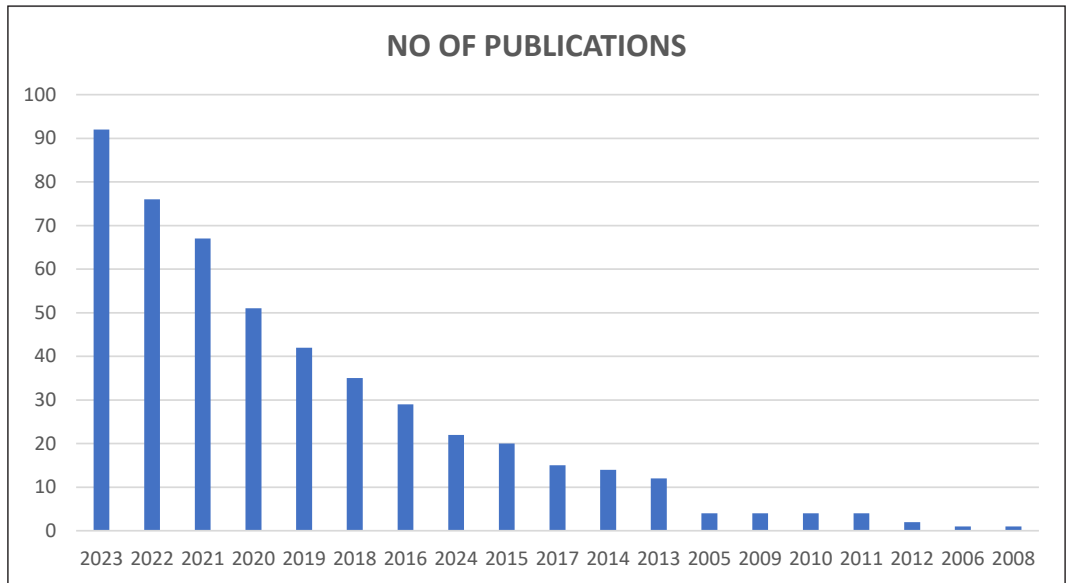
**Author Contributions:** Conceptualization, Data curation, Investigation, Methodology, Validation, Writing—original draft, and Writing—review and editing.

**Funding:** This research received no external funding.

**Conflicts of Interest:** The authors declare no conflict of interest.

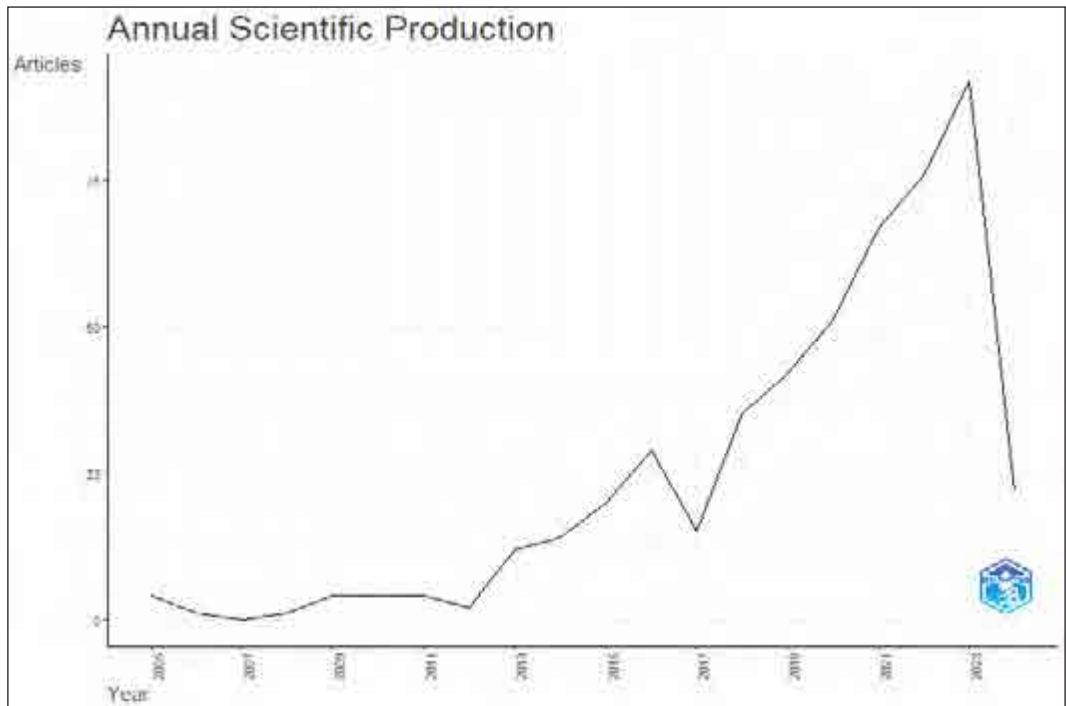
### FIGURES

Figure 1. Number of results per year



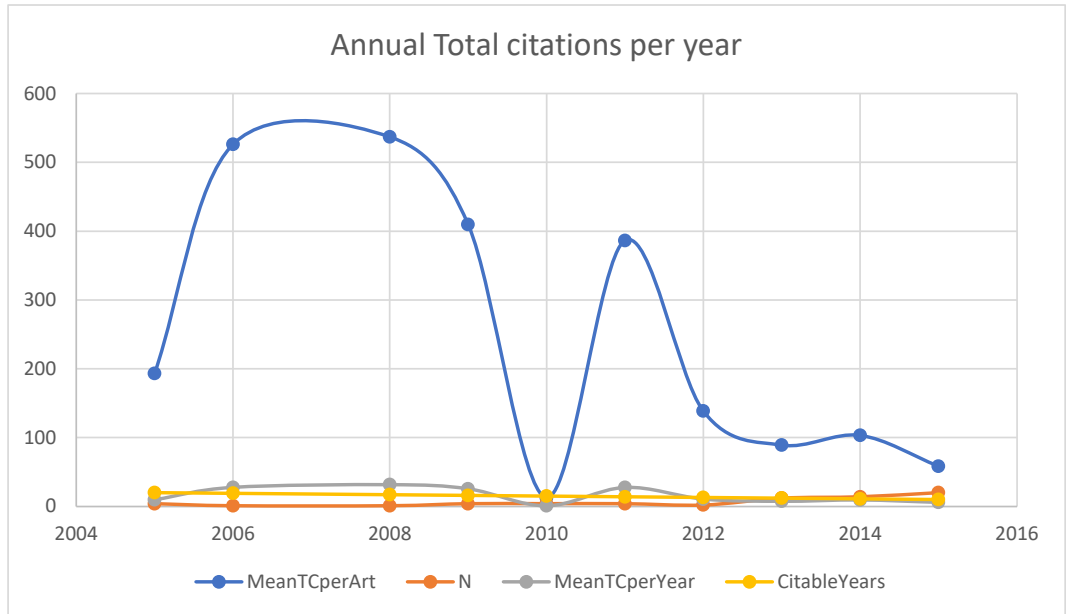
Source: (Bibliometrix R package)

Figure 2. Annual Scientific production



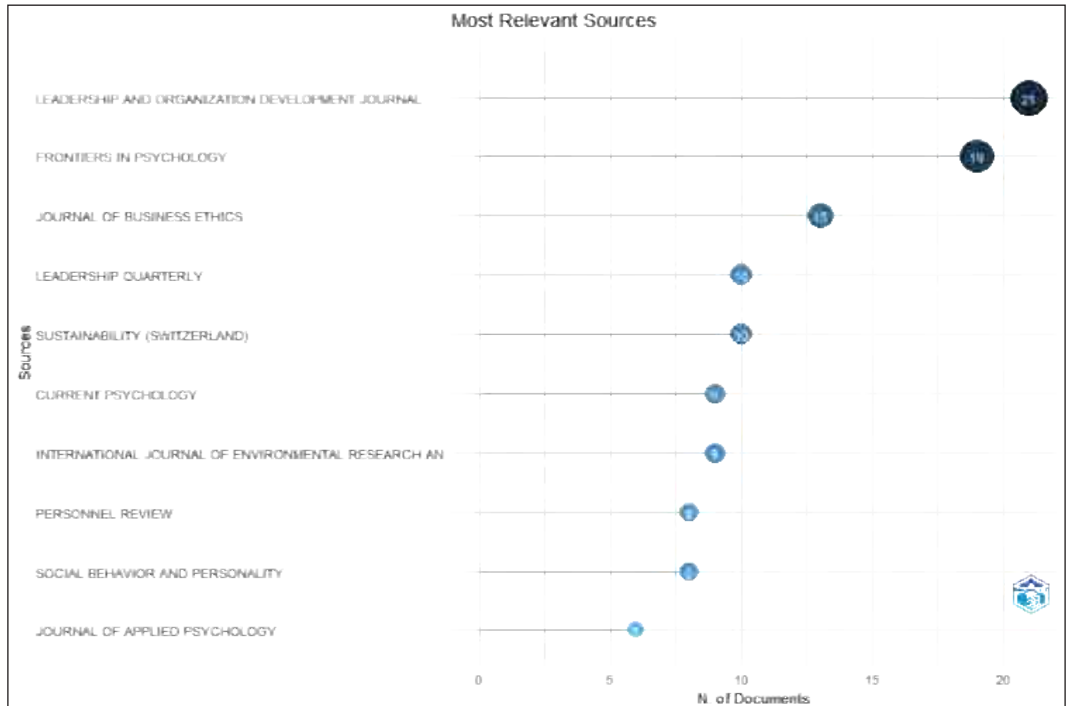
Source: (Bibliometrix R package)

**Figure 3. Annual total citations per year**



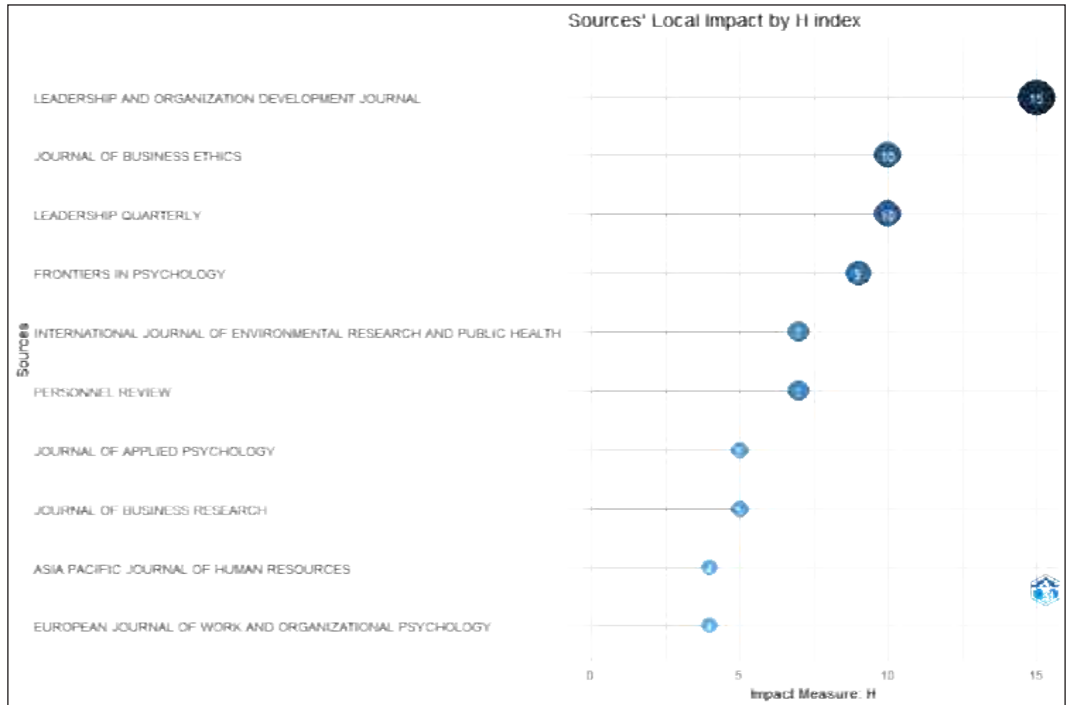
Source: (Bibliometrix R package)

**Figure 4. Most relevant sources**



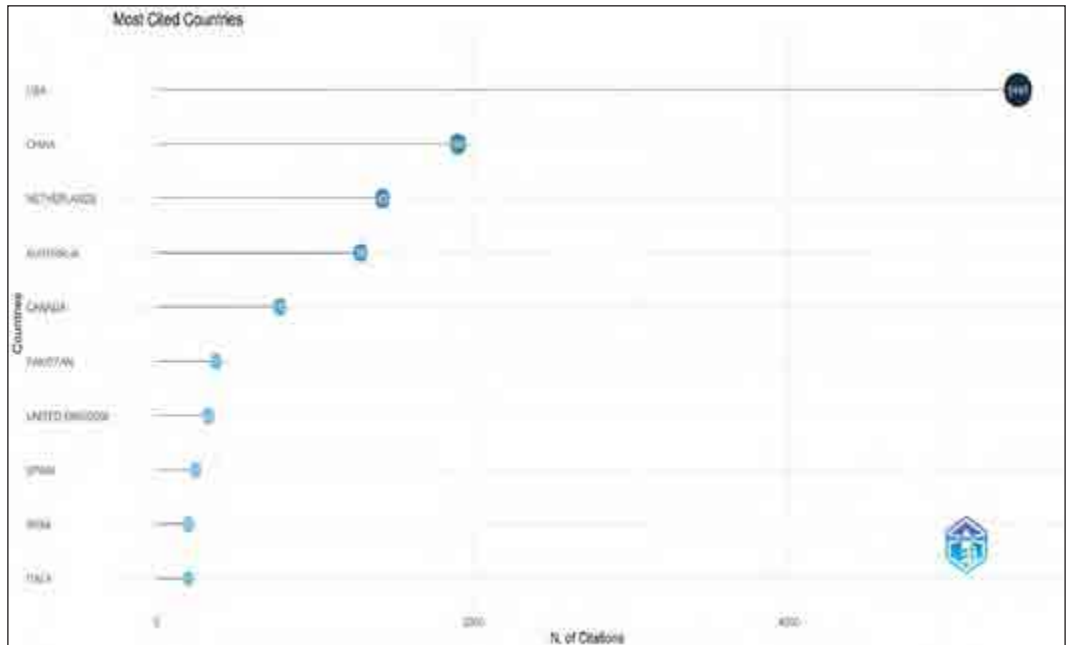
Source: (Bibliometrix R package)

Figure 5. Source's Local Impact by H index



Source: (Bibliometrix R package)

Figure6. Most cited countries

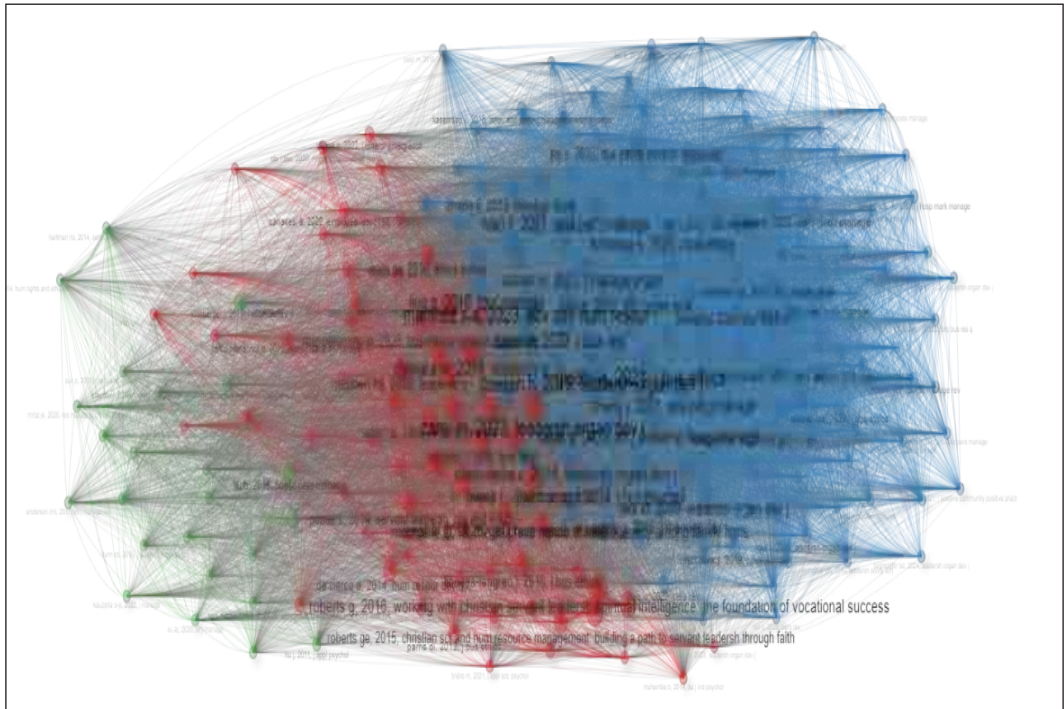


Source: (Bibliometrix R package)



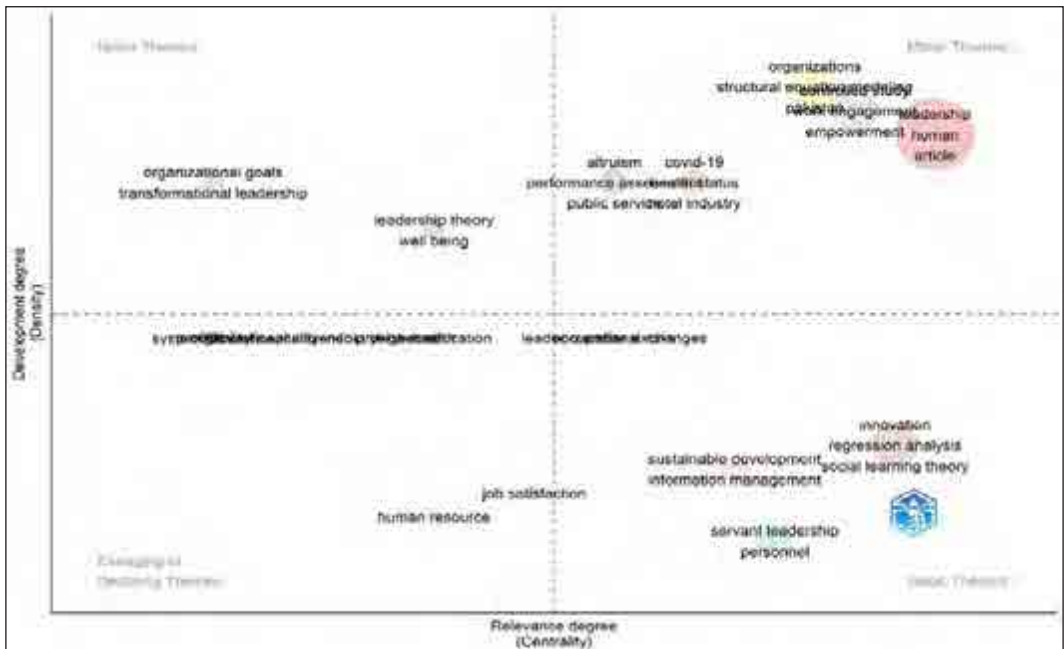


Figure 11. Clusters by Coupling



Source: (Bibliometrix R package)

Figure 12. Clusters by Thematic Coupling



Source: (Bibliometrix R package)



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# The Impact of Work-Force Management (WFM) Systems on Corporate Performance Measures (CPM): An Empirical Case Study

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## Abstract

The objective of the present article is to review the emerging concept of 'Work-Force Management (WFM)' with special reference to millennial hiring and gauge its impact on the overall corporate performance. The attributes of Work-Force Management (Independent Variable) were grouped into three categories: Business Planning, Talent Acquisition, and Employee Attitude. On the other hand, the Corporate Performance Measures (Dependent Variable) were classified into Organizational Efficiency and Employee Satisfaction. Descriptive statistics for each of these variables were computed and further analyzed based on the data collected from a closed-ended questionnaire survey. These questionnaires were designed for all the five bundles of the variables as mentioned above. The target organization for this study was a large-scale IT company. The results were critically analyzed to identify the 'Best Practices' of Work-Force Management (WFM) and perceptions on the Corporate Performance Measures (CPM) by the employees. It is anticipated that the findings from the present research will provide valuable insights for establishing an effective WFM system within any organizations.

**Keywords:** Work-Force Management (WFM), Corporate Performance Measures (CPM), Descriptive Analysis.

## Introduction

Work-Force Management (WFM) is a set of processes that optimizes employee productivity by forecasting resource needs and managing staff schedules effectively. It involves tracking daily performance to identify the improvement areas; ensuring the right person with the right skills is available at the right time. The primary goal of WFM is to enhance the organizational performance and competency, ensuring sufficient staffing with necessary skills to meet customer demands. This complexity is heightened by millennials, who expect a modern, technology-driven workplace free from the outdated systems. With Millennials expected to make up 75% of the workforce by 2025, organizations must adapt to this trend by creating a digital-friendly workplace model. Thus, corporate HR personnel need to play a crucial role in providing an effective WFM solution, especially with respect to the hiring of the Millennials (Dhal et al., 2021; Vogel & Zölch, 2021; Kumari, 2023).

The existing literature indicates a lack of research on how WFM best practices affect organizational performance. This study aims to investigate the relationship between WFM activities and various aspects of corporate performance, particularly considering the millennial workforce. The present research utilizes a quantitative survey model tailored for an IT industry to analyze these linkages. The article examines the concept of WFM with a focus on millennial recruitment and its impact on the overall corporate performance. The WFM characteristics are categorized into three bundles, namely Business Planning & Control (BPC), Talent Acquisition & Competency (TAC), and Employee Performance & Attitude (EPA), while CPM include two bundles - Organizational Culture & Efficiency (OCE), and Employee Satisfaction & Motivation (ESM). The survey data was collected through a closed-ended survey questionnaire having 115 questions prepared in consultation with experts and literature review. The analysis resulted into the identification of the best practices of WFM system under consideration, as well as employee perceptions on the CPM. It is expected that the findings will provide valuable insights for establishing an effective WFM system within any IT organization.

### **Research Design & Objective**

The attributes of the Workforce Management (WFM) variable, which is independent, have been categorized into three main bundles - Business Planning & Control (BPC), Talent Acquisition & Competency (TAC), and Employee Performance & Attitude (EPA). On the other hand, the attributes of Corporate Performance Management (CPM) variable, which is dependent, are bundled into two groups - Organizational Culture & Efficiency (OCE), and Employee Satisfaction & Motivation (ESM). The construct of both independent and dependent variables along with their operationalization, i.e. bundles along with their attributes (items) are shown in Table 1. Questionnaire sets were developed for all five bundles based on an extensive literature review and in-depth discussions with experts. Each question was coded for proper identification and reporting of the final analysis (refer to Annexure) (Guest, 2002; Becker & Huselid, 2006; Paauwe, 2009; Ashford et al., 2018).

It is assumed that the quantitative survey model employed in this research, which consists of close-ended questions, accurately represents the interactions between the items, bundles and variables under consideration. During survey, participants were informed that there are no right or wrong answers and they have to indicate their choices against each question (on a scale from 1 to 5). High score reflects the extent to which the organization advocates for and utilizes WFM best practices or impacted the CPM extreme and conversely. A score of 3 indicates that the individual has mixed outlook about the choice (Robertson-Smith & Markwick, 2009; Harris et al., 2010; Guest, 2011; Wang & Cotton, 2018). There were two overarching aims of the current research endeavor. First, it will examine the WFM best practices within a large IT organization, with a focus on recruiting and integrating millennials. It will also assess how these practices align with HR goals and contribute to overall corporate performance. Second, it will also analyze the impact of WFM strategies on the CPM, exploring their influence on the overall organizational and employee performance highlighting the importance of WFM in creating a productive workplace.

**Table 1: Details of Independent & Dependent Variables**

Variable Type	Variable Name (Code)	Bundle Name (Code)	Item Name (Code)
Independent	Work-Force Management (WFM)	Business Planning & Control (BPC)	<ul style="list-style-type: none"> <li>Forecasting &amp; Budgeting (FB)</li> <li>Resource Planning &amp; Usage (RU)</li> <li>Compensation Structure (CS)</li> </ul>
		Talent Acquisition & Competency (TAC)	<ul style="list-style-type: none"> <li>Resource Benchmarking (RB)</li> <li>Recruitments &amp; Competency Mapping (RM)</li> </ul>
		Employee Performance & Attitude (EPA)	<ul style="list-style-type: none"> <li>Employee Engagements (EE)</li> <li>Individual Performance Management (IP)</li> <li>Learning &amp; Development (LD)</li> </ul>
Dependent	Corporate Performance Measures (CPM)	Organizational Culture & Efficiency (OCE)	<ul style="list-style-type: none"> <li>CICD Approach (CA)</li> <li>Cliential Fulfillment (CF)</li> </ul>
		Employee Satisfaction & Motivation (ESM)	<ul style="list-style-type: none"> <li>Organizational Commitment (OC)</li> <li>People Business Partnering, Policies &amp; Processes (PP)</li> </ul>

**Preliminary Demographic Study**

The demographic questionnaire was distributed to the target group, which consisted of a total of 358 individuals. Following reminders, additional outreach, and the elimination of irrelevant or uninterested responses, as well as focusing on millennials with approximately 10 years of professional experience, the final sample size (N) reached 304, representing 85% of the initial lot size. This sample size was well within the acceptable range for conducting quantitative survey analysis (Huselid, 2018).

The descriptive statistics for the demographics and background characteristics of the sample size are presented in Table 2. The present survey used few assumptions, which are:

- The target sample considered were millennials, i.e. people born in or after the 1990’s within the age group of 20 to 35 years leading to employees having a total working experience of around 10 to 15 years.
- The subjects responded honestly, accurately, and without the influence of others during survey. Incomplete, unfilled, and erroneous responses to the questionnaire were considered invalid.

**Table 2: Individual Demographic Details**

Sl. No.	Questions	Count	Percent (%)
1.	<b>Total Work Experience (including present Organization)</b>		
	<b>Less than 1 Year</b>	66	18
	<b>1 - 5 Years</b>	120	34
	<b>6- 10 Years</b>	118	33
	Beyond 10 Years	52	15
2.	<b>Current Position in the Organization</b>		
	<i>Job Stage 1: DETs, GETs</i>	74	21
	<i>Job Stage 2: Engineers, Software Developers</i>	84	24



SD	1.11	0.84	0.88	0.89	0.89	0.87	0.89	0.93
I.Code	FB-9	FB-10	FB-11	FB-12	FB-13	FB-14	RU-1	RU-2
Mean	3.55	3.69	3.63	4.01	4.20	3.66	3.74	4.03
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.90	0.83	0.74	0.77	0.88	0.75	0.84	0.74
I.Code	RU-3	RU-4	RU-5	RU-6	RU-7	RU-8	RU-9	RU-10
Mean	4.07	2.52	4.13	3.76	4.01	3.78	4.02	3.76
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.80	0.80	0.80	0.831	0.81	0.79	0.77	0.78
I.Code	RU-11	CS-1	CS-2	CS-3	CS-4	CS-5	CS-6	CS-7
Mean	3.75	4.08	4.12	4.00	4.04	3.79	3.78	4.02
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.69	0.85	0.76	0.87	0.80	0.82	0.87	0.80
I.Code	CS-8	CS-9	CS-10					
Mean	2.53	4.04	4.06					
Median	4.00	4.00	4.00					
SD	0.84	0.79	0.77					
b). Talent Acquisition & Competency (TAC)								
I.Code	RB-1	RB-2	RB-3	RB-4	RB-5	RB-6	RB-7	RM-1
Mean	2.93	4.17	4.02	4.00	4.03	3.78	4.05	4.17
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.96	0.81	0.77	0.81	0.75	0.76	0.75	0.86
I.Code	RM-2	RM-3	RM-4	RM-5	RM-6	RM-7	RM-8	RM-9
Mean	4.03	4.18	4.10	4.07	3.78	4.05	2.53	3.78
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.79	0.82	0.79	0.83	0.68	0.76	0.74	0.86
I.Code	RM-10	RM-11	RM-12	RM-13				
Mean	4.01	4.03	3.74	3.72				
Median	4.00	4.00	4.00	4.00				
SD	0.82	0.80	0.72	0.77				
c). Employee Performance & Attitude (EPA)								
I.Code	EE-1	EE-2	EE-3	EE-4	EE-5	EE-6	IP-1	IP-2
Mean	4.12	4.07	4.18	4.00	3.77	3.87	4.09	4.18
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.80	0.65	0.78	0.78	0.74	0.76	0.82	0.70
I.Code	IP-3	IP-4	IP-5	IP-6	IP-7	IP-8	LD-1	LD-2
Mean	3.81	3.80	2.54	3.81	3.82	3.82	4.00	4.04
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.81	0.80	0.82	0.80	0.78	0.745	0.82	0.79
I.Code	LD-3	LD-4	LD-5	LD-6				
Mean	4.03	4.05	4.00	3.81				
Median	4.00	4.00	4.00	4.00				
SD	0.77	0.83	0.78	0.75				

2). CPM Variable (Dependent)								
a). Organizational Culture & Efficiency (OCE)								
I.Code	CA-1	CA-2	CA-3	CA-4	CA-5	CA-6	CA-7	CA-8
Mean	2.68	3.01	3.88	3.90	4.03	3.88	3.88	3.88
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.98	0.86	0.85	0.79	0.76	0.76	0.76	0.75
I.Code	CF-1	CF-2	CF-3	CF-4	CF-5	CF-6	CF-7	CF-8
Mean	4.17	4.05	4.02	3.94	3.81	2.59	3.83	3.83
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.86	0.68	0.79	0.75	0.79	0.76	0.78	0.80
b). Employee Satisfaction & Motivation (ESM)								
I.Code	OC-1	OC-2	OC-3	OC-4	OC-5	OC-6	OC-7	PP-1
Mean	4.14	4.01	4.06	4.02	4.03	3.82	3.82	4.03
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.85	0.70	0.79	0.75	0.72	0.82	0.80	0.77
I.Code	PP-2	PP-3	PP-4	PP-5	PP-6	PP-7	PP-8	PP-9
Mean	2.46	4.10	4.04	3.84	4.02	4.07	3.89	3.05
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.77	0.82	0.74	0.77	0.83	0.76	0.84	0.88
I.Code	PP-10	PP-11	PP-12	PP-13	PP-14	PP-15	PP-16	PP-17
Mean	4.00	4.00	4.06	4.07	4.08	4.00	4.05	3.88
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
SD	0.75	0.80	0.79	0.82	0.74	0.72	0.74	0.72

**Table 4:** Summary of the Construct Evaluation for Bundles & Items

Variables/ Bundles / Items	I.Code	Mean	SD
<b>a). Business Planning &amp; Control</b>	<b>BPC</b>	<b>3.70</b>	<b>0.37</b>
• Forecasting & Budgeting	FB	3.48	0.46
• Resource Planning & Usage	RU	3.78	0.42
• Compensation Structure	CS	3.85	0.46
<b>b). Talent Acquisition &amp; Competency</b>	<b>TAC</b>	<b>3.86</b>	<b>0.40</b>
• Resource Benchmarking	RB	3.86	0.47
• Recruitments & Competency Mapping	RM	3.86	0.42
<b>c). Employee Performance &amp; Attitude</b>	<b>EPA</b>	<b>3.91</b>	<b>0.38</b>
• Employee Engagements	EE	4.00	0.42
• Individual Performance Management	IP	3.73	0.46
• Learning and Development	LD	3.99	0.49
<b>d). Organizational Culture &amp; Efficiency</b>	<b>OCE</b>	<b>3.71</b>	<b>0.43</b>
• CICD Approach	CA	3.64	0.47
• Cliental Fulfilment	CF	3.78	0.46
<b>e). Employee Satisfaction &amp; Motivation</b>	<b>ESM</b>	<b>3.93</b>	<b>0.39</b>
• Organizational Commitment	OC	4.00	0.47
• People Business Partnering, Policies & Processes	PP	3.86	0.39

## Conclusions

- The majority of target employees (67%) had less than 10 years of experience, while 18% had under one year. Most (69%) were Senior Engineers or Architects, and 13% held Executive Director or Vice President positions. Employees with over 10 years of experience and those at job stage 4 were excluded from the survey. Only 6% had a PhD, with 86% holding undergraduate or postgraduate degrees, indicating a high overall qualification level. The organization had a balanced gender ratio, with 42% female and 4% identifying as 'Others'.
- The highest mean score has been allocated to EPA bundle (3.91) under WFM cluster whereas from CPM cluster its ESM bundle (with 3.93 mean score). Additionally, the highest scores have been awarded to items EE, and OC having mean scores of 4.00 each under WFM, and CPM clusters respectively. This indicates that the organization has an enthusiastic and dedicated workforce that values their contributions and is committed to organizational performance. Organization is focused on meeting the employees' basic needs and fosters inclusive work culture, emphasizing a high-performance work system over outdated HR practices. Thus, organization encourages 'Drive-to-Results' culture and provides adequate resources for effective execution of work, ensuring transparency and adaptability to changes. This indicates that a transparent communication channels exist at all levels within the organizational structure promoting loyalty, satisfaction, and alignment with the core values.
- The lowest mean score has been assigned to items FB and CA, i.e. 3.48 & 3.64 respectively. This indicates that the organization aims to enhance its forecasting and budgeting strategy, ensuring sufficient resources for effective WFM. Thus, it need to enforce strict adherence to the processes to keep the project budgets aligned and on-track as well as adoption of dynamic budgeting practices for a dynamically changing market conditions. To meet the future demands properly, the organization need to accurately analyze the staffing needs including precise revenue estimations based on the CTCs. They need to leverage the 'Gig Workforce' model to attract Gen-Z and Millennial talent, creating buffers for business needs and acquiring resources based on the skills. It is recommended that an effective use of the digital tools may help minimize the guesswork, and implement a robust CICD strategy.
- It has been found that the project budget is monitored through strategic initiatives that adapt to market changes and organization efficiently manage its resource utilization accordingly. The tasks are assigned based on team members' skills and resource allocation is managed dynamically, ensuring successful development of corporate social responsibility (CSR) initiatives. The organization emphasizes diversity and integrates corporate and societal cultures while maintaining the compliance with hiring regulations as a successful governance model. Also, it is noted that proper training is provided to help navigate hiring complexities, with clear criteria for performance evaluation and skill-matrix based 'Hire-the-Best' hiring strategy.
- The organization follows a comprehensive employment policy, which clearly outlines the compensation, probation, and termination processes. Compensation packages are competitive aligned to market standards and the automated payroll coupled with attendance systems enhances the efficiency. The employee benefits and recognition system are part of the organization's policy. Job satisfaction is prioritized through a comprehensive 'Rewards

and Recognition (R&R)' policy, with flexible working conditions supporting work-life balance. Also, the employee performance is continuously reviewed to align with the organizational goals, encouraging a culture of learning and collaboration within a positive work environment.

- The HRM policies were found to be integrated into the corporate decision-making and workforce KPIs support competency mapping, utilizing behavioral assessments and personal interviews to enhance hiring. Employees showed high engagement and commitment, feeling valued through policies promoting equality and accurate project deadlines were met. The Individual Performance Management (IPM) function is well placed and fosters planning, monitoring, development, and rewarding of the job activities.
- The company has effectively aligned resources to demand through competency mapping, i.e. 'Customer-First' approach, leading to high customer satisfaction. Resource costs are optimized with 'Job Stage' mapping, enhancing the overall efficiency. Employees showed loyalty and commitment, thriving in an inclusive and interconnected workplace that upholds core values. The organization champions gender diversity and also addresses PWD issues. Employees feel safe and supported, benefiting from health, well-being, and social security measures. Additionally, the leadership is caring and supportive creating a "Happier Workplace/ Great Place to Work" culture.
- It is noted that the organization lacks support for enterprise strategy for forecasting and budgeting activities and are poorly implemented. The 'Occupational Analysis Chart (OAC)' is underutilized, leading to inadequate identification of necessary skills for jobs. Employees show a lack of key cognitive and leadership abilities such as creativity, adaptability, and problem-solving skills. These areas of concern need to be addressed by the company.
- Respondents showed neutrality towards the 'Gig Workforce' model for Gen-Z and Millennials in contract roles and on the usage of an effective CI/CD strategy. This may negatively affect the customer satisfaction leading to poorly managed as client contracts by the sourcing team. The employees may find their work unfulfilling, resulting in low motivation leading to uncertainty in resource benchmarking with respect to hiring and retention activities. The compensation packages may also need a revision relative to market standards. Thus, there is a dire need for further examinations on these aspects, which may be conducted through direct interviews, to gain better insights and further corrective actions.

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## Annexure

### Survey Questionnaire

*Responses to be marked by providing ratings (on a scale of 1 – 5) which best describes the item:*

**1 - Strongly Disagree; 2 - Less Agree; 3 - Somewhat Agree; 4 - Highly Agree; 5 - Strongly Agree**

Part A - WFM Questionnaire	
I.Code	Questions/ Items
<b>(1). Business Planning &amp; Control (BPC)</b>	
<b>(a). Forecasting &amp; Budgeting (FB)</b>	
<b>FB-1</b>	<i>The organization supports enterprise strategy on the above function and there are adequate resources available to handle forecasting &amp; budgeting activities</i>
<b>FB-2</b>	<i>The forecasting &amp; budgeting activities are properly followed within the organization</i>
<b>FB-3</b>	<i>Adequate initiatives are implemented to keep the project budget &amp; work is on track</i>
<b>FB-4</b>	<i>Dynamic budgeting is practiced for resource allocation activity considering the changes in the external market conditions</i>
<b>FB-5</b>	<i>Information is gathered around unique requirements that need attention &amp; improvement</i>
<b>FB-6</b>	<i>Short, medium &amp; long terms staffing requirements are precisely analysed &amp; predicted</i>
<b>FB-7</b>	<i>Project revenues including “Cost-to-Company (CTC)” are correctly estimated for a specific period</i>

<b>FB-8</b>	<i>There is an appreciable use of the 'Gig Workforce' model employing Gen-Z &amp; Millennial workforce, who prefer to be employed in contractual roles</i>
<b>FB-9</b>	<i>Sufficient buffers are created based on future business needs &amp; requirements</i>
<b>FB-10</b>	<i>Requisite resources are determined &amp; acquired suitably based on the requirements &amp; skills</i>
<b>FB-11</b>	<i>Accurate forecast planning is made to achieve &amp; meet the precise scheduled deadlines</i>
<b>FB-12</b>	<i>Business cases for CSR are prepared &amp; implemented</i>
<b>FB-13</b>	<i>The company has balanced corporate &amp; societal cultures while promoting diversity</i>
<b>FB-14</b>	<i>There is a colossal use of appropriate digital tools and there is nil guess-work culture</i>
<b>(b). Resource Planning &amp; Usage (RU)</b>	
<b>RU-1</b>	<i>Resource planning, allocation &amp; deployment activities are adequately executed within the organization</i>
<b>RU-2</b>	<i>The company maintains a comprehensive understanding of regulations on the 'Hiring Laws'</i>
<b>RU-3</b>	<i>Resource usage, capacity, and progress are properly managed &amp; controlled including the utilization rates</i>
<b>RU-4</b>	<i>Project analysis &amp; job rotation activities are properly followed</i>
<b>RU-5</b>	<i>Tasks are allocated to team members based on their capacity, skill sets, and best fit for the job</i>
<b>RU-6</b>	<i>Total headcount including present headcount, yet-to-join, attrition, open positions, etc are accurately analysed</i>
<b>RU-7</b>	<i>The procedure to evaluate skill matrix, project duration, experience levels, resignations, etc are followed dutifully</i>
<b>RU-8</b>	<i>The company pursues "Analogue Capacity Planning (ACP)" through a proper "Competence Management System (CMS)"</i>
<b>RU-8</b>	<i>The governance model enables "Work Force Management (WFM)" personnel to focus &amp; prioritize important tasks</i>
<b>RU-10</b>	<i>The accepted changes are implemented within the organization according to the plan to bring the promised results as per competence management</i>
<b>RU-11</b>	<i>Skills @ local level, as well as global business leaders for future needs, are simultaneously identified and groomed</i>
<b>(c). Compensation Structure (CS)</b>	
<b>CS-1</b>	<i>The company follows a well-laid policy on the scope of employment, terms &amp; conditions on compensation, probationary period, and termination including alternative dispute resolution</i>
<b>CS-2</b>	<i>The company has a consummate compensation package &amp; structure as per market standards</i>
<b>CS-3</b>	<i>The information on pay &amp; benefits isn't locked up within the organization</i>
<b>CS-4</b>	<i>Value-additions in overall cost saving is a continuous process with an attempt to explore room for improvement</i>
<b>CS-5</b>	<i>The 'Compa-Ratio' &amp; 'Job-Stage' strategies are rightly implemented within the company</i>
<b>CS-6</b>	<i>The budgetary goals and objectives are conveyed to all levels of employees</i>
<b>CS-7</b>	<i>The payroll and attendance system are fully automated, as well as the routine recurring mundane tasks are completely standardized</i>
<b>CS-8</b>	<i>Reports are developed in 'Audit-Ready' formats for fast and efficient payment execution</i>
<b>CS-9</b>	<i>The employee benefits including liability protection are adequately designed &amp; implemented</i>
<b>CS-10</b>	<i>There is a formal reward system to recognize employee behaviour &amp; outcomes leading to the accomplishment of the organizational mission</i>

<b>(2). Talent Acquisition &amp; Competency (TAC)</b>	
<b>(a). Resource Benchmarking (RB)</b>	
<b>RB-1</b>	<i>The organization has adapted resource benchmarking as a 'Best Practice' for employee hiring &amp; retention</i>
<b>RB-2</b>	<i>The employees are trained &amp; prepared to handle the complexities of hiring, managing &amp; integrating resources</i>
<b>RB-3</b>	<i>There is a defined criterion in your organization - What makes an employee excellent/ average/ poor in a position</i>
<b>RB-4</b>	<i>The company follows policy on 'Hire-the-Best' strategy</i>
<b>RB-5</b>	<i>The process to assess &amp; determine the type of personnel needed in the future, (i.e. what to look for in future employees) is well-established</i>
<b>RB-6</b>	<i>"Talent Acquisition Metrics (TAM)" is properly implemented, which includes details like time-to-fill, cost per hire, acceptance rate, etc</i>
<b>RB-7</b>	<i>Employees understand the job requirements (i.e. job description) against the skill matrix</i>
<b>(b). Recruitments &amp; Competency Mapping (RM)</b>	
<b>RM-1</b>	<i>The company has a clear matrix on 'Recruitments &amp; Competency Mapping (RCM)'</i>
<b>RM-2</b>	<i>HRM (Human Resource Management) policies are properly incorporated into the corporate strategic decision-making</i>
<b>RM-3</b>	<i>The project delivery deadlines are accurately created to meet the legal &amp; contractual requirements</i>
<b>RM-4</b>	<i>Employee qualifications, personal working time preferences &amp; availability are taken into consideration while executing resource allocation activity</i>
<b>RM-5</b>	<i>Workforce KPIs (Key Performance Indicators) are properly established within the company</i>
<b>RM-6</b>	<i>Employee skills (i.e. abilities, knowledge &amp; behaviours) are appropriately identified &amp; mapped</i>
<b>RM-7</b>	<i>Different types of competency mapping are followed as per suitability &amp; requirement</i>
<b>RM-8</b>	<i>"Occupational Analysis Chart (OAC)" is used effectively, e.g. skills required to operate effectively &amp; efficiently in a specific job are aptly identified</i>
<b>RM-9</b>	<i>Competency mapping uses training test scores, performance appraisals &amp; managerial ratings</i>
<b>RM-10</b>	<i>There is an effective use of behavioural &amp; soft skills assessments including personality tests</i>
<b>RM-11</b>	<i>The personal interviews are designed to highlight the areas that require additional probing &amp; objectivity without any biases</i>
<b>RM-12</b>	<i>The benchmark for core competency standards, e.g. innovation, creativity, technical expertise, quality, customer orientation, etc are designed as per an acceptable level</i>
<b>RM-13</b>	<i>The performance standards/ levels for each skill are created &amp; mapped using a competency-based rating scale</i>
<b>(3). Employee Performance &amp; Attitude (EPA)</b>	
<b>(a). Employee Engagements (EE)</b>	
<b>EE-1</b>	<i>The employees are highly enthusiastic &amp; dedicated to their job</i>
<b>EE-2</b>	<i>The employees are engaged and they care about their work &amp; organizational performance</i>
<b>EE-3</b>	<i>There is a deliberate act to make the employee feel that their efforts make a difference</i>
<b>EE-4</b>	<i>The company has a policy to look into employee's basic needs &amp; treat them equal</i>
<b>EE-5</b>	<i>There is a strategic approach to creating &amp; sustaining high-performance work (HPWS) culture as an alternative to outdated HR practices</i>

<b>EE-6</b>	<i>There is an effective communications system within all levels of the organization</i>
<b>(b). Individual Performance Management (IP)</b>	
<b>IP-1</b>	<i>The organization has properly implemented the “Individual Performance Management (IPM)” function which includes planning, monitoring, developing, rating &amp; rewarding activities</i>
<b>IP-2</b>	<i>The actual performance of employees is compared with the established standards &amp; appraisals are threadbare discussed along with recommendations for personnel action plans</i>
<b>IP-3</b>	<i>Different type of performance review methods is established within the organization to measure the employee performance standards, e.g. self-evaluation, behavioural checklist, 3600 feedbacks, management by objectives, rating scales, etc</i>
<b>IP-4</b>	<i>The employees have a high level of communication, articulation &amp; interpersonal skills</i>
<b>IP-5</b>	<i>The employees have a high level of cognitive &amp; leadership skills, e.g. creativity, persuasiveness, persistence, self-confidence, adaptability, problem-solving aptitude</i>
<b>IP-6</b>	<i>The employees have a high level of honesty, integrity &amp; a strong sense of duty</i>
<b>IP-7</b>	<i>Leaders act as role models and share their success stories</i>
<b>IP-8</b>	<i>The present system enables employees to track their progress in a gradual phase-wise manner</i>
<b>(c). Learning &amp; Development (LD)</b>	
<b>LD-1</b>	<i>The organization has a conducive culture of learning, competence-built &amp; development of an effective &amp; efficient workforce</i>
<b>LD-2</b>	<i>The work culture is rightly aligned with organizational vision, mission, goals, objectives, culture, policies, procedures, etc</i>
<b>LD-3</b>	<i>The continuous process of planning, coaching &amp; reviewing employee performance is effectively executed</i>
<b>LD-4</b>	<i>Employee fulfill &amp; meet the organizational targets/ goals by bringing out their best</i>
<b>LD-5</b>	<i>The company advocates employee engagement &amp; teamwork</i>
<b>LD-6</b>	<i>The creation of a conceptual &amp; socially skilled workforce is the mainstream strategy of the organization</i>
<b>Part B - CPM Questionnaire</b>	
<b>(1). Organizational Culture &amp; Efficiency (OCE)</b>	
<b>(a). CICD Approach (CA)</b>	
<b>CA-1</b>	<i>The organization follows a “Continuous Integration &amp; Continuous Delivery (CICD)” strategy for customer satisfaction &amp; delight</i>
<b>CA-2</b>	<i>All the stages of CICD is implemented properly during the software development lifecycle</i>
<b>CA-3</b>	<i>The company follows strict project delivery deadlines to meet expected levels of profits, productivity &amp; resource efficiency</i>
<b>CA-4</b>	<i>The historical forecasting &amp; optimized scheduling activities are proactively planned</i>
<b>CA-5</b>	<i>There is a complete alignment of ‘Resource-to-Demand’ based on competency mapping</i>
<b>CA-6</b>	<i>Jobs are assigned to the right resources with proper delegation, i.e. right people to the right tasks at the right time with the right quantity/ quality of work</i>
<b>CA-7</b>	<i>The staffing forecasts including detailed reports aligned with business needs are engendered resulting in informed business decision-making</i>
<b>CA-8</b>	<i>The organization follows risk mitigation plans for possible future scenarios</i>
<b>(b). Cliental Fulfilment (CF)</b>	
<b>CF-1</b>	<i>The company follows a strict rule of a ‘Customer-First’ approach</i>

<b>CF-2</b>	<i>There is a high level of customer satisfaction &amp; experience across the channels</i>
<b>CF-3</b>	<i>The resource costs are appropriately optimized using the 'Job Stage' mapping</i>
<b>CF-4</b>	<i>Organizational decisions are data-driven based on reliable information/ data</i>
<b>CF-5</b>	<i>Employees rely on &amp; use technology/ statistics to gain insight on overtime, absenteeism &amp; employee requests</i>
<b>CF-6</b>	<i>The client/ partner contracts are properly negotiated &amp; approved through sourcing team</i>
<b>CF-7</b>	<i>The customer service delivery model is designed primarily to decrease the customer turnover rate</i>
<b>CF-8</b>	<i>Ample research on market competition is conducted to make the data available to leaders for proper decision-making</i>
<b>(2). Employee Satisfaction &amp; Motivation (ESM)</b>	
<b>(a). Organizational Commitment (OC)</b>	
<b>OC-1</b>	<i>The employees are loyal, satisfied, committed &amp; highly motivated</i>
<b>OC-2</b>	<i>The workforce community is inclusive, welcoming &amp; connected</i>
<b>OC-3</b>	<i>The employees accept &amp; follow organizational core values</i>
<b>OC-4</b>	<i>The organizational core culture fosters a 'Drive-to-Results' policy</i>
<b>OC-5</b>	<i>There is adequate resource accessibility to execute work properly</i>
<b>OC-6</b>	<i>The communication channels within the organization are effective &amp; seamlessly interconnected ensuring complete workplace transparency</i>
<b>OC-7</b>	<i>The impact of unforeseen changes is reduced by the usage of "Technology@Work"</i>
<b>(b). People Business Partnering &amp; Policies (PP)</b>	
<b>PP-1</b>	<i>The leaders are caring, reliable &amp; supportive</i>
<b>PP-2</b>	<i>Employee perceive their work as meaningful, fulfilling &amp; sustainable, i.e. there is a high desire for work</i>
<b>PP-3</b>	<i>Employees perceive an organization as a "Happier Workplace/ Great Place to Work (GPTW)"</i>
<b>PP-4</b>	<i>The work environment is focused on job satisfaction &amp; employee motivation</i>
<b>PP-5</b>	<i>There is an adequate opportunity for career development, advancement &amp; promotions</i>
<b>PP-6</b>	<i>The company has a proper "Rewards &amp; Recognition (R&amp;R)" policy</i>
<b>PP-7</b>	<i>The employee perceive that their work is satisfying</i>
<b>PP-8</b>	<i>There is a high level of job security &amp; employee attrition rate is low</i>
<b>PP-9</b>	<i>The total compensation packages are competitive &amp; as per market standards</i>
<b>PP-10</b>	<i>There is flexibility in working conditions/ hours and work-life balance is encouraged</i>
<b>PP-11</b>	<i>The company encourages gender diversity &amp; PWD issues</i>
<b>PP-12</b>	<i>People-at-Work perceive a high level of personal safety @ workplace</i>
<b>PP-13</b>	<i>There is ample support for employee health, well-being, and welfare including social security measures</i>
<b>PP-14</b>	<i>The geographic ties are proper &amp; travel demands are reasonable</i>
<b>PP-15</b>	<i>Organizations provide ample opportunities for interpersonal collaborations</i>
<b>PP-16</b>	<i>The employee training is adequate, effective &amp; enriching</i>
<b>PP-17</b>	<i>Employees have good work-life balance, i.e. good mental health &amp; no stress/ burn-out issues</i>



# Students psychological well-being and suicidal ideation: Exploring mediating and moderating mechanisms

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## Abstract

**Purpose :** Considering the significance of students' academic health to suicidal thoughts, this investigation aims to look at resilience's mediation function between academic stress, non-academic stress, and suicidal ideation, taking into account the moderating effect of coping on students' academic well-being and resilience connection.

**Design/methodology/approach :** The data were gathered from students studying in the southern part of India using non-convenient sampling. There were 456 answers in all. Using the structural equation modeling method, hypotheses were evaluated and Hayes's Model 1.

**Findings :** Results indicate that the relationship between students' academic well-being and resilience is mediated. (academic stress and non-academic stress) and the student's suicidal ideation. In addition, coping buffers the association between students' academic well-being (academic stress and non-academic stress) and resilience.

**Practical implications :** The study's findings imply that supporting students' academic well-being could be beneficial to the educational setting. On the other hand, kids may develop negative views regarding their academic performance if measures meant to ensure a stronger coping mechanism are not implemented and suicidal behaviors.

**Originality/value :** In two respects, the study adds to the body of knowledge already available on students' academic well-being. Initially, through analyzing academic wellness in terms of academic stress and non-academic stress, welfare with attitudes toward academia and suicidal thoughts and actions.

**Keywords:** students' well-being, academic stress, non-academic stress, coping, and resilience

## 1. Introduction

The Health Promoting School (HPS) method was introduced by the World Health Organization (WHO) in the early 1980s. It promotes positive organizational change, like improving a school's physical and social environment, and healthy student development, curriculum, teaching and learning methods, and curricula (Nutbeam, 1987; The Bangkok Charter for Health Promotion, 2005). According to national statistics, there was a 31% increase in suicide rates among teenagers between the ages of 13 and 15 in 2010. The second leading cause of death for teenagers is suicide. (Centers for Disease Control and Prevention, 2016; Twenge, Joiner, Rogers,

& Martin, 2018). Since the onset of suicidal thoughts usually occurs during the transition into adolescence, this is an important time to identify risk and protective factors as well as the connections between them (Kessler, Borges, & Walters, 1999; Nock et al., 2013). Teen suicide has grown to be a serious public health issue in recent years. Suicide is one of the top five causes of mortality for young people worldwide, taking the lives of over 46,000 teenagers annually, according to UNICEF's 2021 State of the World's Children report. According to Ribeiro et al. (2016), suicidal conduct is commonly understood as a spectrum of intensity that ranges from passive death wishes to suicide ideation, planning, and attempts. One important component of suicide intervention is the identification of suicidal ideation as a critical risk factor for suicide. According to studies, the second most common cause of adolescent death is now suicide. Breslin et al., 2020 and Brent et al., 2015 Additionally, about 8,00,000 people globally commit suicide each year, projected to be between 10 and 20 million additional suicide attempts. 2014 World Health Organization Conversely, suicidal ideation has the potential to predict suicide and plays a crucial role in averting suicidal conduct in teenagers, so aiding in the prevention and intervention of suicidal behavior. (Zhu X and others, 2019) Teens' health is known to be negatively impacted by academic stress because it can lead to unhealthy coping mechanisms like alcohol and tobacco use (Glozah & Pevalin, 2014). Significantly, rather than emphasizing outcomes, some psychologists suggested that resilience plays a part in delivering upgrades and preventions (Southwick et al., 2014). Studies on suicidal issues have consistently demonstrated a negative relationship between suicidal ideation and resilience (Gooding, Johnson, Wood, Taylor, & Tarrier, 2011; Southwick et al., 2014a), with a lower incidence of suicidal thoughts being associated with a higher resilience level. The term "peer bullying victimization" describes the aggressive behavior—both physical and verbal—that students encounter from their classmates in their social interactions on campus. 21 According to a study, secondary school pupils' suicidal thoughts were significantly influenced by their experiences with discrimination and humiliation. According to S. L. Mcmanimen et al. (2021), adolescents who grow up in stressful environments may exhibit heightened stress responses, which may act as a stand-in for maladaptive coping mechanisms that could mitigate the link between persistent sleep issues and the subsequent emergence of suicidal thoughts. Our main goals in this study are to determine how resilience influences academic stress, non-academic stress, and suicide ideation, as well as how coping influences these same variables in a moderating way. Since this relationship has not been studied before, the following questions are meant to fill the knowledge gap in this study: research questions (RQs):

RQ1: How do academic stress and non-academic factors affect resilience?

RQ2: How do academic stress and non-academic factors affect suicidal ideation?

RQ3: What role does coping play in moderating the link between suicidal thoughts and Academic stress?

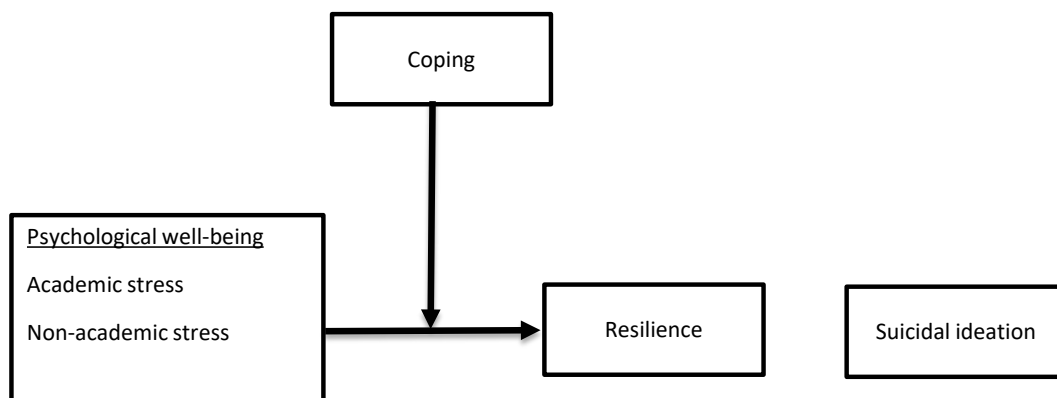
RQ4: In what ways can coping moderate the connection between suicidal thoughts and non-academic stress?

The current study contributes to the domains of study on student psychological well-being and suicide by integrating the literature in these areas. Initially, we add to this field of study by examining the direct and indirect relationship between students' academic, and non-academic well-being and their suicidal ideation. We propose that students' resilience influences suicidal ideation by way of psychological well-being, specifically regarding academic and non-academic stress. Second, earlier studies have demonstrated that the effects of well-being vary. Among

people, indicating the presence of putative moderators affecting the connection between students' well-being and coping. The suggested research model is shown in Figure 1

### 1.1 Research Model

Figure 1



## 2. Theoretical framework and Hypothesis development

As a result, it has been suggested that resilience and the resilience theory could aid in healing at a more profound, gentler, and effective level (Richardson, 2002). It has been suggested that having an optimistic outlook on oneself, the world, and the future mediates the association between resilience and happiness (Mak et al., 2011). Many resilient pupils can adjust well, even though stress is commonplace in contemporary educational settings (Chow et al., 2018; Pooley & Cohen, 2010). To learn more about how individuals develop resilience and cope with stress in a variety of unsettling and frightening circumstances, psychologists have been examining the individual variations in traits, convictions, and dispositional qualities. (Duan, 2016; Hobfoll, 1989; Ryff, 2014). Helgeson, Reynolds, Siminerio, Becker, and Escobar (2014) have pointed out that the paradigm in resilience research has shifted from looking at risk factors that lead to psychological stress to looking at an individual's strengths. To do this, it is necessary to make an effort to pinpoint protective variables, such as personal resources, and how they affect a person's psychological health (Southwick, Pietrzak, Tsai, Krystal, & Charney, 2015). The mechanisms of resourcefulness and perceived control of stress were examined by the researchers to gain a better understanding of the relationships between academic stress and students' resilience, university adaptation, and physical health. According to Ungar (2010), resilience theory outlines a dynamic mechanism that allows a person to withstand or overcome significant stress or adversity. Additionally, resilience theory emphasizes an individual's protective variables over their exposure to risk factors (Khanlou and Wray 2014). According to Wolin & Wolin (1993), a resilient individual demonstrates social competence (asking for help from peers and adults), problem-solving abilities, confidence, independence in acting and planning, a sense of purpose, and an optimistic outlook. Resilience is essential for helping students overcome obstacles, maintain their well-being, and finish their studies, as evidenced by the literature on higher education (Beltman, Mansfield, & Price, 2011; Howe, Smajdor, & Stockl, 2012; McAllister & McKinnon, 2009; Reyes et al., 2015). In light of the aforementioned arguments and the empirical data at hand, we propose the ensuing hypothesis:

### **2.1 H1 Academic Stress is positively related to Resilience**

Suicidal ideation is more likely to occur in students who are under a lot of academic stress (Ang and Huan, 2006). In addition to these direct correlations, psychopathological variables such as psychological distress (Thompson et al., 2011b), hopelessness (Dixon et al., 1992), and depression (Yang & Clum, 1994) have been studied as potential mediators of the relationship between life stress and suicide ideation; resilience has received less attention from researchers. Moreover, negative psychological symptoms have been connected to increased levels of acculturative stress and difficult adaptation processes, suicidal thoughts, and poorer levels of happiness, according to a recent study of Korean immigrant teenagers (Cho & Haslam, 2010; Shin, Han, & Kim, 2007). Therefore, the stressors related to the process of adaptation have a variety of detrimental effects on the lives of immigrant teenagers. Considering the aforementioned justifications and the empirical evidence, we offer the following hypothesis:

### **2.2 H2 Non-academic stress is positively related to resilience**

Numerous sociodemographic, environmental stressors, and psychological factors have been proposed as potential triggers for suicidal ideas and actions (e.g., Fortuna, Perez, Canino, Sribney, & Alegria, 2007; Hawton, Sutton, Haw, Sinclair, & Deeks, 2005; Hawton, Sutton, Haw, Sinclair, & Harriss, 2005; Hawton & van Heeringen, 2009). For instance, it has been discovered that substance abuse (Hawton & van Heeringen, 2009), family conflict (Fortuna et al., 2007), and handgun ownership (Willis, Coombs, Drentea, & Cockerham, 2003) are all linked to suicide risk. These findings can serve as targets for suicide treatments. The term “peer bullying victimization” describes the aggressive behavior—both physical and verbal—that students encounter from their classmates in their social interactions on campus. A study found that exposure to discrimination and humiliation were essential factors impacting secondary school students’ suicidal thoughts (Cevik 2020). Considering the aforementioned justifications and the empirical data at hand, we propose the following theory.

### **2.3 H3 Resilience is positively related to suicidal ideation**

The growth of resilience, effective coping mechanisms, and stress management has also been connected to several parental characteristics. Effective coping mechanisms and the development of self-esteem are two benefits of authoritative parenting (Buri, Louiselle, Misukanis, & Mueller, 1988). However, studies have shown that different parenting philosophies may negatively affect people’s stress-reduction mechanisms, which may then affect their psychological well-being (Cui, Graber, Metz, & Darling, 2016; Ogilvie, 2006). For example, excessive control or overprotection from parents can hinder the development of healthy coping mechanisms. Reduced perception of mastery and perceived competence are linked to excessive control (Affrunti & Ginsburg, 2012). For instance, McLeod, Wood, and Weisz (2007) discovered a considerable link between parental overcontrol and anxiety issues in kids. Poor emotion-regulation techniques have also been connected to overbearing parents (Manzeske & Stright, 2009). These factors can then influence psychopathology, self-harm, and suicidal thoughts and actions. In light of the aforementioned reasoning and the empirical data at hand, we propose the following hypothesis:

### **2.4 Resilience as a mediator**

It has been suggested that having an optimistic outlook on oneself, the world, and the future mediates the association between resilience and well-being (Mak et al., 2011). Research (Cleverly & Kidd 2011) revealed that while increased psychological distress was linked to

higher suicide ideation, teens' perceived resilience was connected with reduced suicidal ideation. Moreover, suicidal ideation has been connected to depression, and suicidal ideation has also been associated with anxiety, mental health, resilience, and daily stressors (Thompson et al., 2011b). Once more, in individuals who had previously attempted suicide, resilience factors like social resources and familial cohesiveness were positively and depressingly connected with depression, interactive sensitivity, and humiliation (Clum & Febbraro 1994). In light of the aforementioned reasoning and the empirical data at hand, we propose the following hypothesis:

H3a. Resilience mediates the association between suicidal thoughts and academic stress.

H3b. Resilience mediates the association between non-academic stress and suicidal ideation.

#### ***2.5 H4 Coping moderates the affiliation between academic stress, non-academic stress, and suicidal ideation.***

The findings of Yongju Yu and Min He (2023) demonstrate the protective functions of coping humor and life purpose in the relationship between perceived stress from interpersonal relationships and SI in Chinese university students. These findings offer practitioners practical guidance on suicide prevention and intervention. According to Endler and Parker (1990), coping strategies have a big impact on how people react to stressful life events, including suicidal thoughts and actions. A single study (1995; Wilson et al.) that looked into stress, coping mechanisms, and teen suicide attempts discovered that those who attempted suicide were less likely to genuinely employ coping mechanisms than those who did not. It has been seen in a variety of samples that people who attempt or consider suicide more frequently either lack developed coping skills and methods or use them less frequently (Botis et al., 1994; Kaslow et al., 2002; Kralik & Danforth, 1992). Furthermore, some attempters have stated that suicide is their major coping mechanism for stressful situations, even while they are using coping measures. In light of the aforementioned reasoning and the empirical data at hand, we propose the following hypothesis:

### **3. Method**

#### ***3.1 Sample and procedure***

The purpose of this study is to evaluate the effect of suicide ideation among students in South India's education sector. We created a meticulously designed survey tool and dispersed it to students across multiple campuses. We utilized English in the survey instrument because it was the language of instruction in these institutions. We used Google Forms to collect data and provided the students with the survey link on the Web. Mid-March 2024 saw the beginning of the data collection, which ended in mid-April 2024. We got in touch with some students directly and made sure they filled out surveys because social separation was not necessarily necessary. We asked the respondents to be as impartial as possible and informed them that the information would be kept private and used for academic purposes. According to (Krejcie and Morgan 1970), the minimum required sample size is 384. So, Non-probability sampling based on convenience was employed. Numerous researchers have adopted this strategy. (Chidambaram et al., 2022). We generated 488 surveys, out of which 32 were incomplete. As a result, we included 456 surveys in the analysis.

#### ***3.2 Measures***

After reviewing the literature, we created a self-administered survey with scale questions that were modified from tried-and-true measurements. Every signal was assessed using a 5-point

Likert-type scale. (‘1’ ¼ “strongly disagree” and ‘5 ¼ “strongly agree”). All the measures and sources of measures are presented in the Appendix. The survey was administered to the participants in English. English is the official language of correspondence for school students in the Southern part of India. All the constructs came from previous research and were anchored on a five-point Likert scale ranging from 1 = Strongly disagree to 5 = Strongly agree.

**Stress.** We measured Student stress with two sub-dimensions, namely, academic stress and nonacademic stress. Academic stress was measured using seventeen items (Dalia bedewy and Adel gabriel 2015). A sample item is “competition with my peers for grades is quite intense” (a = 0.86).

**Non-academic stress** was measured using fourteen items (Narayanaswamy Jagannathan et al.,2022). The sample items are “Problem in communication with opposite gender” and “worry about parents’ expectations” (a = 0.86).

**Resilience.** The resilience commitment was measured using an eighteen-item inventory developed by Simon Cassidy 2016). The sample items are “I would use the feedback to improve my work” and “I would begin to think my chances of success at university were poor” (a = 0.91).

**Coping.** Coping was measured using a sixteen-item inventory developed by (Carver et al.,1989). The sample items are “I take additional action to try to get rid of the problem” and “I try to come up with a strategy about what to do” (a = 0.87).

**Suicidal ideation.** We measured student suicidal ideation with the ten-item inventory developed by (Efi Fitriana et al., 2022). The sample items are “I just wish my life would end, which is mentioned in the suicidal desire” and “I have come close to taking my own life” (a = 0.87).

### 3.2 Demographic profile of the respondents

**Table 1 – Demographic profile of the respondents**

Category	Profile	Total number	Percentage
Gender	Male	399	88
	Female	57	12
Age	14-15 Years	150	33
	16 Years	75	16
	17 Years	98	21
	18 years above	133	29
Grade	9th Standard	150	33
	10th Standard	75	16
	11th Standard	98	21
	12th Standard	133	29
Syllabus	CBSE: Central Board of Secondary Education	100	22
	CISCE: Council for the Indian School Certificate Examinations	122	27
	IB: International Baccalaureate	103	23
	IGCSE: International General Certificate of Secondary Education	31	0.07
	State Board: State Government Recognized Board	100	22

Preparing for competitive exam	NEET	152	33
	JEEE	128	28
	OTHERS	176	39
Geographical Location	URBAN	165	36
	SEMI-URBAN	128	28
	RURAL	163	36
Mode of Living	Hostel	168	37
	Day-Scholar	125	27
	Private Lodge	58	13
	Others	105	23
Total		456	100%

## 4. Results

### 4.1 Descriptive statistics

Table 2 displays the study variables’ means, standard deviations and correlations.

Variables	Mean	SD	AVE	ASV	1	2	3	4	5
Academic Stress	3.82	0.64	0.67	0.026	(0.92)				
Non-Academic Stress	3.66	0.72	0.53	0.013	0.35**	(0.90)			
Resilience	3.91	0.87	0.64	0.018	0.31**	0.42**	(0.91)		
Coping	2.88	1.01	0.63	0.024	- 0.19**	-0.25**	-0.26**	(0.89)	
Suicidal ideation	4.01	0.69	0.61	0.008	0.21**	0.34**	0.49**	-0.15*	(0.92)

Notes: N = 456. AVE = average variance extracted, ASV = average shared variance, reliability coefficients (shown in the diagonal position of the table in parentheses). \*p < 0.05, \*\*p < 0.01

### 4.2 Construct validity

The author used AMOS 22.0 to perform a series of confirmatory factor analyses (CFAs) to assess the distinctiveness of our study variables before testing hypotheses. Model fitness was evaluated using the comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR), by Hu and Bentler’s (1999) recommendations. Table 2 illustrates the CFA results, which showed that the standard five-factor model (academic stress, non-academic stress, resilience, coping, and suicidal ideation) was significantly better than the alternative models. These included a four-factor model ( $\chi^2 = 203.056$ , Ddf = 6), a three-factor model ( $\chi^2 = 308.99$ , Ddf = 8), and a one-factor model ( $\chi^2 = 560.77$ , Ddf = 11) in which all items loaded on one construct, academic stress, and non-academic stress were considered as one construct. Thus, the outcomes offered evidence in favor of the unique characteristics of our research variables. We first used the average variance extracted (AVE) to check the convergent validity of our measurements to make sure they were valid. We discovered that AVE scores exceeded the cutoff point of 0.5 (Table 1; Fornell and Larcker, 1981), indicating that our constructs are convergent. By comparing each construct’s AVE with the average shared variance (ASV), or the mean of the squared correlations between the constructs, we were also able to determine discriminant validity (Hair et al., 2010). As

anticipated, discriminant validity was supported by all AVE values being greater than ASV constructs (Table 1).

#### 4.3 Common method variance

We used the following methods to look for common method variance (CMV):

- Harman's one-factor test.
- CFA

Five factors with eigenvalues larger than 1.0 explained 69.12% of the variance in the exogenous and endogenous variables, according to Harman's one-factor test. The single-factor model did not adequately fit the data, according to the CFA results ( $\chi^2 = 937.88$ ,  $df = 210$ ,  $CFI = 0.126$ ,  $SRMR = 0.122$ ,  $RMSEA = 0.136$ ). These tests indicated that CMV wasn't a significant problem for this research.

#### 4.4 Hypotheses testing

A structural model in AMOS 22.0 (Figure 2) was used to evaluate the mediation-related hypotheses, and it showed a respectable goodness of fit ( $\chi^2 = 298.01$ ,  $df = 175$ ,  $CFI = 0.97$ ,  $RMSEA = 0.04$ , and  $SRMR = 0.04$ ). In SPSS, hypotheses regarding moderation were examined (25th edition) PROCESS Model 1 (Hayes, 2017; Table 3) was utilized.

**Table 3 - Results of confirmatory analysis of study measures**

Model	X2	Df	Dx2	Ddf	CFI	RMSEA	SRMR
Model 1 (hypothesized five-factor model)	377.11**	199	-	-	0.971	0.034	0.044
Model(four-factor model: combines AS and NAS)	580.16**	205	203.05**	6	0.865	0.081	0.110
Model 3(three-factor model: combines AS,NAS and RES)	686.10**	207	308.99**	8	0.780	0.101	0.117
Model 4(one-factor)	937.88**	210	560.77**	11	0.642	0.136	0.122
Notes: N =456. AS = academic stress, NAS = non-academic stress, RES= resilience, SU= suicidal ideation							

Chi-square is represented by the symbol  $\chi^2$ , degree of freedom by the symbol  $df$ , root mean square error of approximation (RMSEA) by the symbol SRMR, and comparative fit index by the symbol CFI. \*\* $p < 0.01$

H1 and H2 suggested that academic stress and non-academic stress positively relate to resilience. The findings show that resilience is positively correlated with both academic stress ( $b = 0.26$ ,  $p < 0.01$ ) and non-academic stress ( $b = 0.32$ ,  $p < 0.01$ ), as shown in Figure 2. When combined, these two results provide credence to H1 and H2. In H3, we hypothesized a favorable correlation between suicidal ideation and resilience. Resilience was found to positively predict suicidal ideation ( $b = 0.41$ ,  $p < 0.01$ ), hence confirming hypothesis H3.

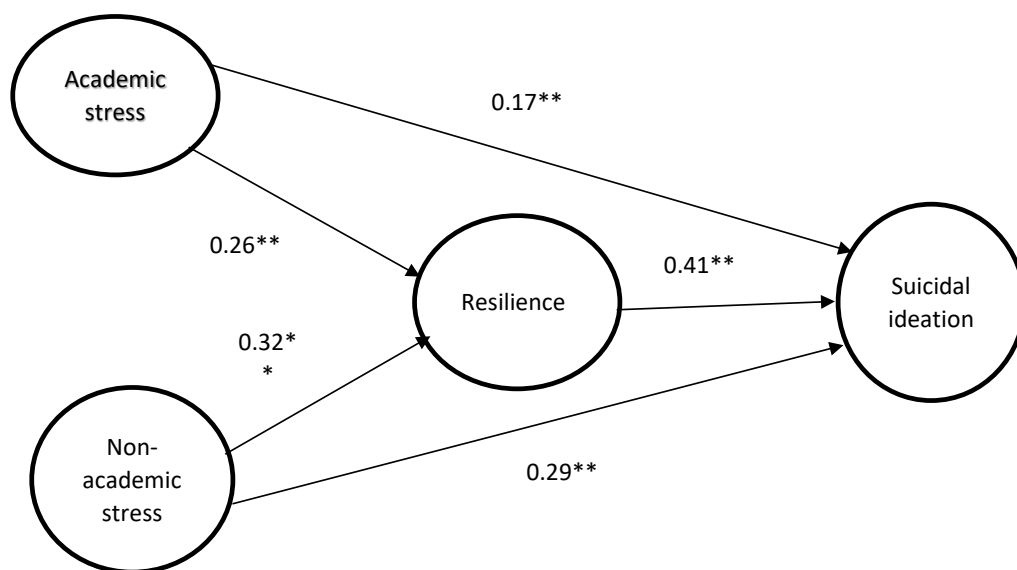
H3a and H3b proposed that the association between academic stress, non-academic stress, and suicidal thoughts is mediated by students' resilience. The results, as shown in Figure 2, show that academic stress is positively related to suicidal ideation via resilience ( $b = 0.11$ , 95% CI = 0.09; 0.23). Similarly, resilience plays a favorable role in the relationship between non-academic stress and suicidal thoughts ( $b = 0.15$ , 95% CI = 0.12; 0.35), hence supporting H3a and H3b.

Lastly, coping was expected to adversely reduce the positive association between H4a and H4b:

- academic stress.
- non-academic stress and resilience.

Our results (Table 3) showed a negative and substantial interaction effect between academic stress and coping on resilience, supporting H4a and H4b.

**Figure 2. Standardized coefficient structural model; N = 456**



**Table 4 - Results for moderation analysis (PROCESS Model 1)**

Predictors	Resilience	
	B	SE
Academic stress	0.23**	0.08
Non-academic stress	0.34**	0.11
Coping	-0.15**	0.08
Coping x academic stress	-0.12**	0.06
Coping x non-academic stress	-0.28**	0.09

Notes: N = 456; \*p < 0.05, \*\*p < 0.01; demographic variables are controlled; unstandardized coefficients and average bootstrap estimates are shown; bootstrapping method (5,000 iterations, 95% confidence interval, bias-corrected)

(p < 0.05, b = -0.12). The nature of this interaction supported our hypothesis that there would be less of a positive correlation between resilience and academic stress in the presence of strong coping than low coping (Figure 3). Similarly, a negative significant interaction was seen between coping strategies and non-academic stress on resilience (b = -0.28, p < 0.01). The interaction pattern supported our hypothesis that there was less of a positive correlation between non-academic stress and resilience when high coping was present as opposed to low coping (Figure 4). H4a and H4b were therefore approved. The direction of our hypothesis was supported by the pattern of these interactions, which showed that there was less of a positive

correlation between academic and non-academic stress and suicidal thoughts when there was high versus low perceived coping.

## 5. Discussion

The present research examined the direct and indirect crossover of academic stress and non-academic stress to suicidal ideation through resilience and the moderating role of coping between academic stress, non-academic, and resilience relationship. The results revealed that both academic stress and non-academic stress have a direct and indirect effect on suicidal ideation. Suicidal ideation was found to be a potential mediating mechanism (explaining partial variance) in the relationship between academic stress, non-academic stress, and suicidal ideation. Findings regarding the buffering role of coping revealed that coping buffers the positive relationship between academic stress, non-academic stress, and resilience such that the higher the coping, the lower be resilience. We discovered that while coping mitigated the link and made it more probable that low or moderate coping with academic stress would result in suicidal thoughts and maybe its eventful act, coping did not significantly predict suicidal ideation and its act. According to El Ansari et al. (2014) and Phang et al. (2015), students typically face difficulties adjusting to a new academic environment, workload, academic performance, attending lectures, overwork, and future employment.

### 5.1 Theoretical implications

The current study makes multiple additions to the body of knowledge regarding suicidal behavior and academic well-being among adolescents. By examining students' resilience as a crucial mechanism by which academic well-being (academic stress and non-academic stress) affects suicidal behavior, the current study adds to the body of research on students' academic well-being. Our findings, however, are in line with the literature that is currently available and has shown a connection between academic stress and suicidal thoughts (Consoli et al., 2015; Panadero et al., 2018; Ugurlu & Ona, 2009). Uncertainty surrounds whether suicide behaviors are causally related, even though they have been observed to usually occur in the setting of acute and chronic stressors (Cevik, 2020). But this correlation might just be coincidental or co-morbid. Thus, it is critical to comprehend the causal relationship between academic stress and suicidal ideation to further our understanding of suicide, intervention, and therapy. In this sense, we discovered that students' ability to effectively manage academic pressures may be crucial to preventing suicidal thoughts and the actual act. This conclusion is critical since stressors are a part of every school student's life, especially in our culture and at this dangerous moment. Educational administrators and policymakers should add courses and teachings on good coping strategies for young kids in particular. Resilient students can bounce back from stress (Wagnild, 2009a), but only if they have effective coping mechanisms. Resilience was found to be inversely correlated with suicidal thoughts and favorably correlated with academic stress. With the indirect effect being significant, the hypothesis that resilience would moderate the association between academic stress and suicidal thoughts was therefore verified. This only suggests that those who manage academic stress well are more likely to recover than those who do not, and they are also less likely to consider suicide. According to Tugde and Fredrickson (2004), who also observed that resilient people experience positive emotions during stressful situations, resilient people exhibit a greater degree of adaptive behaviors, especially in the areas of social functioning, morale, and physical health. This is consistent with our findings, as moral and social functioning are known to be anti-suicidal tonics. Richardson (2002) proposed the theory of resilience.

## 5.2 *Practical implications*

There are various ramifications for our research. Above all, this study will support educational institutions in realizing how much student stress—both academic and non-academic—affects attitudes toward studying and suicidal conduct. Our findings suggest that educational institutions must recognize the critical role that both academic and non-academic stress play in helping students succeed academically and prevent suicidal thoughts and behaviors. Every young person wants to be accepted and acknowledged by their peers, which has a significant impact on their adaptive functioning, according to Chu et al. (2015) and Preston et al. (2022). Nonetheless, it has been shown that perceived interpersonal stressors, such as a fear of being rejected and a thwarted sense of belonging, can serve as reliable indicators of suicidal thoughts and attempts (SA). Our results suggest that the educational institution's system of interventions to enhance students' academic performance, psychological well-being, resilience, and suicidal thoughts may be ineffective in the presence of coping mechanisms. Put differently, educational institutions should make sure that pupils have a feeling of coping if such initiatives are deemed ineffective.

## 5.3 *Limitations and Future Studies*

This study has various restrictions. Initially, we used a self-report survey to quantify our research variables at a specific period in time, which could lead to CMB. We conducted CFA by Podsakoff et al. (2012) standards and employed a variety of procedural remedies to reduce the possibility of CMB to guarantee that CMV would not be a problem in our investigation. To mitigate the risk of such bias, future studies might, however, rely on supervisors rating workers' job performance or gathering data at various intervals. Second, the generalizability of our findings to other industries or sectors has not yet been demonstrated because the sample of this study consisted of students studying in the southern portion of India with varying demographic characteristics and backgrounds in education studies. Our study paradigm should be tested in different sectors and cultures in future studies. Future research could look at the many moderating roles of variables in the relationship between students' suicidal thoughts, resilience, and academic and nonacademic stress.

## 6. **Conclusion**

This study offered a paradigm for comprehending the connection between students' academic stress, non-academic stress, resilience, and suicidal ideation. It also described how academic stress and, non-academic stress influences suicidal ideation. This study also looked at the moderating effect of coping on the connection between resilience and psychological well-being in students. The findings showed that both academic and non-academic stress on students' psychological well-being had positive effects on their resilience, which in turn improved their suicidal thoughts. Furthermore, the findings showed that coping negatively impacts students' resilience, particularly when those students had high perceived levels of less coping.

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# Impact of Information Technology Competency as Mediator between Entrepreneurial Skills and Micro-enterprise Business Success: An Empirical Analysis

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## Abstract

In recent years, entrepreneurship has undergone significant changes, as both entrepreneurial competencies (ENC) and information technology competencies (ITC) have become increasingly crucial for achieving microenterprise business success (MBS). This study seeks to explore the relationship between ENC and MBS, emphasising ITC's mediating function. The study used a quantitative approach, collecting data from microenterprise owners in Odisha's Ganjam district through a questionnaire. Convenience sampling was used, and 209 valid replies were obtained between March 25 and May 28, 2024. Data analysis was done through SPSS and Smart PLS. The study's results showed that ENC has a positive relationship with both MBS and ITC. Additionally, ITC played a mediating role between MBS and ENC. These findings emphasized how important it is to integrate ITC and ENC to meet MBS goals. This study, undertaken on microenterprises in the Ganjam district of Odisha, might be less relevant to more significant geographic regions. Findings might help in formulating plans to boost microenterprise performance and stimulating economic growth of the state and nation.

**Keywords:** Entrepreneurial Competency, Information Technology Competency, Microenterprises, Business Success, Smart PLS

## 1. Introduction

In today's rapidly changing business landscape, the fusion of entrepreneurial competencies (ENC) and information technology (ITC) competencies has become pivotal for microenterprise business success (MBS). Micro-businesses are significant contributors to economic growth and job creation and are crucial in driving local economies. However, achieving sustainable growth in fragile business environments necessitates more than just entrepreneurial insight; it demands a strategic integration of IT solutions to enhance efficiency and business competitiveness. While entrepreneurial skills empower microenterprise owners to identify opportunities and mobilize resources, IT competence enables them to streamline operations, reach wider markets, and foster innovation (Awamleh & Ertugan, 2021). Research highlights that microenterprises with strong IT capabilities are better positioned to adapt to market changes and sustain long-term growth (Erävala et al., 2019).

The swift progress in information technology is driving the global economy, presenting businesses with unseen prospects as well as difficulties. In this environment, promoting sustainable growth and competitiveness in microenterprise ventures requires an awareness of the complex interactions between entrepreneurial competencies and IT capabilities. Microenterprises, frequently distinguished by their small size and resource limitations, are essential to economic development because they act as catalysts for regional innovation and creating jobs. To improve efficiency, productivity, and market response, managing the complexity of today's corporate environment calls for more than simply entrepreneurial zeal—it necessitates the strategic integration of IT solutions.

The significance of entrepreneurs depends on the unique combination of vision, risk-taking tendencies, resourcefulness, and adaptability that they offer to the company. These traits are essential for spotting market opportunities, gathering capital, and directing corporate endeavours towards long-term success (Pulka et al., 2021). However, in a world that is becoming more digitally connected and where technological advances are transforming industries, success as an entrepreneur depends not only on conventional commercial acumen but also on one's capacity to use the transformative power of information technology.

Despite the acknowledged importance of both entrepreneurial competencies and IT competence, the precise nature of their relationship and the mechanisms through which they influence microenterprise success still need to be explored, particularly in the context of the Ganjam district of Odisha. Hence, this study investigates how entrepreneurial competency and microenterprise business success are interconnected with the mediating role of IT competency in order to fill this knowledge gap (Hadi & Abdullah, 2018; Marei et al., 2023).

## 2. Literature Review and Hypothesis Development

Entrepreneurial competence involves skills, knowledge, attitudes, and traits necessary for launching, managing, and growing a successful business. Entrepreneurial competency, encompassing skills like opportunity recognition, strategic planning, and innovation, is crucial for navigating the competitive landscape and ensuring business sustainability (Sakib et al., 2022). Entrepreneurs with high competency levels are better equipped to manage resources, respond to market demands, and implement effective business strategies, leading to improved performance and growth. Previous Studies indicate that microenterprises benefit significantly from solid entrepreneurial competencies, which enhance their ability to adapt and thrive in dynamic environments (Rahoo et al., 2023). Moreover, research shows that these competencies are vital for building and maintaining a competitive edge, essential for business success in microenterprises (Abdullah et al., 2018). By fostering innovation and improving operational efficiencies, entrepreneurial competency plays a pivotal role in driving the success of microenterprises. Hence, the following hypothesis is made:

*H1: Entrepreneurial Competency has a positive effect on Microenterprise Business Success Top of Form*

Entrepreneurs with high levels of competency—encompassing skills such as strategic vision, innovation, and opportunity recognition—are more adept at integrating IT solutions into their business models (Umar & Ngah, 2016). These competencies enable entrepreneurs to perceive the strategic advantages of IT, such as enhanced operational efficiency, better customer engagement, and improved data management. Several studies show that competent entrepreneurs are more likely to invest in and adopt advanced IT systems, viewing them as critical tools for maintaining

a competitive edge in the market. Their ability to innovate and willingness to embrace new technologies drive this proactive IT adoption. Furthermore, entrepreneurial competency often involves a mindset oriented towards continuous improvement and agility, which aligns well with the dynamic nature of IT advancements (Abdul, 2019). Thus, entrepreneurial competency significantly facilitates effective IT adaptation, enhancing overall business performance and sustainability. As a result, it suggests the following proposition:

*H2: Entrepreneurial Competency has a positive effect on Information Technology Adaptation*

IT competency, which includes the ability to effectively utilize digital tools, manage information systems, and leverage online platforms, is crucial for enhancing microenterprises' operational efficiency and competitiveness (Abubakre et al., 2022). Microenterprises with high IT competency can streamline processes, reduce costs, and improve customer engagement through better data management and communication technologies. Research indicates that IT competency enables microenterprises to innovate and adapt quickly to market changes, thereby gaining a competitive edge. Furthermore, IT competency facilitates access to broader markets and resources, which is vital for the growth and sustainability of small businesses. By integrating IT solutions into their operations, microenterprises can enhance productivity, improve service delivery, and achieve better business outcomes, thus validating the positive impact of IT competency on business success (Marei et al., 2023). As a result, it suggests the following proposition:

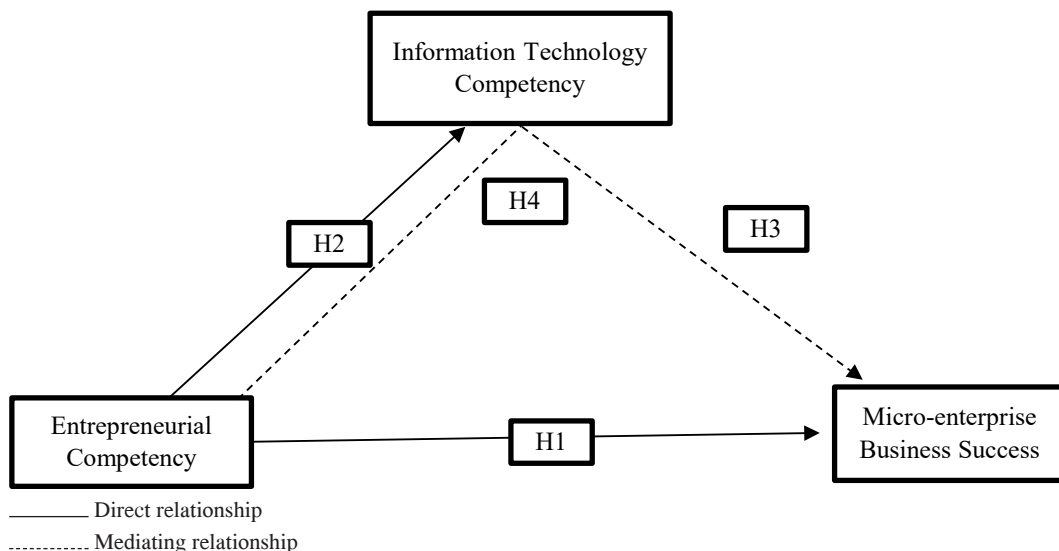
*Top of FormBottom of FormH3: Information Technology Competency has a positive effect on Microenterprise Business Success.*

Entrepreneurial competency, which encompasses innovation, strategic planning, and opportunity recognition, provides a strong foundation for effective business management (Huang, 2011). However, the ability to leverage IT competency can significantly amplify these competencies by enabling entrepreneurs to implement and utilize digital tools and technologies effectively. Previous research suggests that IT competency acts as a critical intermediary, enhancing the impact of entrepreneurial skills on business outcomes. Entrepreneurs adept at identifying opportunities and innovating are better positioned to adopt and integrate IT solutions, improving operational efficiency and market reach (Zahoor et al., 2021). This integration allows businesses to streamline processes, optimize resource allocation, and respond swiftly to market dynamics.

Furthermore, IT competency enhances the capability of microenterprises to manage information systems, utilize digital marketing, and engage with customers through online platforms, thereby reinforcing the positive effects of entrepreneurial competency on business success. Thus, IT competency is a vital link that strengthens the relationship between entrepreneurial competency and microenterprise performance, highlighting its mediating role in driving business success (Rahoo et al., 2023). Hence, the following hypothesis is proposed:

*H4: Information Technology competency mediates the relationship between entrepreneurial competency and Microenterprise Business Success.*

**Figure I: Conceptual Model of the Study**



**3. Research Methodology**

This research utilised a quantitative approach. The study’s participants were microenterprise business owners who had established their companies in the Ganjam district of Odisha. The data collection was done with an adopted survey questionnaire from the available previous literature. Convenience sampling was used to collect the data from March 25, 2024, to May 28, 2024. The responders were given a total of 150 questionnaires. After eliminating the 41 incomplete questionnaires, 209 correct responses were received and included in this study. All the item questionnaires were measured with a five-point Likert scale, which ranged from 1 strongly disagree to 5 strongly agree. Data analysis was done through SPSS and Smart PLS to examine the measurement model and structural model in the study.

**4. Data Analysis and Results**

*4.1. Demographic characteristics of the respondents*

**Table 1: Demographic Information**

Demographic	Items	Frequency	Percentage (%)
Gender	Female	60	28.7
	Male	149	71.3
Age Group	21 to 30 yrs	95	45.5
	31 to 40 yrs	46	22
	41 to 50 yrs	35	16.7
	51 to 60 yrs	27	12.9
	More than 60 yrs	6	2.9

Educational Qualification	Intermediate	7	3.3
	Graduate	131	62.7
	Post Graduate	61	29.2
	Others	10	4.8
Business Types	Agro-based	58	27.8
	Handicraft- based	31	14.8
	Handicraft -based	17	8.1
	Service-based	44	21.1
	Textile-base	32	15.3
	Trade-based	27	12.9
Job Experience	Less than 5 yrs	72	34.4
	5 to 10 yrs	75	35.9
	11 to 15 yrs	46	22..0
	11 to 15 yrs	44	21.1

**Table 1** above shows the demographic data of a sample group. There are 60 females (28.7%) and 149 males (71.3%). Most of the group falls within the 21-30 years age range (45.5%), followed by the 31-40 years age range (22%). Most participants hold graduate degrees (62.7%). The predominant business type is agro-based (27.8%). Job experience is primarily less than ten years, with 34.4% having under five years and 35.9% having 5 to 10 years.

#### 4.2. Descriptive Statistics of the Constructs.

**Table 2:** Descriptive Statistics of the Constructs.

Variable(n=209)	Mean	SD	$\alpha$	Skewness	Kurtosis	ENC	ETC	MBS
(1) Entrepreneurial Competency (ENC)	4.234	0.829	0.905	-1.470	0.584	1		
(2) Information Technology Competency (ITC)	4.345	0.737	0.823	-1.468	1.538	.266**	1	
(3) Microenterprise Business Success (MBS)	4.244	0.790	0.864	-1.740	1.812	.309**	.316**	1

Note:  $\alpha$ : Cronbach alpha; SD: Standard Deviation; \*\* Correlation is significant at 0.01.

**Table 2** outlines statistics and associations among three variables: Entrepreneurial Competency (ENC) exhibits moderate variability, with a mean of 4.234 and a high reliability of 0.905. Information Technology Competency (ITC) shows slightly less variability (mean 4.345), with a good reliability of 0.823. Micro-enterprise Business Success (MBS) correlates positively with ENC (.309) and ITC (.316), suggesting moderate relationships. Overall, higher entrepreneurial and IT competencies correspond to increased business success, with statistically significant correlations.

#### 4.3. Assessment of Measurement Model

The measurement model in structural equation modelling is critical in establishing if the outer model—composed of Factor loads, Composite Reliability (CR), and Average Variance Extracted (AVE)—is being measured correctly. Furthermore, to evaluate discriminant validity

in the measurement (outer) models, the Heterotrait-Monotrait (HTMT) Ratio (Henseler et al., 2015) and the Fornell and Larcker (1981) in addition to the known problems related to sample size and power, is that it may indicate an increasing correspondence between the hypothesized model and the observed data as both the measurement properties and the relationship between constructs decline. Further, and contrary to common assertion, the risk of making a Type II error can be substantial even when the sample size is large. Moreover, the present testing methods are unable to assess a model's explanatory power. To overcome these problems, the authors develop and apply a testing system based on measures of shared variance within the structural model, measurement model, and overall model.", "container-title": "Journal of Marketing Research", "DOI": "10.1177/002224378101800104", "ISSN": "0022-2437, 1547-7193", "issue": "1", "journalAbbreviation": "Journal of Marketing Research", "language": "en", "license": "http://journals.sagepub.com/page/policies/text-and-data-mining-license", "page": "39-50", "source": "DOI.org (Crossref Criterion are applied.

**Table 3: Validity and Reliability of the Constructs**

Constructs	Items	Factor Loadings	$\alpha$	CR (rho_a)	AVE
Entrepreneurial Competency (ENC)	ENC1	0.863	0.907	0.911	0.727
	ENC2	0.838			
	ENC3	0.835			
	ENC4	0.867			
	ENC5	0.861			
Information Technology Competency (ITC)	ITC1	0.839	0.827	0.835	0.743
	ITC2	0.898			
	ITC3	0.848			
Micro-enterprise Business Success (MBS)	MBS1	0.853	0.864	0.87	0.71
	MBS2	0.853			
	MBS3	0.856			
	MBS4	0.808			

Note:  $\alpha$ : Cronbach alpha; AVE: Average Variance Extracted

**Table 3** provides statistical implications for assessing the measurement (outer) models used in the current study. For these evaluations, Hair et al.(2020) state that factor loading should be at least 0.70 or higher and that CR and AVE should be at least 0.70 and 0.50, respectively.

The constructs ENC, ITC, and MBS demonstrate strong internal consistency, with Cronbach's alpha values ranging from 0.827 to 0.907. Composite Reliability values, ranging from 0.835 to 0.911, also confirm the constructs' reliability. Average Variance Extracted values, between 0.71 and 0.743, indicate the proportion of variance captured by the items in each construct. These results bolster the study's credibility by affirming construct validity and validating the measurement instruments.

**Table 4: Discriminant Validity using Fornell and Larcker Criterion**

Constructs	ENC	ITC	MBS
Entrepreneurial Competency (ENC)	<b>0.853</b>		
Information Technology Competency (ITC)	0.28	<b>0.862</b>	
Micro-enterprise Business Success (MBS)	0.315	0.32	<b>0.842</b>

**Note:** The square root of average variance extracted (AVE) is shown on a diagonal in bold.

**Table 4** above depicts construct correlations and diagonal values representing the square roots of Average Variance Extracted (AVE). Diagonal values (**in bold**) should exceed off-diagonal ones. Here, diagonal values exceed off-diagonal ones, confirming satisfactory discriminant validity, as stated by Fornell and Larcker (2017). Each construct's diagonal value (ENC, ITC, MBS) exceeds correlations with other constructs, validating their distinctiveness.

**Table 5:** Discriminant Validity using HTMT 0.8 criterion

Constructs	ENC	ITC	MBS
Entrepreneurial Competency (ENC)			
Information Technology Competency (ITC)	0.32		
Micro-enterprise Business Success (MBS)	0.352	0.373	

In **Table 5** above, Henseler et al.(2015) state that the HTMT ratio for latent constructs should be smaller than 0.80 to have appropriate discriminant validity. In this case, all correlations fall below 0.8, ensuring satisfactory discriminant validity, as each construct demonstrates adequate differentiation from the others.

#### 4.4. Assessment of Structural Model

The assessment of the Structural equation model begins with the calculation of the coefficient of determination ( $R^2$ ) for each endogenous latent variable. Table 6 below depicts the coefficient of determination( $R^2$ ) of 0.157, indicating that ENC and ITC explained 15.7 per cent of the overall variance of MBS. Meanwhile,  $R^2$  of 0.079 shows that ENC explained 7.9 percent of the overall performance of ITC. The assessment model of Predictive relevance ( $Q^2$ ) values of MBS and ITC were 0.834 and 0.708, respectively. Hence, the values of the endogenous variables in the model indicate the predictive relevance. Additionally, the study found the effect size ( $F^2$ ) of the independent variables of ENC has a weak impact on MBS (0.065) and ITC (0.085), respectively, in the model. Similarly, MBS has also been impacted by ITC (0.069).

**Table 6:** Coefficient of Determination ( $R^2$ ), Predictive Relevance ( $Q^2$ ) and Effect Size ( $f^2$ )

Constructs	R-Square	Q- Square	F- Square	Decision
MBS	0.157	0.834		
ITC	0.079	0.708	0.069	Weak
ENC			0.065 <sup>a</sup> ; 0.085 <sup>b</sup>	Weak; Weak

Note: <sup>a</sup>MBS; <sup>b</sup>ITC

**Table 7:** Hypothesis Testing result of direct effect: Structural model

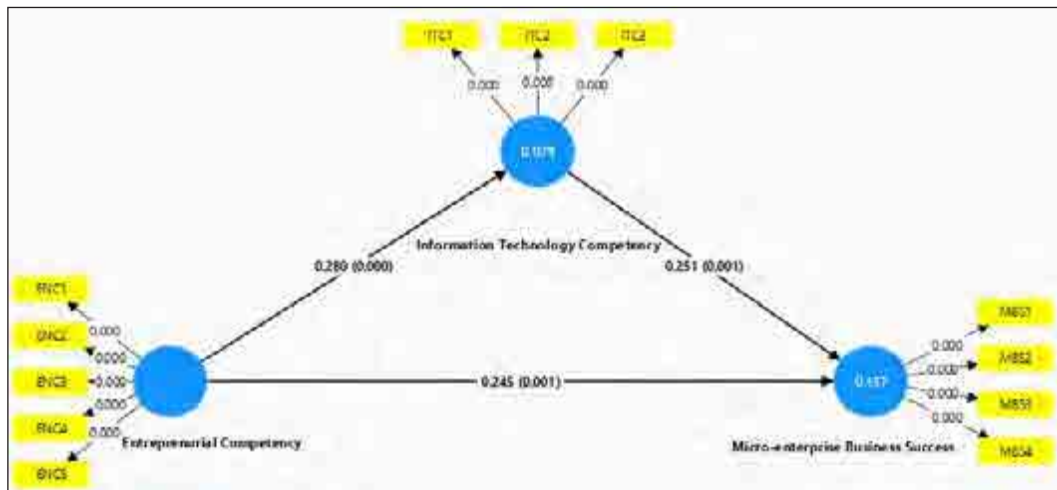
Hypothesis	Relationship	$\beta$	T -statistics	P -values	Decision
H1	ENC-> MBS	0.245	3.251	0.001	Accepted
H2	ENC -> ITC	0.280	3.554	0.000	Accepted
H3	ITC -> MBS	0.251	3.130	0.001	Accepted

Note: ENC: Entrepreneurial Competency, ITC: Information Technology Competency, MBS: Micro-enterprise Business Success

In the current study, the bootstrapping method was used with 5000 re-samples for the hypothesis testing. The statistical measures of T- Statistics and P-Values were employed to ascertain the acceptance of a hypothesis. In the above **Table 7 and Figure II**, the results demonstrated that ENC has a direct and positive effect on MBS ( $\beta = 0.245$ , T-Stat. =3.215,

P< 0.001) and ITC ( $\beta=0.280$ , T-Stat.=3.552, P< 0.000). Furthermore, the result showed that ITC has a positive effect on MBS ( $\beta=0.251$ , T-Stat.=3.130, P< 0.001). The results confirm the three direct hypotheses (H1, H2, H3), as evidenced by the high path coefficient, T-statistics> 1.96, and P- value < 0.05 with bootstrapping of 95% confidence interval. As a result, this study substantially affects all direct effects. The results show that information technology competency plays a mediating role in the relationship between entrepreneurial competency and micro-business enterprise success, and this relationship is positively and significantly correlated.

**Figure II:** PLS algorithm results for the assessment of the structural model



**Table 8:** Mediating Hypothesis Testing of indirect effect: structural model

Hypothesis	Relationship	B	T-statistics	P -values	Decision
H4	ENC -> ITC-> MBS	0.070	1.962	0.027	Accepted

Note: ENC: Entrepreneurial Competency, ITC: Information Technology Competency: Micro-enterprise Business Success

In **Table 8**, the result shows that the indirect effects hypothesis refers to the mediator. In assessing the result of one mediating hypothesis, the result revealed that ITC mediates between ENC and MBS ( $\beta= 0.070$ , T-stat.= 1.962, P-value =0.027). Hence, the mediating hypothesis (H4) was supported. It was found that ITC increased MBS, but ENC directly impacted MBS and ITC. It was also revealed that ITC acted as a mediator between ENC and MBS, confirming its role in the research model.

### 5. Discussion

To gain a better understanding, this study investigated crucial variables that underpin entrepreneurial competencies (ENC) and microenterprise business success (MBS), as well as the mediating role of information technology competency (ITC) in this relationship.

This study’s findings confirmed the hypothesis (H1) that entrepreneurial competency (ENC) impacts microenterprise business success (MBS). The confirmation of the hypothesis that

entrepreneurial competency impacts microenterprise business success reinforces established theories and empirical evidence in the field of entrepreneurship (Lovely et al., 2021). It affirms the notion that individual entrepreneurs' capabilities and characteristics significantly influence their ventures' performance and outcomes (Umar & Ngah, 2016).

Next, the finding of hypothesis (H2) of the study, which established a positive relationship between entrepreneurial competency (ENC) and the adoption of information technology (ITC) in microenterprise businesses, aligns with previous research in the field of entrepreneurship (Huang, 2011). This positive effect emphasizes the pivotal role of ENC in shaping entrepreneurial behaviours and decisions regarding technology adoption in microbusiness enterprises (Lovely et al., 2021). As a result, they are better equipped to understand the benefits of integrating information technology into their operations and navigate their business.

Moreover, the study highlights the impact of ITC adeptness as a channel for exchanging technological knowledge and best practices among their peers (Ahmadi & Letter, 2021). By leveraging their ITC skills, they facilitate collaborative learning environments where information technology adoption is encouraged and supported. This integration of ITC and knowledge-sharing accelerates the diffusion of technological innovations within the microenterprise sector, contributing to overall digital readiness and competitiveness.

Furthermore, the study investigated the proposition outlined in hypothesis (H3), which suggests a positive relationship between information technology competency (ITC) and microenterprise business success (MBS). This finding underscores the crucial role of technology proficiency in driving the success of microenterprises in today's digital landscape (Abdul, 2019). Information technology competency encompasses a spectrum of skills, ranging from basic digital literacy to more advanced abilities in utilizing software, online platforms, and data analytics tools. Microenterprises that possess a higher level of ITC are better equipped to adapt to technological advancements, capitalize on digital opportunities, and address challenges in an increasingly competitive market environment (Ferreira et al., 2022).

The research findings provide convincing evidence to support the hypothesis (H4), which posits that information technology competency (ITC) serves as a mediator in the relationship between entrepreneurial competency (ENC) and microenterprise business success (MBS) (Yustian et al., 2021). This implies that the extent to which entrepreneurs are influenced by their ability to leverage information technology effectively impacts their business outcomes. Entrepreneurs who are well-connected with ITC may have greater access to information, resources, and opportunities related to technology adoption and innovation (Agbenyegah & Mahohoma, 2020). This access enables them to develop and enhance their information technology competency, which, in turn, translates into improved business performance and success. Recognizing the mediating role of ITC emphasizes the importance of incorporating digital literacy and technology training into entrepreneurship programs. Entrepreneurs with strong information technology competency are better positioned to capitalize on emerging opportunities in the digital economy and remain competitive in an increasingly interconnected world.

## 6. Implications of Study

The implications of these findings extend to entrepreneurs, policymakers, and stakeholders involved in fostering microenterprise development. Entrepreneurs should prioritize investing in technology training and skill development to enhance their digital capabilities and remain

competitive in the business. Policymakers and support organizations should prioritize initiatives that promote technology training, facilitate knowledge-sharing platforms, and foster a culture of digital innovation within the microenterprise sector. By investing in technology education and support, stakeholders can empower micro-entrepreneurs to harness their full potential and drive sustainable business success in the digital era.

## **7. Conclusion**

This study has examined the impact of entrepreneurial competency (ENC) and information technology competency (ITC) on microenterprises business success (MBS) in the Ganjam district context of Odisha.

The findings of the study showed that ENC directly and positively affect the ITC and MBS. Additionally, the finding revealed that ITC positively impacts MBS. Therefore, the impacts of this study are significant for all direct relationships. Further, the results of one mediating relationship revealed that ITC mediates the relationship between ENC and MBS, which is in support of the mediating relationship. Hence, this study shows that microbusiness enterprises need to prioritise ENC and adapt ITC competency to improve and sustain the microenterprise business success. The study examined the impact of entrepreneurial competency on business success, adding to the body of knowledge while integrating ITC competency. The path analysis's results verified that information technology and entrepreneurial competency were the cornerstones of microbusinesses and directly and indirectly influenced their ability to succeed as business enterprises.

All business enterprises, especially those in the microenterprises sector, must integrate IT competency. This study's findings emphasize the critical importance of entrepreneurial and information technology competencies in driving microenterprise business success. Further, the study highlights the pivotal role of both entrepreneurial competency and information technology competency in steering the success trajectory of microenterprise businesses. With the rapid advancements in technology and the increasingly interconnected global economy, leveraging information technology has become advantageous and necessary for microenterprises to remain competitive and sustainable. Moreover, the synergy between entrepreneurial competency and information technology competency creates a virtuous cycle of innovation and growth. Entrepreneurs who embrace technology not only enhance their operational efficiency but also unlock new opportunities for value creation and differentiation in the market. By fostering a culture of continuous learning and adaptation, microenterprises can leverage information technology as a strategic asset to fuel their growth aspirations and achieve long-term success.

## **8. Limitations of the Study and Scope for Future Research**

This study was carried out in the Ganjam district of Odisha. Microenterprise's business sector may limit the applicability of findings to more significant geographic regions. Future research should be undertaken on how entrepreneurial and IT competencies impact micro-enterprise success over time and across diverse sectors and regions for the generalisability of findings. Investigating demographic influences, emerging technologies, policy support, education, and training effectiveness can reveal tailored strategies to enhance micro-enterprise performance, providing valuable insights for practitioners and policymakers.

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# Decoding Generation Millennials Investment Decisions: A Behavioral Approach

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**Purpose:** This research seeks to explore the influence of various behavioural factors on investment decisions in capital market made by individuals of Generation Millennials (born between 1981 and 1996) in India.

**Methodology/ Design/Approach:** A total of five behavioural factors such as FOMO, Stock Characteristics, Market Information, Investor's Cognitive Psychology, Word of Mouth using a sample of 251 respondents have been investigated.

**Findings:** The results indicate that while word of mouth negatively impacts investment decisions, factors such as FOMO, stock characteristics, market information, and investor's cognitive psychology positively and significantly influence these decisions. Additionally, the study reveals significant differences in investment decision-making based on gender, age, employment status, trading frequency, and income allocation.

**Originality:** According to a survey of the literature, not many studies have exclusively examined these behavioural factors in relation to their influence on Generation Millennials investors. While several studies have explored psychological constructs among Generation X, there is a notable dearth of research focusing on Millennials in India. One of the reasons for limited study can be that these investors have started investing in capital markets only few years ago. This indicates that this aspect of behavioural finance among generation Millennials investors remains largely unexplored and requires further attention from researchers globally. Additionally, most existing studies have been conducted in European, African, and American regions, with minimal research available on Asian markets. By investigating the influence of multiple factors on investment decisions and the various biases related to them, this study seeks to bridge this gap.

**Keywords:** Generation Millennials, FOMO, Stock Characteristics, Market Information, Investor's Cognitive Psychology, Word of Mouth, Investors Investment Decisions.

**Paper Type:** Research Paper

## 1. Introduction

Financial Investment decision have not always been a straightforward procedure. Researchers have linked Behavioral biases and investing decision-making (Kimeu et al., 2016a, b; Kumar and Goyal, 2015; Nga and Ken Yien, 2013; Masini and Menichetti, 2012). There is an assumption in Traditional finance that people are rational and knowledgeable enough to make informed investment decisions, even when some investors may genuinely have inadequate comprehension.

The Conventional finance theory states that individual investors make rational decisions based on evaluation of the underlying value/prices of different stocks in order to reduce risk and maximize profits. It is assumed that investors are “rational economic men,” which tends to explain the decisions. (Nell, 2007).

It follows that all relevant information is assumed to be fully reflected in market pricing, resulting in the creation of efficient stock markets. However, behavioral finance argues that people’s investing decisions are significantly influenced by a variety of psychological biases.

Psychological biases are employed in behavioral finance to assess and analyze the available investment options for investors. Both the individual’s departure from conventional finance theory and the market’s departure from efficiency are generally explained by it. Classical economists such as Adam Smith, John Stuart Mill and David Ricardo suggested to include human psychologists into the evaluation of economic activity in the beginning of the eighteenth and nineteenth centuries (Andrikopoulos, 2006).

According to various studies (Muradoglu and Harvey., 2012; Kimeu et al., 2016a, b; Davis et al., 2015), behavioral finance is driven by social activities as well as economic activities and human perspectives. However, the majority of researchers concur that traditional and behavioral finance have an impact on investment decision-making (e.g., Kimeu et al., 2016a, b). Every market in the world, including India, has both rational and irrational individual investors (Kimeu et al., 2016a, b).

According to Youths (2017), Generation Y in India is hesitant to join in the share market. The primary causes of Indian youths’ unwillingness to invest in the stock market are fear of losses and ignorance. Many experts think that some parents have psychological barriers as a result of being severely impacted by the 1997’s Asian Financial Crisis; as a result, they persuade their kids that it’s not worthwhile to participate in the stock market. Due to significant psychological biases and market volatility stemming from the 1997’s Asian Financial Crisis fear, Indians are not typically inclined to trade in the financial markets. This includes India’s numerous social and economic issues.

The macroeconomic climate, the rate of inflation, and unforeseen expenses are just a few of the many variables that could lower the standard of living in retirement. Compared to baby boomers and Generation X, Generation Y makes a substantial contribution and has strong purchasing power. Recently, they have drawn the interest of several researchers. In 1931, George Bernard Shaw famously said, “Youth is wasted on the young.” The majority of folk don’t understand the value of investments and saving until later in life. Millennials may choose to participate in a variety of financial instruments including equity, mutual funds and the stock market, in order to create some extra income and meet their long-term monetary goals, rather than setting money aside for a pension fund.

To raise the degree of young participation in India and increase their investment linked parties must address two primary concerns regarding decision-making competence alongside. The first is raising awareness and knowledge about finance with regard to technical and basic analysis. Enhancing psychological behavior is the second, as it could help with avoiding making foolish or illogical financial decisions. To enhance their investment behavior, individual investors in a nation must be aware of the existence and type of behavioral biases.

Chen and Volpe (1998) discovered that a person’s financial behavior and level of financial understanding had a big impact on their decision to invest. East (1993) contends that the attitude

of individual investors can be used to forecast the process of making investment decisions. Thus, a number of research studies examining human behavior and investment decisions have been conducted in recent years in various countries with varying behavioral biases. This study examines how several behavioral biases influence Indian Generation Y investors' decision-making. The results will help identify the behavioral biases present in the Indian market and develop suitable regulations that encourage Generation Y to engage in the financial markets. It is anticipated that the study's findings will increase investors' understanding of the process involved in making financial decisions.

Those born between the years of 1980 and early 1990 are referred to as Generation Y. They are mainly the offspring of baby boomers and are often thought to be more accustomed to digital and electronic technologies. Instead of being referred to as digital immigrants, members of Generation Y are termed digital natives (Bolton et al., 2013). According to Wesner and Miller (2008), Since they are the first generation to have lived exclusively in the digital age, Generation Y is greatly impacted by information technology in both their personal and professional life. According to Brosdahl and Carpenter (2011), opinions about the beginning and ending points of Generation Y are divided. Immordino-Yang et al. (2012) claim that early and frequent exposure to technology, which has advantages and disadvantages in terms of the effects on cognition, emotions, and society, is an essential developmental characteristic of Generation Y.

For example, they engage with people and rely heavily on technology. The target group for this study is Generation Y because of the group's considerable population. As of 2016, they accounted for 44% of Malaysia's total population (Kavanagh, 2016). With an estimated \$600 billion in annual spending power, Generation Y has a significant impact on how much money parents spend (Kennedy, 2001). Furthermore, this generation has more disposable income than any other cohort in history (Morton, 2002), which may also mean that the funds are left for personal investment too.

However, McCrindle (2003) notes that in reality, over 70% of Generation Y's income is discretionary, primarily going toward entertainment, travel, and food. In addition, rather than being digital immigrants, Generation Y was born to be the digital natives (Prensky, 2001). Their manner of life has been greatly impacted by information technology, as they live in a digital age (Bennett et al., 2008). This generation frequently uses social media to share, provide, look for, and use digital content related to works and entertainment (Bolton et al., 2013). Large-scale information sharing or exchange will actually boost market efficiency and amplify societal influence on decision-making.

## **2. Literature Review**

### **2.1 Investment decision**

The assets in which the company will invest its capital are referred to as investment decisions. It is made by the company's directors, investment managers, and investors. An investor is a person who invests money in investment products in order to achieve an expected return. An investor's primary goal is to maximize profits while lowering risk.

Kishori and Kumar (2016) assert that investors forego short-term benefits in order to pursue larger gains down the road. Every investment has a set of precise goals that must be met. Having a choice between risk and return, as well as safety against inflation, growth, and liquidity, are only a few of the practical goals of investing. Prior to making a choice, the majority of investors thoroughly assess the investment product.

A number of things undermine those investors' rationality and lead to illogical actions on the part of individual investors. This study looks at five psychological biases and personal traits that have been shown to be consistently significant: FOMO, stock features, market information, investor cognitive psychology, and word-of-mouth. It also looks at how these traits affect individual investment decisions.

## **2.2 FOMO and Investment Decision**

Individuals who watch, read, or learn about the activities of others and feel as though they're missing out on it experience FOMO (Abel et al., 2016). Additionally, research on FOMO and its impact on consumer behavior and decision-making processes has been conducted (Kang et al., 2020). The same is true for investors who, driven by a desire for greater returns, believe they will lose out on chances if they wait to act (Dennison, 2018; Kang et al., 2020).

Their decisions on investments are therefore influenced by this FOMO on investments. Hence, it is hypothesized that:

H1. Fear of missing out positively affects the decision making of retail investors.

## **2.3 Stock Characteristics**

An increasing body of research suggests that investors' preferences for particular stock attributes could influence the diversity of their portfolios. Results from earlier research indicate that in a self-reported survey, investors express preferences for dividend yield stocks, equities with lottery elements, and a variety of stock-specific attributes (Graham & Kumar, 2006; Khan, Tan, & Chong, 2016; Kumar, 2009). According to Aspara (2013), investors' inclinations to invest in a company are influenced by their affective assessment of its brands and products since it raises their expectations for the company's financial returns. Given that investors frequently display preferences for particular stock qualities, these preferences may influence the choice of stock to include in a portfolio that possesses particular characteristics. From a basic standpoint, investors may own a variety of stocks in their portfolio due to their preferences for particular stock qualities and their superior and confidential knowledge of those attributes. Preferences for stock features may therefore result in an informed and diverse portfolio. On the other hand, Goetzmann and Kumar (2008) demonstrate through the use of transaction data that stock characteristics are linked to under-diversification.

When stock volatility, skewness, turnover, and market beta are overweighted, investors hold comparatively fewer diversified portfolios. High-priced, bigger, value, and dividend-paying equities are likewise associated with less diversity. However, reported preferences for stock traits were not the subject of their investigation. Thus, despite its significance, the influence of expressed preferences for stock attributes on diversification has not received enough attention in the literature to warrant testing the following hypothesis:

H2. Stock characteristics positively affects the decision making of retail investors.

## **2.4 Market Information**

Businesses can get more accurate information about the worth of their growth chances from the stock market by using different market information. By assisting managers in making wiser investment choices, this knowledge increases the value of the company. An increasing body of research is pointing to the idea that stock price information influences managerial decisions (Jegadeesh, Weinstein, and Welch, 1993; Markovitch, Steckel, and Yeung, 2005; Luo, 2005;

Chen, Goldstein, and Jiang, 2007; Bakke and Whited, 2006). It is therefore important to further study the implications of the following hypothesis:

H3. Market information positively affects the decision making of retail investors.

### **2.5 Investors Cognitive Psychology**

Investors make complex decisions in vast, unpredictable markets using their intuition, perceptions, emotions, and reasoning (Kahneman and Riepe, 1998). However, these decisions are frequently irrational since cognitive biases are at play and full information is disregarded (Du and Budescu, 2018). Investors' tastes are influenced by the information that is available to them, and their thoughts can occasionally be altered by irrelevant information that leads to human mistake. Investors move rapidly and make decisions based on the information at hand in order to gain a competitive edge, implying that mental shortcut cause irrationality and influence investment decisions (Bowers and Khorakian, 2014). Additionally, heuristic biases affect both novice and seasoned investors (Elliot et al., 2018). Therefore, we developed the following hypothesis:

H4. Investors cognitive psychology positively affects the decision making of retail investors.

### **2.6 Word of mouth**

According to Franke [1988], enhancing consumers' perceptions of service quality requires effective communication. The ability of an advisor to explain different aspects of investment options and provide information about their advantages and disadvantages, as well as to provide customers with information and understandable answers to their questions, makes communication crucial. These kinds of communication also have a positive impact on customers' perceptions of individual investors. Drawing from the previously presented arguments, the subsequent hypothesis was formulated

H5. Word of mouth positively affects the decision making of retail investors.

Based on the study, objectives and Hypothesis, the conceptual model has been drawn as shown in Figure1

## **3. Methodology**

The study makes use of the SPSS software 22.0 version and an empirical methodology. In this study, the model was calculated, and the hypotheses were evaluated based on the direct relationship. Refer Figure 1

This study makes an effort to look into the important variables and analyze how these influences affect their choice of investments. Through the use of correlation, multiple regression analysis, reliability testing, and hypothesis testing, the chosen essential factors—such as FOMO, stock characteristics, market information, investor cognitive psychology, and word-of-mouth—are categorized into profiles. This study takes into account variations in the respondents' investing choices and profiles. Additionally, the study looks for evidence of the connection between these important variables.

### **3.1 Measurements**

This study looks into the important variables and how these affect people's decision to invest. The hypothesis test, correlation, multiple regression analysis, reliability test, and market information are used to classify the chosen essential factors—such as FOMO, stock characteristics, investor

cognitive psychology, and word-of-mouth—into profiles. Variations in the respondents' profiles and investment choices are taken into account in this study. Furthermore, the study attempts to validate the connection between these important variables.

### 3.2 Survey Administration and Sampling

A self-completion survey is used in this study to gather information from study participants. The survey questions were organized into variable categories where the order of questions within each category makes sense and is intuitively clear. This lessens the chance that survey participants will fill it out randomly and with mental leaps. The survey's five-point Likert scale, which goes from (1) strongly disagree to (5) strongly agree, was used to create each question. According to Nemoto and Beglar (2014), the Likert scale is the most widely used instrument for evaluating a person's psychological constructs.

The study's respondents are members of Generation Y, or Indian citizens between the ages of 25 and 43 who were born between 1981 and 1999. The purpose of the survey was briefly explained to the respondents, and they were kindly asked to fill out the questionnaires. Respondents are urged to provide as accurate of an answer as they can while guaranteeing the privacy of their personal data. After filling out the questionnaire, the respondents gave it to the researcher. Out of the 400 that were distributed, 251 were returned, meaning that the usable response rate was around 62.75%. For the purpose of the study, a total of 251 suitable respondents—both male and female—were recruited from among the following groups: self-employed (such as business owners), employed (such as at universities, banks, offices, shops, and stores), and unemployed.

## 4. Analysis

### 4.1 Demographic Analysis

Table 1 provides the sample's demographic characteristics. The respondents' gender was evenly split, with 52.19% of men and 47.18% of women. Regarding age distribution, the largest age group is those between the ages of 36 and 40, comprising 39.04 percent of the sample as a whole. Participants between the ages of 32 and 26 make up 28.69 percent of the sample as a whole. The age groups with the lowest percentages are those from 40 to 43 (17.53%) and those between 27 and 31 (14.74%). Thirteen percent of respondents are single, eighty-one percent are married, and six hundred and seventy-seven percent are divorced or widowed.

With a graduation degree, 62.55% of respondents had the greatest level of education, followed by a post-graduate degree (16.73%) and a doctorate (12.75%). Merely 7.57 percent of the participants had only completed secondary education or less.

The survey finds that 41.43 percent of participants are working, followed by 35.06 percent of independent contractors, 19.12 percent of students enrolled full-time, and 4.38 percent of jobless people. 43.43 percent of participants trade weekly, followed by 31.47 percent on a monthly basis and 10.76 percent on a quarterly basis in terms of trading frequency. In the meantime, 3.19 percent of participants trade more frequently than quarterly, and 12.75 percent of active participants trade daily.

### 4.2 Quantitative Data Analysis

Analysis of the data collected through the questionnaires was carried out for each construct of Herding bias. Validity and Reliability of the data has been established. The purpose was to first find the correlation between each construct of bias and retail investor decision. Linear regression

and Linear step wise regression analysis have been carried out to analyse the influence of the herding bias in investor decision. The purpose of this analysis is to integrate the main concepts of the study i.e. Herding bias and to establish the relationship with the Investor Decision as a theoretical framework of the study.

#### 4.2.1 Construct Validity

**Convergent Validity:** The study uses the coefficient alpha value to assess each construct's dependability. This method looks into the internal consistency of all underlying items to determine how well the measurement can describe particular structures. According to Cortina (1993), a greater Cronbach's alpha value denotes a higher level of data dependability. According to Hair et al. (1991), the items ought to be loaded onto a single factor (Anderson & Gerbing, 1991), with a factor loading of at least 0.50. Another summary measure of convergence is the average variance extracted (AVE). Establishing convergent validity requires an AVE value greater than 0.5.

The factor loadings for various parameters of Herding bias and Retail Investor Decisions are shown in Table 2 The study reliability of each construct ranges from 0.694 to 0.818. Given that every factor loading value above 0.5, there appears to be a significant degree of convergent validity. The calculated values of AVE are also more than 0.5, so it also establishes convergent validity.

#### 4.2.2 Reliability

According to Nunnally and Bernstein (1994), Cronbach's alpha coefficient should be more than 0.70, in order to be assured about the internal consistency. If the value is more than 0.7, it can be assumed that the scales used in the study are reliable. Cronbach's alpha value was calculated for each instrument in order to gauge internal consistency of reliability. Table 2 shows the Cronbach's alpha value of each variable. Since all the values are more than 0.7. It establishes the reliability of the data.

**Composite Reliability:** In Table 2, the value of 0.70 of composite reliability has been regarded as acceptable (Nunnally & Bernstein,1994). Both the tables show that the values of Composite Reliability (CR) are more than 0.7; hence reliability of data is established.

**Discriminant Validity:** Table 3 for Herding Bias constructs shows the comparison between square root of AVE and correlation. The tables demonstrate that there are no correlation estimates higher than square root AVE (below the diagonal), indicating that the study's discriminant validity is adequate.

### 5. Data Analysis

Initially, Pearson Correlation is used to explore the correlation between the Pearson Correlation Coefficient between Retail Investor Decision and Independent Variables. The analysis reveals that there is no violation of the assumptions of linearity and all the associations except Word of Mouth (WM) were found to be significant either at 99 percent or 95 percent significance level.

Table 4 shows that the strongest association of the Retail Investor Decision is with Stock Characteristics followed by Investor Cognitive Psychology (ICP), Fear of Missing Out and Market Information. having r value equal to .645, .561, .530, .255 respectively.

However, Word of Mouth has a negative impact on Investor Decisions as the coefficient value is -.207. This implies that the four factors viz Fear of Missing Out Stock Characteristics Market

Information and Investor Cognitive Psychology (ICP) has positive impact on the investor decision.

Regression analysis is used to explore the relationship amongst 'Investors investment decisions and the constructs of Evaluation Criteria. The mathematical expression of the research model for the above relationships is displayed as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + e_t$$

Y = Investment Decisions

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}$  = coefficients of dimensions of Herding Bias

Dimensions of Herding Bias:  $X_1 = \text{PBO}, X_2 = \text{TP}, X_3 = \text{DBO}, X_4 = \text{NV}, X_5 = \text{IQ}, X_6 = \text{ECF}, X_7 = \text{CAU}, X_8 = \text{HRU}, X_9 = \text{CSR}, X_{10} = \text{EB}, X_{11} = \text{OC}$

$e_t$  = Error term

Since the construct 'Word of Mouth' has negative impact on Retail Investor Decision, it has not been considered in further analysis of the data.

A linear connection between the observed and perceived values of the dependent variable is represented by the Multiple Correlations (R).

In order to check for correlation between residuals, the Durbin – Watson Test statistics was carried out. Field (2006) suggests that Durbin – Watson Test statistics value less than 1 or more than 3 are not acceptable. However, value near to 2 means that residuals are not related. Result of D-W test is shown in Table 5 Value of Test is 1.992 which is close to 2. It shows that residuals are independent, thereby fulfilling the assumption for applying the regression model.

The regression coefficient (R-Square) determines the strength of correlation in the model between the dependent and independent variables. The results are tabulated in Table 5. It shows that coefficient of determination or R-Square is equal to 0.621 indicating the high proportion of explained variance. It shows that model explains 62.1.3% of influence Investor Decision.

Coefficient Model summary as a result of Liner Regression Analysis is as shown in Table 6. Beta values under headings standardised Coefficients determine the relative importance of significant predictors. The link between the five independent variables (such as fear of missing out, stock characteristics, market information, and investor cognitive) and the dependent variable of the investment choice is displayed in Table 6, based on the linear regression results. Fear of missing out, Stock Characteristic, Market Information and Investor Cognitive Psychology has positive impact on the investor decisions. However, Word of Mouth has a negative impact on Investor Decisions.

Stepwise linear regression analysis was further used to analyse the predictor dimensions of Leadership

Table 7 shows the results of step-wise linear regression analysis. Stock Characteristic accounts for 52.2% of variance in Investor Decision Making. It along with Investor Cognitive Psychology, accounts for 57.4% variance. The three parameters viz Stock Characteristics, Investor Cognitive Psychology and Fear of Missing Out account for 60.5% variance in Investor Decisions. The four constructs together account 62.6% variance in decision making. The remaining variance is due to unaccounted factors.

## 6. Hypothesis Testing and Findings

Based on the test of hypothesis done, the results indicate the relationship obtained amongst different constructs. The results indicate that H1: Fear of missing Out has a positive impact on the Retail investor decision. However, it does not have the maximum impact. FOMO along with stock Characteristics, Investor Cognitive Psychology account for more than 60% impacts on decision making. Hence H1 is accepted. This result is supported by the results given by Gupta and Shrivastva (2023). Analyzing Table 6 and 7 it has been concluded that this construct (Stock Characteristics) has maximum impact on the decision making and alone accounts for more than 52% impact on it. Hence H2 is accepted. Also, Market Information has a positive impact on Decision making. From the Table 6 and 7 it has been concluded that MI, FOMO, ICP and SC combined has more than 62% impact on Decision making. Hence H3 is accepted. Table 7 shows that Investor Cognitive Psychology also has a positive impact on the Retail Decision making. Table 7 also shows that ICP along with SC have more than 57% impact on decision making. Hence, H4 is accepted. H2, H3 and H4 are supported by the results given by Khan et al., 2017. While performing the analysis for hypothesis H5, Table 7 indicates that Word of Mouth has negative impact on Retail decision making. Hence H5 is rejected. The result obtained is against the findings given by Hwang, 2023.

Hence, in the figure 2 model is derived based on the hypothesis proven from the analysis. The model indicates that Word of Mouth does not have any positive impact on Retail Investors Investments Decisions.

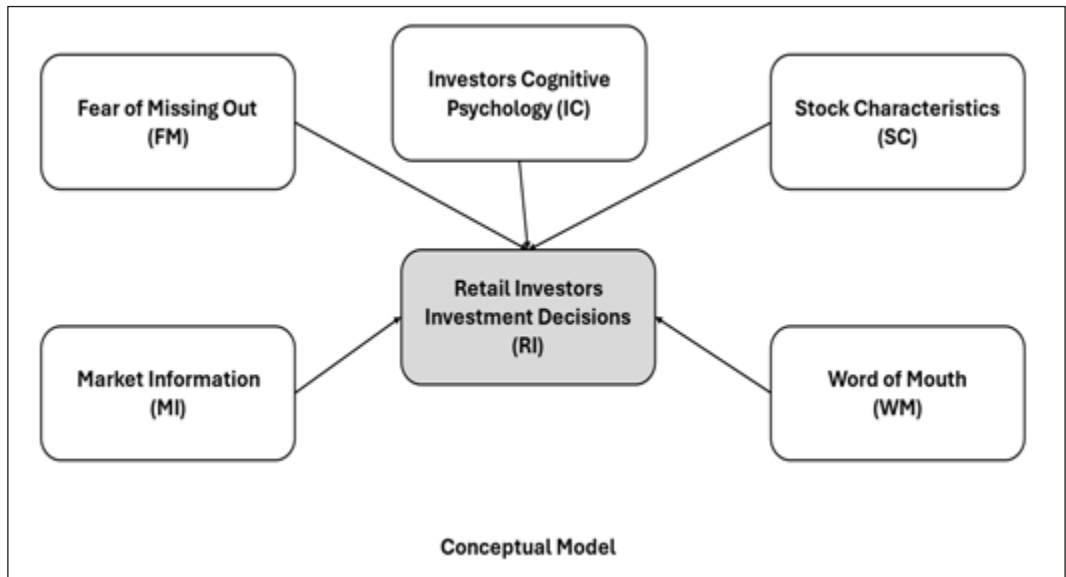
## 7. Limitations and Scope for Future Research

One of the study's shortcomings is the limited selection of behavioral variables for use as dependent variables. Because of time constraints, only five psychological variables are tested in this study. With a low R squared value, it was unable to explain how behavioral aspects affected investment decision-making. The validity of the findings may be impacted by the study's small sample size (n 251). It appears that these 251 sample sizes are not enough to clearly interpret every member of Generation Y in India. Larger sample numbers would have increased the cost of data collection due to travel costs and time commitment, but we were unable to obtain them. The accuracy of the findings in this study may be impacted since different geographic regions may have distinct lifestyles and cultures, which may have an impact on investors' decision-making processes and behavior.

To make up for this research paper's shortcomings, additional behavioral characteristics pertaining to Generation Y in India, such as anchoring, gambling behavior, under- or overreaction, risk avoidance, and others, should be studied. Compared to the combination of these five dependent variables in this study, another possible combination of behavioral characteristics may have a more substantial impact on investment decision-making (better R squared). In order to increase the validity of the findings, a bigger sample size should be obtained in a subsequent investigation. It should be encouraged for researchers with more free time, like full-time students, to take their time gathering data in order to get a larger sample size.

Data collecting may benefit from and be made easier in the future by the convenience and advancement of infrastructure, as well as Internet availability, particularly in rural locations. In order to increase the accuracy of the study's findings, a larger geographic area and data from as many states as possible should be included in future research. You may accomplish this by asking friends who live in other states or regions to assist with gathering data, or you could organize a group of people who come from various places to conduct the survey.

**Figure 1: Conceptual Model**



**Table 1: Respondents Profile**

Demographic Data

		No's	%
Gender	Male	131	52.19
	Female	120	47.81
	Other	0	0.00
Age (yrs.)	27-31	37	14.74
	32-36	72	28.69
	36-40	98	39.04
	40-43	44	17.53
Marital Status	Married	201	80.08
	Unmarried	33	13.15
	Divorce/ Widowed	17	6.77
Educational Level	Secondary or lower	19	7.57
	Graduation	157	62.55
	Post Graduation	42	16.73
	Doctorate	32	12.75

		No's	%
Employment	Self Employed	88	35.06
	Employed	104	41.43
	Unemployed	11	4.38
Trading Frequency	Full time Student	48	19.12
	More than quarterly	8	3.19
	Quarterly	27	10.76
	Monthly	79	31.47
	Weekly	109	43.43
	Daily	32	12.75

**Table 2: Reliability Analysis**

	Constructs	Mean	S. D	Factor Loading	AVE	CR	Alpha Value
Fear of Missing Out					0.58	0.874	0.703
FM1	It bothers me when I do not hear news about my investments.	4.27	0.671	0.785			
FM2	I get anxious when I do not know what the companies, I am investing in are planning.	3.79	0.71	0.756			
FM3	I would like to be immediately updated about the trends in stocks I have invested in.	4.13	0.695	0.789			
FM4	It bothers me if I miss out on investment opportunities.	4.17	0.706	0.765			
FM5	I fear being the last to know about news that is relevant to my portfolio.	4.17	0.789	0.712			
Stock Characteristics					0.602	0.883	0.753
SC1	My investment decision is based on expected corporate earning	4.06	0.789	0.802			
SC2	I often rely on the data provided by the company on its past performance	4.14	0.724	0.791			
SC3	Stock marketability is one of the factors on which my investment decision is based	4.09	0.735	0.734			
SC4	I consider dividend paid by the company in the last 2 years	4.11	0.714	0.812			
SC5	I try to calculate expected Dividend to be paid by the company	4.14	0.733	0.737			
Market Information					0.605	0.821	0.801
MI1	Market information is important for my stock investment.	4.17	0.694	0.791			
MI2	I check the market information before making stock purchases or sales.	4.21	0.695	0.769			
MI3	I prefer to buy local stocks than international stocks because the information of local stocks is readily available.	4.22	0.678	0.773			
MI4	I usually react quickly to the changes of other investors' decisions and follow their reactions.	4.01	0.645	0.713			
MI5	I read financial newspapers to keep myself updated on the market news	4.02	0.654	0.714			

Investor Cognitive Psychology (ICP)					0.633	0.838	0.725
IC1	I feel Investing in stock where everyone else is investing is less risky	4.15	0.692	0.801			
IC2	I invest in stocks where foreign investors are investing	3.99	0.742	0.815			
IC3	I consider Information provided by stock brokers is reliable	4.01	0.741	0.771			
IC4	I usually get confused regarding where to invest due to too many options, so I prefer to invest in the same type of investments again and again.	3.94	0.689	0.763			
IC5	When I need to make quick decision, following most investors behaviour is fast and certain	4.01	0.699	0.782			
Word of Mouth					0.631	0.872	0.743
WM1	On hearing a rumour, I try to obtain further information supporting the view rather than looking for contradicting news.	3.75	0.751	0.769			
WM2	I often immediately sell/exit my stock when I hear a strong negative news on TV without waiting further.	4.02	0.769	0.813			
WM3	I feel the information spread by word of mouth is not correct	4.01	0.758	0.784			
WM4	I consider investment decisions are influenced by the communication skill of the speaker	4.12	0.742	0.811			
WM5	I feel investment decisions are influenced by the recommendation style	3.87	0.659	0.793			
Retail Investor Decisions					0.631	0.872	0.735
RI1	My investment in stocks has a high degree of safety.	4.13	0.738	0.818			
RI2	My investment pays me higher dividends as compared to others.	4.06	0.748	0.832			
RI3	My investment has a lower risk compared to the market in general	3.86	0.681	0.759			
RI4	My investment in stocks has demonstrated increased revenue growth	4.35	0.623	0.766			
RI5	The rate of return obtained on my investments is equal to or higher than the market's average rate of return	3.87	0.634	0.794			

**Table 3: Corelation between Constructs and AVE**

	FM	SC	MI	ICP	WM
FM	0.761				
SC	.356**	0.775			
MI	.275**	.208**	0.777		
ICP	.097*	0.017	.230**	0.795	
WM	.151**	.148**	-0.064	.334**	0.794

**Table 4: Pearson Correlation Coefficient between Retail Investor Decision and Independent Variables**

RI	FM	SC	MI	ICP	WM
	.530**	.561**	.255**	.645*	-.207*

**Table 5: Results of Linear Regression Analysis on Model Summary**

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.791a	0.626	0.621	0.141	1.992

**Table 6: Results of Linear Regression Analysis: Coefficient Model Summary**

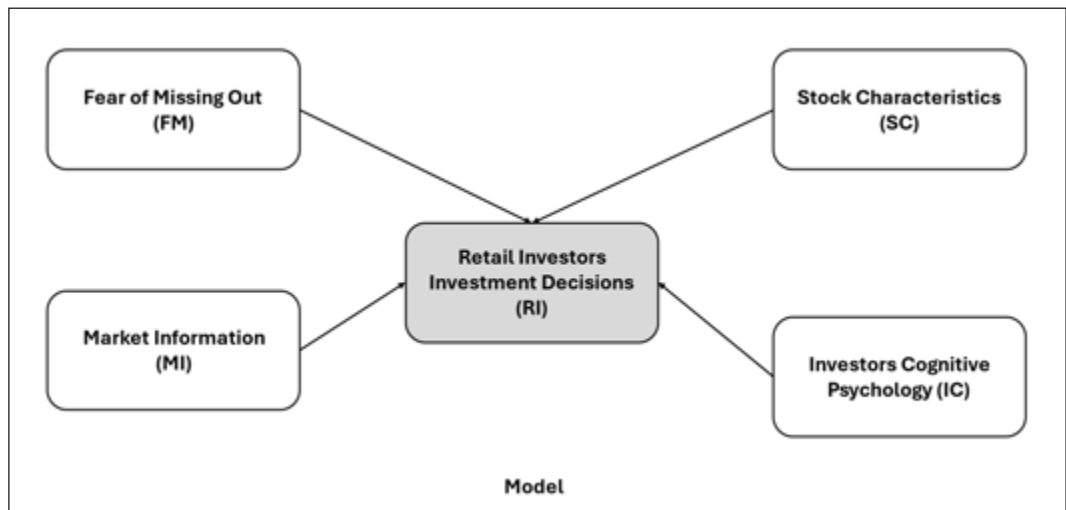
Model		Standardized Coefficients	S. E
1	(Constant)		0.014
	Fear of Missing out	0.546	0.021
	Stock Characteristics	0.556	0.051
	Market Information	0.234	0.025
	Investor Cognitive Psychology	0.623	0.031
	Word of Mouth	-0.223	0.052

**Table 7: Step-wise Regression Analysis: Retail Investment Decisions**

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.723a	0.522	0.521	0.395	
2	.758b	0.574	0.572	0.322	
3	.778c	0.605	0.602	0.309	
4	.791d	0.626	0.623	0.141	1.99

- Predictors: (Constant), Stock Characteristics
- Predictors: (Constant), Stock Characteristics, Investor Cognitive Psychology
- Predictors: (Constant), Stock Characteristics Investor Cognitive Psychology, Fear of Missing out
- Predictors: (Constant), Stock Characteristics Investor Cognitive Psychology Fear of Missing out, Market Information
- Dependent Variable: Investor Decisions

Figure 2: Final model based on the Data Analysis



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# Millets Purchase and Consumption Behaviour- Current Trends and Implications for Future Research Based on Systematic Literature Review

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## **Abstract:**

*The popularity of millet is on the rise due to its nutritional, health and environmental benefits. The main aim of the study is to understand the current trends in millet purchase and consumption behaviour and to suggest future research directions. The methodology adopted for the study is a systematic literature review. The analysis is based on content and thematic analysis. The study used secondary data from the research papers published in national and international journals. In total 20 research papers were selected based on their fulfilment of the eligibility criteria. The results of the thematic analysis revealed 15 areas in the research findings related to the purchase and consumption behaviour of millets. The 15 areas are general millet consumption behaviour, millet awareness and consumption impact, preferred meal period for consuming millets, millet recommendation to friends and family members, millets consumption and geographical location relationships, millet consumption and demographic factor relationships, health & nutritional benefits of millets, consumption frequency of millet, perception about millets, reasons for consuming millets, reason for not consuming millets, millet promotion recommendations, millet type preferences, millets affordability and KAP about Millets. The results of this study will be beneficial for researchers to know the gaps in the literature and to gain a clue to conduct forthcoming research based on the recommended future research directions of the present study. The study will help marketers align their promotional strategies with millet purchase and consumption.*

**Keywords:** Millets, Millet Purchase, Millet Consumption, SLR (Systematic Literature Review), Millet trends, Millets Future Research Directions.

## **1. Introduction**

Never judge a book by its cover is one of the popular quotes used in day-to-day life. This quote does not apply only to books or people but it applies to grains too. A grain that looks very tiny but is packed with multiple nutritional benefits such as fiber, protein, vitamins, minerals, magnesium, calcium, iron and phosphorus has been called a miracle grain since ancient times. This miracle grain that is proudly finding a place in everyone's plate across the globe is called

millet. Millets are a part of the cereal grain from the Poaceae family or grass family. The main consumers of millets are from Asia and Africa and millets are becoming popular across the length and breadth of the world. Other interesting attributes of millets are gluten free, rich in antioxidants, packed with soluble fiber and low glycemic index. Due to the presence of multiple nutritional properties in the millet and its high flexibility to the human body, it provides multiple health benefits. The health benefits of consuming millet are that, it enhances gut health, prevents/ controls diabetes, prevents/ reduces cholesterol levels, helps to recover from digestive challenges such as constipation and bloating, is best for people with celiac disease, manages blood pressure and assists in weight loss.

Since the discovery of millets as a grain for human consumption, millets have seen several ups and downs in retaining themselves as part of the main grain used in daily consumption. The popularity and the demand for millet are steadily increasing due to the increasing health-related disorders among the general population and due to the promotion from agencies such as the Food and Agriculture Organization (FAO) and, the United Nations. The year 2023 was declared the International Year of Millets (IYM). In the closing ceremony of IYM, millets were announced as “Global Superfood” citing its nutritional and health benefits.

As per the report published by Mordor Intelligence, the market size of the millet is estimated at USD 11.53 billion in 2024 and the market is expected to touch USD 14.43 billion in the year 2029. The millet market is expected to grow at a CAR of 4.60% during the period 2024-2029. With regards to India, India is the largest producer of millet with an attractive statistic of 38.40% of the world’s millet production (Food and Agricultural Organisation) as reported by APEDA (Agricultural and Processed Food Products Development Authority). With regards to consumption of millets based on the report of Statista, consumption of Sorghum in India accounts for 4.45 million metric tons and other millet consumption exceeded 13 million metric tonnes during the year 2022. These statistics indicate a positive trend in the production and consumption of millets.

One of the important phases in the success of any business is the product purchase and consumption by the consumers in the market. Millet’s purchase and consumption are evolving only in the recent times in the market. Academic literature related to millet purchase and consumption is limited and it makes it difficult for the stakeholders to make decisions or to develop a strategic business plan to promote millet. In this context, the present study is focused on understanding the purchase and consumption of millets using an evidence-based approach called Systematic Literature Review.

## **2. Objectives of the study**

### **Research Question:**

Research Question:1: What are the reporting’s of the research papers that investigated the purchase and consumption behaviour of millets?

Research Question 2: What are the patterns reported in the findings of the research papers related to the purchase and consumption of millets?

Research Question:3: What are the factors influencing the purchase and consumption of millets and the current trends?

Research Question 4: What is the available scope to conduct future research related to the purchase and consumption of millets?

**Objectives:**

1. To review the existing review of literature related to Millet purchase and consumption Behaviour to understand the Current Trends in the Millet purchase and consumption.
2. To know the factors influencing the Millet purchase and consumption and to recommend future research directions.

**3. Methodology**

Dewey, A. & Drahota, A. (2016) reported SLR (systematic literature review) as a process of identification, selection and critical appraisal of the existing research to answer the research question of a study. Gough, D et al., (2017) defined SLR as a review type that intends to collect large research reports and summarize the research findings to answer a specific research question by adopting rigorous methods. The authors reported steps to conduct SLR. The four steps are indicated in table:1.

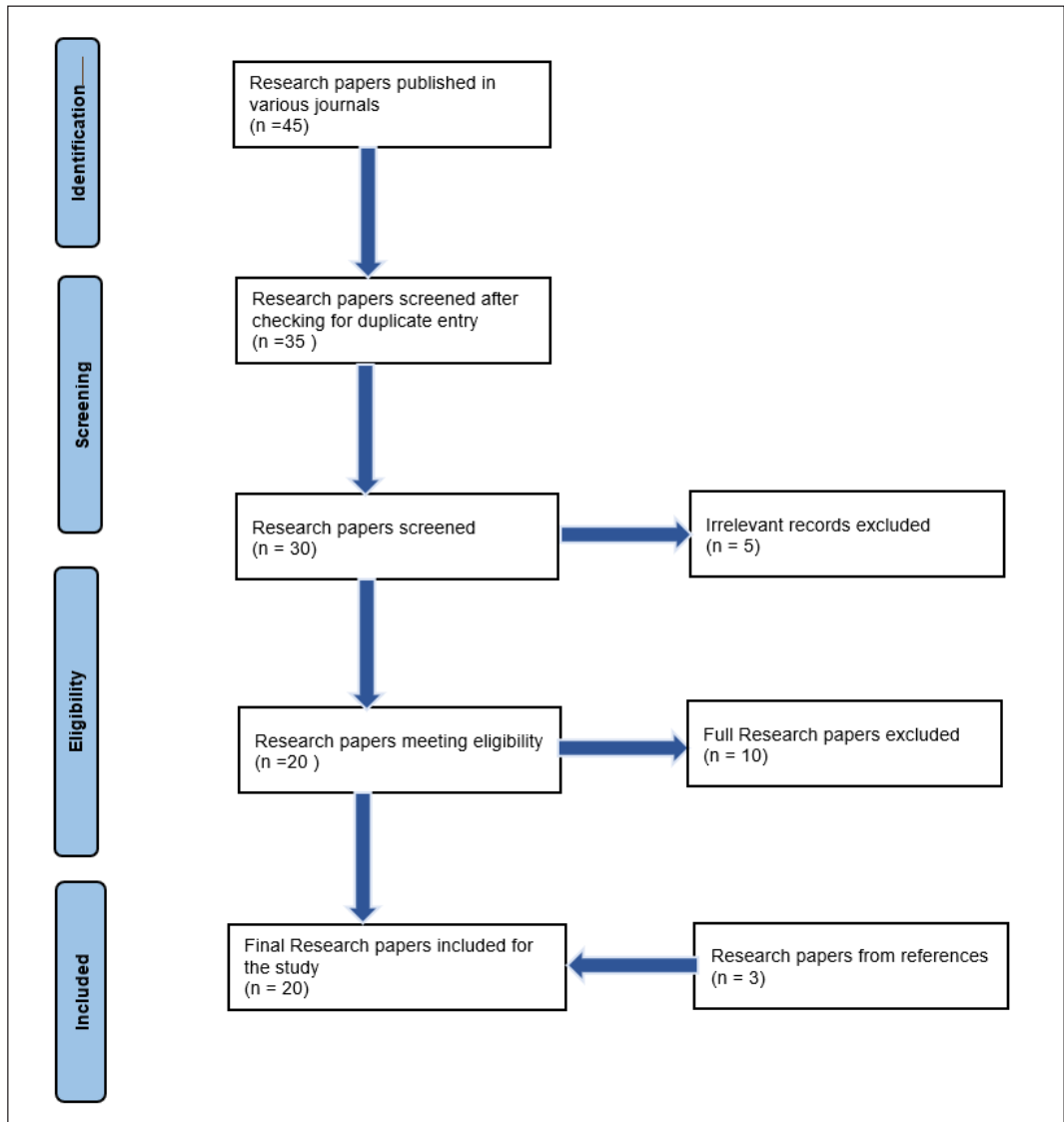
**Table:1: Steps in Conducting a Systematic Literature Review**

Steps	Step Description
Step:1	Identification of relevant research reporting
Step:2	Systematically reviewing and investigating the research findings reported in the research reporting
Step:3	Synthesizing the findings reported in the research reporting
Step:4	Understanding and concluding the research by addressing the research question

The author Pittway (2008) reported 7 important principles for conducting a systematic literature review. The principles are transparency, clarity, integration, focus, equality, accessibility and coverage. The methodology to achieve the objective is a systematic literature review. Considering the applicability and relevance of SLR to the present study, a systematic literature review (SLR) was focused on understanding the prior research relevant to millet purchase and consumption behaviour across the globe. The research question posed for SLR is “What are the trends of consumer behaviour about the purchase and consumption of millets?”. The definition formed for the SLR is “Any studies related to purchase and consumption of millets reflecting the consumer behaviour in the global context. The keywords used for the SLR are millets, millets purchase, millets consumption, millet consumer, millet customer, millet buying behaviour and millet purchase intention. The study included research papers published by journals with Scopus, Web of Science and other indexing platforms as databases. The query for the SLR is based on the keywords proposed for the study.

Any research paper providing insights on millet purchase and consumption was included in the inclusion criteria of the present study. Any other paper that does not reflect the purchase and consumption of millet is excluded from the study. The search process for the SLR is based on the Journal Finder and Journal Suggester. All the research papers reflecting the keywords were selected and then screened based on the abstract of the paper. Papers providing insights on the purchase, selection and consumption of millets were retained and other papers were eliminated. The selected research papers were analysed based on content and thematic analysis and the findings of the research papers were grouped and named based on the specific area the findings were related. The study followed the PRISMA framework for conducting the SLR as exhibited in Figure: 1

**Figure 1.** PRISMA model for screening, excluding and accepting the research papers



Steps for screening and filtering articles for final inclusion in the review study following the

#### 4. Results

Based on the content and thematic analysis, the study identified 15 themes related to the purchase and consumption of millet. The themes are,

1. General millet consumption behaviour
2. Millet awareness and consumption impact
3. Preferred meal period for consuming millet
4. Millet recommendation to friends and family members

5. Millet consumption and geographical location relationships
6. Millet consumption and demographic factor relationships
7. Health & nutritional benefits of millets
8. Consumption frequency of millet
9. Perception about millets
10. Reasons for consuming millet
11. Reason for not consuming millet
12. Millet promotion recommendations
13. Millet type preferences
14. Millets affordability
15. KAP about Millets.

Each theme is separately discussed with the synthesis drawn by observing the patterns of millet purchase and consumption reported among the studies and avenues for future research in the themes also discussed below.

### 1. **General Millet Consumption:**

Shirisha, S.D.S.N (2018) reported that 70% of the consumers consumed millet whereas 30% did not consume millet due to various reasons. The consumption of millet as per Thodeti Manasa et al., (2024) study is higher, 91% of the consumers consumed millet since it was served at their home. reported that millets were included in the diet of the consumers. 79% of the consumed millets and 21% did not consume millets. Adithya Girijavallabhan et al., (2022) reported that the majority of the respondents 89% consumed millet. Rizwana et al., (2023) reported that 62.7% of the women were involved in consuming millet.

Based on the findings of the above studies, it is clear that there is a positive trend in the consumption of millet. The general consumption pattern of millets is between 62.7% to a maximum of 91%. Although the percentage of consumption of millets differs from one study to the other, the percentage of people consuming millets is above 60%. Future research should be based on understanding the variability in the consumption percentage of the millets and knowing the factors that favour or hinder individuals in consuming millets.

### 2. **Millet Awareness and Consumption Impact**

MK Vahini et al., (2023) found an association between awareness of millet and its effect on consumption. Alam Prashanthi et al., (2022) mentioned that awareness of millets contributed to the consumption of millets among school children. Rizwana et al., (2023) reported that although 80.6% of the women knew about millets only 62.7% consumed millets, Contrary to these three studies, U. Sangeetha et al., (2022) reported that awareness of millets did not result in actual consumption.

Based on the above evidence, it is clear that awareness of millets indeed influenced the consumption of millets. One study did not find a positive relationship between awareness and consumption. Future research should be focused on how awareness and what attributes of the awareness are influencing or not influencing the consumption of millet.

### 3. **Preferred meal period for consuming millet**

Thodeti Manasa et al., (2024) reported that 64% of the consumers preferred millet for their breakfast.

The preferred meal period for consuming millet was not found in other research papers selected for the present study. Only Thodeti Manasa et al., (2024) reported that the breakfast meal period is preferred for consuming millets.

Future research should be focused on understanding the role of meal periods and the consumption preference of millet. What factors influence consumers to choose millets for a specific meal period can be an interesting area of research.

#### **4. Millet's recommendation to friends and family members**

Shah et al., (2024) findings revealed that millets were consumed by regular consumers due to their dependency and they had initiated to provide the experience of the millets to their family members. However, the family members viewed millet-based meals were more for convenience.

Based on the above finding, it is clear that meal patterns in the home could influence the members of the family to adopt or try millet as part of their diet. Future research should be focused on how millet recommendations from friends and family members influence the consumption of millet.

#### **5. Millets Consumption and Geographical Location Relationships**

MK Vahini et al., (2023) reported that per capita consumption of millets was higher in urban households (2.29 kg/month) in comparison with Rural India (1.83 kg/month). Kavimalar et al., (2024) highlighted the link between the local production and consumption pattern of millets with specific reference to Karnataka State, the authors highlighted Karnataka as the second largest producer of millets and also a high rate of consumption of millets. Kane-Potaka et al., (2021) reported no statistical significance between state-wise per capita production and millet consumption frequency in the Urban areas. Purvi Jain and Renu Mogra (2023) reported unevenness in millet consumption across geographical locations.

Based on the above evidence, it is clear that the difference in consumption of millets and the production of millets in a specific geographical location differs from one place to the other. Future research should focus on how millet production in a specific geographic location influences the consumption of millets in the same location. What factors contribute to the consumption or avoidance of consumption can be interesting areas of research.

#### **6. Millet Consumption and Demographic Factor Relationships:**

Several studies investigated the association between millet consumption and Demographic factors. Shirisha, S.D.S.N (2018) reported that the education, income, and health level of the family influenced the millet's consumption. The study found that the educational qualification of the consumers and the income status of the consumers influenced millet consumption. A significant relationship was observed among consumers with higher educational qualifications had consumed more millets when compared to consumers with low educational qualifications. Similar to this finding, Lakshmy Priya et al., (2024) reported that monthly income and family size influenced the millets consumption. In particular, consumers with monthly income above fifty thousand per month had higher millet consumption frequency in comparison with consumers below fifty thousand per month income. Contrary to the above studies, Kaur, J et al., (2024) & MK Vahini et al., (2023) reported that consumers consumed millet irrespective of their family income. Age also played an important role in the consumption of millet. The age of the consumer influenced the consumption of the millet. As the age increases, the likelihood of consuming the millet also increases MK Vahini et al., (2023). This study also reported

female consumers enhanced the consumption statistics of millet. Apart from the age and sex of the consumers, the role of educational qualification of the consumers had a minor impact on the consumption of millet. Other studies such as Rizwana et al (2023) also found the role of demographic factors on millet consumption. Age, educational qualification and income had a direct impact on the consumption of millet. K Prasanthi and Dr G Sireesha's (2022) study revealed that consumers who are consuming millets were from the age group of 15-25 years and U. Sangeetha et al., (2022) had consumers from 22-23 years representing the millets consumption population. These consumers were educated with minimum UG qualifications.

Based on the above evidence, it is clear that educational qualification, income level, health status, age, monthly income, and family size influence the consumption of millet. Along with these demographic factors, insights such as the age of the consumer increase in the consumption of millets also increases, higher educational qualifications influencing higher consumption of millets and the role of the female gender in the consumption of millets are worth highlighting. Future research should focus on providing explanations of how demographic factors determine the consumption of millet more comprehensively.

#### **7. Health & Nutritional Benefits of Millets**

Improvement in the health status was noticed by 70% of the study population in Shirisha, S.D.S.N (2018) study. Hence, the author reported that millet consumption positively influenced the health status of the individual and it was attributed to the realization of the consumers towards the nutritional and health benefits of millet. Shah et al., (2024) reported that millet-based meals were prepared for parents experiencing lifestyle diseases. Adithya Girijavallabhan et al., (2022) reported that 90% of the respondents mentioned that millets are known for their nutritional benefits.

Based on the above evidence, it is clear that millet consumption helped to enhance health and to manage lifestyle diseases. This is mainly due to the multi-nutrition presence in the millet and its role in curing lifestyle illness and enhancing the overall health of the consumers. Future research should focus on providing scientific evidence on how millets enhance the health of the individual and how millets help to manage lifestyle diseases.

#### **8. Consumption Frequency of millet**

Shirisha, S.D.S.N (2018) reported that consumers consumed millet daily or on alternate days and it was beneficial for the consumers. Similar findings were reported by Purvi Jain and Renu Mogra (2023). As per the study, 51.67% of the consumers consumed millets frequently, 27.50% consumed millets regularly, 14.17% consumed occasionally and 6.67% of the consumers did not consume millets at all. Lakshmy Priya et al., (2024) reported that 41% of the consumers consumed millets one to 3 times a week to one to three times in a month. However, Adithya Girijavallabhan et al., (2022) reported that only 4% of the consumers consumed millets daily and 23% of the consumers reported consuming millets 3-4 times a week.

Based on the above evidence, it is clear that the frequency of millet consumption among consumers is higher. Future research should focus on providing insights into why millet consumption is high or low in a specific population and the factors associated with the consumption.

#### **9. Perception about Millets:**

Shirisha, S.D.S.N (2018) reported that millets were superior in comparison with wheat or rice. Interestingly, while investigating the perception of the consumers, consumers viewed wheat

or rice had better nutritional value when compared to millet. Shah et al., (2024) highlighted consumers who frequently consume millets had higher awareness of the environmental benefits of millets and its cultivation than the consumers who consume millets occasionally. MK Vahini et al., (2023) highlighted that when the millet consumer holds a positive perception of the taste of millets, it enhances the likelihood of purchasing millets by 12.44%. In the case of a positive perception of millets for its nutritional value, it enhanced the consumption of millets by 14.82%. Adithya Girijavallabhan et al., (2022) reported that 6% of the respondents of the study mentioned millet as rural food. U. Sangeetha et al., (2022) reported a positive attitude towards the consumption of millets.

Based on the evidence reported above, consumers have both negative and positive perceptions. While studies reported positive attitudes towards the consumption of millets, millets being superior and millets having environmental benefits, nutritional value of millets and taste of millets, studies also reported wrong or negative perceptions about millets such as wheat or rice having better nutritional value compared to millets and millet as rural food. Future research should be focused on how consumers form positive or negative perceptions of millet and the factors associated with it.

#### 10. Reasons for Consuming Millets:

Several studies reported the reasons for Consuming millet. Kane-Potaka et al., (2021) reported that millets were accepted by consumers with health problems (28%), consumers trying to lose weight (15%), and consumers selecting millets for taste (14%). Padmalini, S et al., (2023) reported that millets were consumed to maintain overall health. Lakshmy Priya et al., (2024) found that the nutritional value of millets and their health benefits were the main reason for the consumption of millets. MK Vahini et al (2023) indicated a list of influential factors for the purchase of millets, the first one was health benefits, the second one was price and the last one was a taste of the millets. Interesting results regarding the consumption and reason for consuming millets were reported by Adithya Girijavallabhan et al., (2022). The first reason was for the health benefits of millets, and the second reason was for the taste of millets. In the international context, Changmei Shadang (2017) highlighted that consumer selected millets due to their health benefits, ease of preparation and taste of the millets.

Rizwana et al., (2023) reported that millets were consumed due to their potential in preserving health. Immunity building of the self and the family was one of the most important factors for consuming millet. A. Kalaiselvi & L.A.Razia Fathima (2016) millets were preferred by consumers for their nutritive value. Other reasons were, to reduce the consumption of wheat and rice, millets were considered as best food for diabetes, the price of millets, convenience in using millets, taste of the millets and weight reduction. Kaur, J et al ., (2024) reported that millets were consumed due to health-related reasons, family tradition in using millets, and raising awareness of millets, especially among the younger population.

Based on the above evidence, it is clear that the top three reasons for consuming millets are the health benefits of the millets, the taste of the millets, potential to manage or cure health related disorders. Other reasons for consuming millets are the nutritive value of millets, price of millets, reducing the consumption of wheat or rice, family tradition in using millets, increasing awareness of millets, ease of preparation of millets and convenience in using millets. Future research should focus on other factors that may be influencing consumers to purchase and consume millet. Such as environmental factors, availability of millet, recommendations from the important referents etc.

### 11. Reason for Not Consuming Millets:

Padmalini, S et al., (2023) reported the factors inhibiting the purchase and consumption of millet. The factors are low awareness of the nutritional benefits of millets, and lack of availability of millets and millets were expensive in comparison with rice/ wheat. Other reasons for not consuming millet as reported in Kane-Potaka J et al., (2021) were millet not consumed at home and not preferring the taste of millet.

Shah et al., (2024) pointed out that although millets were suitable for any age group of consumers it was not selected by all consumers since millets were promoted as medicinal food. U. Sangeetha et al., (2022) highlighted that the consumption of millets was lacking due to factors such as low purchasing ability, difficulty involved in preparing millet-based products and lack of availability of millet-based products in the market.

Based on the above evidence, the list of reasons for not consuming millets are lack of awareness of nutritional benefits of millets, lack of availability of millets, price of millets being expensive when compared to rice/ wheat, millet not being consumed at home, not liking the taste of millets, promotion of millets by tagging it as a medicinal food, lack of affordability to purchase millets and challenge in preparing millet-based products. Future research should focus on overcoming the challenges of consuming millets by addressing the reasons for not consuming millets as reported in this present study.

### 12. Millet Promotion Recommendations:

For promoting millet among Urban Consumers, Kane-Potaka et al., (2021) recommended to use of social media since social media is the main source of information for the Urban market. The author also recommended three important strategies to increase millet consumption. The strategies are designing tasty millet-based products to satisfy the taste preference of the consumers, making the consumers aware of the nutritional and health benefits of millet and most importantly, making millet accessible and available for the Urban markets. Kavimalar et al., (2024) recommended that millet should be promoted as a staple food not only for its excellent nutritional benefits but for its indirect benefits such as benefits for economic development and agriculture. Adithya Girijavallabhan et al., (2022) suggested ensuring the ease of availability of millets especially for children and young adults to enhance the consumption of millets. In addition, a public distribution system could be a platform for supplying millet, similar to rice or wheat distribution. Alam Prashanthi et al., (2022) recommended that providing education on the nutritional benefits of millets may further enhance awareness thereby increasing the consumption of millets. Shah et al., (2024) mentioned that consumers who were consuming millets regularly and occasionally pointed out that they were not satisfied with the way how millets marketing is done. Millets were promoted as a medicinal food to manage health or reduce weight.

MK Vahini et al., (2023) recommended promoting the millets and their consumption by focusing on attributes such as enhancement of taste of millets, increasing the awareness of millets and making millets affordable to a mass market segment. Mohan, A et al., (2022) recommended that food manufacturing companies should focus on launching a wider choice of millet-based snacks. The authors also recommended the Food and Health Department devising policies for promoting millet-based food. Purvi Jain and Renu Mogra (2023) recommended more popularization of millets to reach a large population. U. Sangeetha et al., (2022) reported that consumers had recommended ready-to-cook or ready-to-eat value-added millet-based products.

Based on the evidence given above, a comprehensive list of promotional strategies of millets reported in the research papers selected for the study are , usage of social media to promote millets among urban market, designing tasty millet-based products, enhancing the taste of millets, rising awareness and educating the consumers about the nutritional and health benefits of millets, enhancing the accessibility of the millets in particular to the Urban markets, children and young adults and mass market, promoting millets as staple food, highlighting the other benefits of consuming millets among the consumers such as ability of the millets to contribute to the development of the economy and helping the farmers growing millets, using public distribution system as a supply chain for distributing millets to the consumer, refrain from promoting millets as medicinal food, launching wider choice of millet based snacks, devising specific policies for promoting millet based food, popularization of millets to wider market, creating more options for millet based ready to cook or ready to eat products. Future research should focus on understanding how the promotional strategies of millets reported influence the purchase and consumption of millets.

### 13. Millet Type Preferences:

Purvi Jain and Renu Mogra (2023) reported that 82.50 % of the consumers had an awareness of Sorghum. Other millets known to the consumers were pearl millet, finger millet, barnyard and foxtail millet. Little awareness of Kodo and Little Millets was found in the study. A comparative study between Urban and Rural consumers to know the choice of millets by Changmei Shadang (2017) revealed that urban consumers preferred finger millets whereas in the rural areas, consumers preferred pearl millets followed by Barnyard and then finger millets. Purvi Jain and Renu Mogra (2023) reported that Sorghum was the top most preferred millet by all age group. The second preferred millet was pearl millet. Proso millets were least preferred by children.

Lakshmy Priya et al., (2024) reported a list of millet-based preparations that are preferred by the consumers. The list includes millet dumplings, millet porridge, millet pongal, millet upma and millet biscuits. The author also reported that consumers practiced mixing millets with other grains in particular with the pulses. The most preferred millets were finger millets and it was witnessed across all income groups. The high preference for finger millet among adolescents was also reported in Thodeti Manasa et al., (2024) study and U. Sangeetha et al., (2022) as well. The author mentioned that preferred millet products were millet dosa batter, millet noodles, millet flakes, millet bread and millet-based beverages. Adithya Girijavallabhan et al., (2022) reported a list of millet-based products consumed by consumers. It includes millet roti, millet kichadi, millet snacks, millet bread, traditional millet-based sweets, millet dumplings/porridge and millet dosa/pancake. Awareness of millet-based products among the majority of the consumers were millet cookies, little millet vermicelli, multi millet noodles/ pasta, millet biscuits, millet idly/ dosa or pancake mix was reported. Anbukkani et al., (2017) reported that the highest consumption of small millets was found across India and in Rural areas. Alam Prashanthi et al., (2022) reported that students with millet awareness displayed awareness of millets such as sorghum, pearl millet and finger millet.

Based on the above evidence, it is clear that top topmost preferred millet is finger millet and the following millet is sorghum. Other millets known to the consumers are pearl millet, barnyard millet, foxtail millet, and proso millet. Millet in the fresh and the processed form includes millet dumplings, millet porridge, millet pongal, millet upma, millet dosa, millet roti, millet kichadi, millet bread, millet biscuits, millet noodles, millet flakes, millet-based beverages, millet snacks, traditional millet sweets, millet pancake, millet cookies, little millet vermicelli, multi millet

noodles, millet pasta and millet pancake is highly recommended. Future research should be focused on understanding the underlying phenomenon towards preference or non-preference of millets and how different types of millets in the natural or processed form influence the purchase and consumption of millets.

#### 14. Millets Affordability

Lakshmy Priya et al., (2024) reported that the majority of the consumers felt that they could afford millet. Adithya Girijavallabhan et al., (2022) reported that only 3% mentioned millet as an expensive product. MK Vahini et al., (2023) reported that as the price of millets increases, the consumption probability of millets.

Based on the above evidence, it is clear that millets are affordable for the consumers in the market and the price plays an important role in determining the consumption of millets. Future research should how different pricing of millets plays a role in the purchase and consumption of millets.

#### 15. KAP about Millets

KAP-related studies in the millets such as K Prasanthi and Dr G Sireesha (2022) indicated that 80% of the consumers had good KAP about millets and only 20% had poor KAP levels. A similar KAP study by U. Sangeetha et al., (2022) consumers in the age groups of 18-19, 20-21, 22-23 had displayed good knowledge and attitude about millets but the practices related to millets were in the range of medium to poor in all age groups.

Based on the evidence reported above, overall, the KAP of the consumers handling millet is acceptable. Future research should focus on the KAP of millets between rural vs urban and the role of demographic factors in the KAP of millets.

#### 5. Limitations:

Although the present study has achieved the objectives set for the study, the data is not free from limitations. The limitations reported in this section can serve as directions for future research in this area. The data for the present systematic literature review is purely from the twenty research papers qualified to be included in the SLR analysis. In this context, the present study acknowledges the limitation in providing total insights on millet purchase and consumption. The insights provided in the present research are exploratory. Generalization of the results reported in the present study should be exercised cautiously. In addition, the study acknowledges a rare chance of missing some relevant research papers meeting the inclusion criteria of the present study. Given the vast research repository and fragments in the publication of the research paper in different journals, the scope of missing relevant research papers exists as a limitation of the present study. In addition, the present study has not included research papers that were published only in the print version. A final limitation of the present study is not including the research papers that were published in any language apart from English.

#### 6. Conclusion:

The concept of millet purchase and consumption is evolving. Important insights that are evident from the synthesis of the literature include the following,

Overall, there is a positive trend towards the purchase and consumption of millets. More consumers prefer to consume millet and the frequency of consumption is also high. The main reason for consumption of millets is due to their nutritional benefits, health benefits, taste of

the millets and power of the millets to manage lifestyle related disorders. This purchase and consumption trend is a boon for the stakeholders including farmers, millet marketers, millet retailers and also to the policymakers. The stakeholders involved in the millet supply chain must join hands together to develop strategies that will ensure continuous enhancement of the millet purchase and consumption experience of the customers by fulfilling the needs and expectations in millets, such as ensuring the nutritional content of the millets is retained, the taste of the millets is enhanced and assist the consumers to reap the health benefits in consuming millets. The marketing strategies should focus on highlighting the powerhouse of nutrition present in the millets, showcasing the health benefits and the taste of the millets.

The present study also found evidence for the relationship between millet consumption demographic factors and geographical locations. Due consideration of the demographic factors and geographical location shall be given while designing the marketing mix or any strategies related to the millet promotion. The present study also highlighted a set of recommendations given by the researchers to promote millets such as using social media to promote millets in urban markets, promoting millets as staple food instead of medicinal food, creating more educational and awareness programmes for the consumers by highlighting the nutritional and health benefits of millets. In addition, the economic and environmental benefits of millet shall also be informed to the consumers.

An interesting finding of the present study is consumers prefer millets in a wider variety of value-added or ready-to-eat formats. The marketers can capture this opportunity to innovate and introduce more choices in the millet-based products in the market. The KAP related to millets was positive as per the evidence reported in the present study. However, there is a scope for improvement in KAP of millets. Beyond creating awareness, the complete KAP of millets shall be focused on to enhance the purchase and consumption of millets and to ensure the retention of the customers. Overall, the present study sheds light on the ocean of opportunities available for the millet business across the globe. Linkage of all the stakeholders under one roof and more collaboration along with active participation will pave the way for the millet to regain its place on everyone's plate as a staple food as how it was during the ancient times.

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# The Relationship between Absorptive Capacity and Knowledge Sharing and Transfer in the Context of Research and Development: A Systematic Review

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## Abstract:

*Absorptive capacity (AC) and knowledge sharing and transfer (KS) are two key concepts for research and development (R&D) driven innovation. This systematic review of 33 articles published from 2010 to 2023, using the Web of Science, explores their interconnection. The review identifies three main themes: AC and innovation performance, knowledge transfer and R&D alliances, and knowledge spillovers and external sources of innovation. The findings suggest that AC and KS in R&D, mutually strengthen innovation, but also highlight challenges like knowledge leakage. The review calls for more empirical studies and context-specific strategies for optimizing KS and AC in R&D environments.*

## Introduction

Within the broader scope of KM, KS serves as a key mechanism for enabling organizations to exchange and develop knowledge internally and externally (Davenport, 1998), and contributing to performance, innovation, and learning (Wang 2010). Hendriks (1999) highlighted KS as essential for leveraging individual knowledge for shared benefit. It includes activities such as education, collaboration, and sharing technology (de Wit-de Vries 2019).

While KS plays a vital role in enhancing organizational innovation, it does not act alone (Balle, 2020). For knowledge to translate into meaningful outcomes, organizations must also possess the ability to absorb and apply it effectively. This is where absorptive capacity (AC) becomes crucial—it reflects an organization's capability to recognize valuable external knowledge, assimilate it, and leverage it for innovation. In fact, AC significantly influences both performance and innovative output (Easterby-Smith, 2008; Flatten, 2011). As Balle et al. (2020) point out, KS and AC are not isolated concepts; rather, they are deeply interconnected and often reinforce one another, where AC influences the effectiveness of knowledge transfer (Minbaeva 2001), and knowledge transfer can enhance AC (Zhang 2023).

The interplay between KS and AC has drawn increasing interest for its impact on modern business (Kartiraharjo 2021; Paulsen, J 2014; Liao S 2007), competitiveness (Ali 2018), innovation (Ye 2021), and KM (Balle 2020), with differing views on their directional relationship, with some studies suggesting that KS is a precursor to AC (Supartha, 2017), while others view it as an outcome of AC (Baker, 2017).

Research and development (R&D) environments where expertise and creativity are high, knowledge is a vital resource (Cohen & Levinthal 1990; Hemlin 2013). It provides the foundation innovation for the development of new solutions (Kang 2017; Burbiel (2009) suggests that KS fosters collaboration and innovation in R&D (Akhavan 2015), while AC enables effective assimilation and application of external knowledge (Elidjen 2022; Lim 2018).

Notwithstanding the evident relevance of KS and AC in R&D, their interrelationship in this context remains underexplored. This review attempts to synthesize literature on the KS–AC relationship in R&D. A systematic review offers an impartial synthesis of current evidence and identifies research gaps and future directions (de Menezes 2011).

Our goal was to consolidate literature on KS and AC in R&D, to provide further understanding into the factors influencing them and to suggest emerging avenues for future research.

This study attempts to address two key questions:

RQ1: What is the relationship between knowledge sharing and transfer and absorptive capacity within the context of R&D?

RQ2: What are the themes, and gaps that require further research?

### **Theoretical Background**

*Knowledge sharing and transfer:* In the contemporary dynamic business environment, knowledge is key sustained competitive advantage (Huang, 2008). KS is widely recognized as vital to effective knowledge management (Huang, 2009) involving collaborative exchanges, leading to the collective generation of fresh ideas (Lee, 2020). KS entails individuals imparting their professional expertise or experiences to assist others gain new understanding (Ortiz 2017). The process entails acquiring and disseminating valuable knowledge within groups (Mustika, 2022).

Moreover, in R&D, KS becomes an iterative process, and multidirectional due to the interaction of diverse stakeholders (Berends, 2006). Bogers et al. (2011) examined KS within the realm of R&D, emphasizing the paradox between sharing and safeguarding knowledge. Xiao (2021) described KS in R&D as influenced by cognitive ability, absorptive capacity, knowledge transformation, complementarity, innovation ability, and risk factors.

Paulin (2012) concluded that the definitions *knowledge sharing* and *transfer* as ‘blurry’, urging integrated study of both. This view is resonated by Jonsson (2008) and Liyanage et al. (2009). More recently some studies (Anand 2021; Alvarez-Meaza 2020; Asrar-ul-Haq 2016) treat them as interconnected elements of the knowledge management process.

*Absorptive Capacity:* AC, a concept that was introduced by Cohen and Levinthal (1989, 1990), AC describes existing knowledge is leveraged to acquire and apply new knowledge for innovation. For instance, in a firm employees scan the environment, bring in external knowledge, and use it to develop new offerings (Martínez-Sánchez, 2020), with individual capabilities contributing to organizational-level AC (Ter Wal, 2017).

Furthermore, AC is a multidimensional concept. While Cohen and Levinthal emphasized identifying, assimilating, and exploiting external knowledge, later studies proposed two broad dimensions: acquiring external knowledge and applying it internally (Contreras, 2021). Zahra and George (2002) termed these as ‘potential’ (acquisition and assimilation) and ‘realized’ (transformation and exploitation) AC.

AC is a key determinant of innovation and competitiveness in R&D-intensive firms (Cordero 2019). R&D enhances both AC and profitability (Leahy, 2007). Collaborative R&D fosters AC by building shared technical understanding and helping identify knowledge holders across units (Frost and Zhou, 2005).

**Methodology:**

Following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, this review ensures a structured and transparent process for selecting and analyzing literature. The PRISMA approach has been effectively applied in management studies to improve the quality and reproducibility of literature reviews (Breugh, 2021; Khatri, 2021).

Data was sourced from the Web of Science (Wos) databases for its broad academic coverage and detailed bibliographic records. Studies were identified through defined search terms, inclusion criteria, and timeframe.

**The Systematic Review Process:** The systematic review procedure involves three fundamental stages: identification, screening, and eligibility. (Fig. 1)

**Identification:** Identification entails a thorough search for synonyms, related phrases, and keyword variations to enhance the database with more search options for finding relevant articles. The query used in this systematic literature review is as it follows: TS = “absorptive capacity” OR “absorptive capabilities” OR “potential absorptive capacity” OR “realized absorptive capacity” AND “knowledge shar\*” OR “Knowledge transfer” AND “Research and development” OR “R&D”) and the search terms were combined with Boolean Operators “OR” and “AND”. [Table 1]

KS, along with its variants—knowledge exchange and transfer—was included as a search term. Although these are conceptually distinct (Noor 2020; de Wit-de Vries 2019; Ahmad 2019), many studies use them interchangeably without clear differentiation (Paulin 2012; Jonsson 2008). The authors did not disregard its overlapping terms, considering them relevant to the sharing of knowledge within organizations.

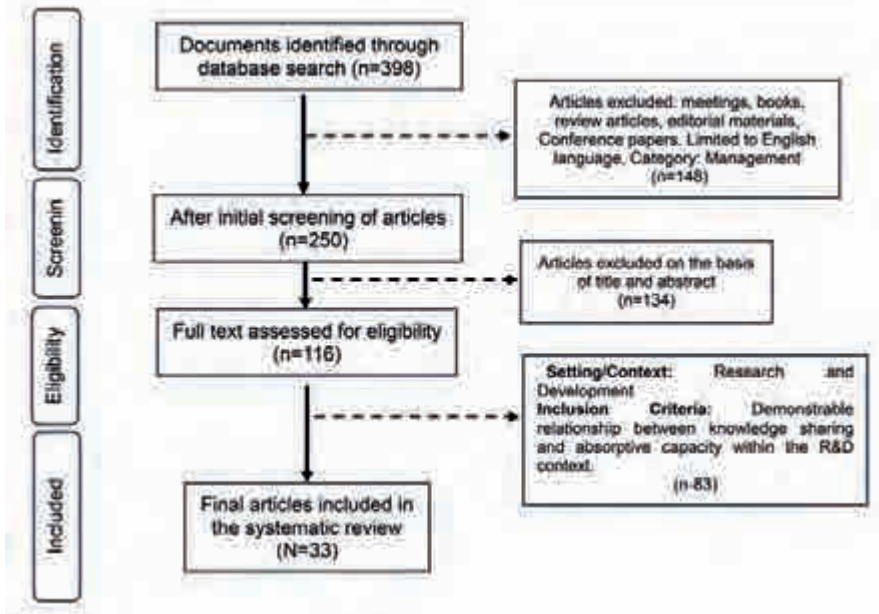
Table 1: Database and Keywords used for search

Database	Keywords
Web of Science	“absorptive capacity” OR “absorptive capabilities” OR “potential absorptive capacity” OR “realized absorptive capacity” AND “knowledge shar*” OR “knowledge transfer” AND “Research and development” OR “R&D”

**Screening:** The screening followed PRISMA guidelines with clear inclusion-exclusion criteria (Fig. 1). After removing books, reviews, editorials, and non-English works—most social science articles being in English (Tenzer 2017)—250 management-focused articles were selected from an initial 398. Data were compiled in Excel, detailing journal, title, keywords, year, author info, and abstract.

**Eligibility:** Eligibility was determined through full-text or abstract review, focusing on R&D contexts with a clear link between knowledge sharing and absorptive capacity. This process yielded 33 relevant articles, aligned with research trends from January 1, 2010, to November 18, 2023, in Web of Science.

Fig 1: Flowchart following the PRISMA guidelines for the systematic literature review process.



**Result and Discussion**

**Descriptive Analysis:**

**Country-wise Distribution:** Analysis of the selected studies (Table 2) shows that the USA and Spain appeared in 6 studies each, followed by China with 4. The UK and Finland featured in 2 studies each, while South Korea, Pakistan, Sweden, Germany, Russia, and Italy had one study each. Six studies covered multiple regions, and one did not specify a location. All studies were empirical, with a predominantly quantitative approach; only one used qualitative method.

**Table 2: Regional Distribution**

Country	Articles considered for review	Country	Articles considered for review	Country	Articles considered for review
USA	6	UK	2	Russia	1
Spain	6	South Korea	1	Italy	1
Cross-country	6	Pakistan	1	Unspecified	1
China	4	Sweden	1		
Finland	2	Germany	1		

**Table 3: Leading articles in the selected literature**

Authors	Cited Reference Count	Times Cited, WoS Core	Times Cited, All Databases	GoogleScholar Citation
Ritala, P et al (2012)	83	363	390	786
Tortoriello, M (2015)	38	171	189	356
Schildt, H et al (2012)	77	124	134	270

Frishammar, J et al (2015)	98	101	112	208
Kang, M et al (2017)	57	87	89	205
Díez-Vial, I et al (2015)	80	82	87	174
Hurmelinna-Laukkanen, P et al (2012)	94	63	67	154
Ceccagnoli, M et al (2013)	44	52	54	126
Schulze, A et al (2014)	110	41	44	119
Lawson, B et al (2012)	80	60	60	117

**Table 4: Prominent keywords**

Author Keywords and Keyword Plus	Frequency of keywords in the selected articles
Innovation	20
Absorptive Capacity	19
Research and Development (R&D)	19
Knowledge Transfer	16
Strategic Alliances	9
Knowledge Management	4
Product Development	4
Firm Performance	4
Dynamic Capabilities	3

Table 4 presents the primary keywords extracted from the articles selected for the systematic review. These keywords comprise a combination of author-provided keywords and “KeywordPlus,” a distinct index available in WoS (<http://webofscience.help.clarivate.com/>).

**Influential research:** Table 3 presents the citation matrix, highlighting the most influential studies. Ritala (2012), with the highest citations, suggests that potential absorptive capacity drives co-competition-based innovation, moderated by the appropriability regime. Kang (2017), the most recent study, shows both potential and realized absorptive capacity positively affect innovation, with KS mediating through realized AC.

### Thematic analysis

Even though the existing literature exhibits significant diversity, three overarching themes (Table 5) emerged from the literature:

**Table 5: Themes identified from the analysed literature**

Themes identified	References
Absorptive capacity and innovation performance	Ritala, P., (2012); Hurmelinna-Laukkanen, P., (2012); Segarra-Ciprés, M., (2014); Tortoriello, M. (2015); Kang, M., (2017); Garcia Martinez, M., (2017); Fudickar, R., (2019); Runge, S., (2022); Zhou, N., (2023).
Knowledge transfer and R&D alliances	Lawson, B., (2012); Caner, T., (2014); Devarakonda, S., (2018); Garcia Martinez, M., (2017); Runge, S., (2022); Friedmann, J.-C., (2023).
Knowledge spillovers and external sources of innovation	Díez-Vial, I., (2015); Devarakonda, S., (2018); Fudickar, R., (2019). Audretsch, D. B., (2022).

**Absorptive capacity and innovation performance:** This theme explores how organizations use external knowledge to enhance innovation. It highlights factors influencing the development and application of absorptive capacity, such as R&D, human and social capital, network structure, governance, and learning adaptability. The studies show how AC enables firms to acquire, assimilate, and apply knowledge, while managing trade-offs between sharing and protecting knowledge.

**Knowledge transfer and R&D alliances:** This theme explores collaboration and exchange knowledge in R&D activities. The papers in this theme focusing on factors that influence knowledge transfer, its role in innovation and value creation, and the dynamics of R&D alliance networks. It underlines how partnerships among firms, universities, and others support learning and innovation while addressing challenges such as coordination, opportunism, conflict, and knowledge leakage. Effective management of alliances and KS processes is key to exploiting outcomes.

**Knowledge spillovers and external sources of innovation:** This theme examines how organizations can leverage unintentional knowledge diffusion from external sources, analyzing their impact on innovation and performance. The papers in this theme investigate the origins, pathways, and management of spillovers, focusing on inter-organizational contexts. Many papers focus on factors like knowledge attributes, individual traits, networks, and institutions influence spillover effectiveness, revealing both benefits and challenges for source and recipient entities.

#### **Mediating and Moderating variables:**

The selected studies highlight key mediating and moderating variables. Kang and Lee (2017) posit that AC as a bridge between KS and the innovative behavior of R&D. Similarly, Rafique et al. (2018) show that learning adaptability and organizational commitment mediate the KS-AC relationship in pharmaceutical firms. Knowledge transfer emerges repeatedly as a mediator (Galati and Bigliardi, 2019; Zhou et al., 2023; Lawson and Potter, 2012; Díez-Vial and Fernández-Olmos, 2015), crucial in shaping R&D ties, innovation, and growth. Other mediators include R&D steering committees (Devarakonda and Reuer, 2018), knowledge leakage in collaborations (Frishammar et al., 2015), and government policy influence (Xu et al., 2014).

Structural holes (Tortoriello, 2015), and resource heterogeneity (Zhang et al., 2021) are examples of such moderating factors shape how external knowledge drives innovation. Knowledge transfer also moderates innovation (Segarra-Ciprés et al., 2014; Caner et al., 2014), depending on flow direction and type. Contextual factors like openness in China's R&D sourcing (Wang et al., 2017) further affect these dynamics. Collectively, these variables reveal the complex interplay between knowledge processes, collaboration, and innovation.

#### **Identified gaps:**

**Need for more empirical studies:** More empirical evidence is need to comprehend the causal effects of AC on innovation performance (Raharso, S. 2021). Furthermore, exploring the interplay between AC and KS in the R&D context is essential, as recent studies suggest their "interdependence and complementarity" (Balle, 2020).

**Optimal Knowledge Transfer:** Excessive knowledge transfer can indeed impede local innovation. Striking a balance between knowledge transfer and protecting local innovation is a topic of ongoing research (McNichols, D. 2010, Wu, C 2018).

**Table 6. Summary of reviewed articles**

SI No	Title of Article	Purpose	Methodology	Setting	Findings	Relation between KS and AC
1	Absorptive capacity, knowledge sharing, and innovative behaviour of R&D employees (Kang, M., et al. 2017)	Explores the link between AC and KS, as they relate to individual innovative behaviour.	Data was collected through a survey of 138 R&D employees. Analysis done using structural equation modelling.	R&D department of a multinational electronics company in South Korea	Potential and realized absorptive capacity positively influence innovative behaviour, with KS indirectly affecting it via the mediation of realized absorptive capacity.	Potential absorptive capacity enriches KS, and KS strengthens realized absorptive capacity.
2	Knowledge Sharing and Safeguarding in R&D Collaborations: The Role of Steering Committees in Biotechnology Alliances (Devarakonda, S et al 2018)	The impact of steering committees in biotech R&D alliances on sharing and protection.	Utilizes propensity score matching and negative binomial regression. Analyzes steering committees' impact on post-alliance KS with cross-citations. Data from alliance contracts and patent information.	Non-equity R&D alliances in the biopharmaceutical industry from 1987 to 2006	Steering committees promotes KS and mitigate misappropriation, while also reducing the influence of technology overlap and knowledge value on knowledge transfers.	AC increases knowledge utilization but raises misappropriation concerns. Steering committees help manage knowledge spillovers and protect a firm's knowledge assets.
3	The social underpinnings of absorptive capacity: the moderating effects of structural holes on innovation generation based on external knowledge (Tortoriello, M. 2015)	To examine how individuals leverage external knowledge for innovation and the role of their position in the internal KS network.	Data from 276 professionals in multinational tech company R&D labs. Measures external knowledge, innovation, and structural holes in the network.	R&D unit of a leading semiconductor company	External scientific knowledge boosts innovation. External industrial knowledge hinders innovation. Structural holes strengthen the link between external scientific knowledge and innovation.	KS is key for utilizing external knowledge for innovation. Internal network structure is pivotal for strengthening AC
4	Impact of knowledge sharing, learning adaptability and organizational commitment on absorptive capacity in pharmaceutical firms based in Pakistan (Rafique, M., et al 2018)	To find the influence of KS, learning adaptability, and organizational commitment on AC.	Survey of 102 middle managers from 80 pharmaceutical companies, uses multiple regression analysis.	Pakistan's pharmaceutical industry	KS, learning adaptability, and organizational commitment all positively affect AC. KS has the strongest influence among them.	KS enhances AC and facilitates knowledge acquisition, assimilation, transformation, and exploitation. It also fosters a culture of collaboration and trust.
5	Incremental and Radical Innovation in Cooperation—The Role of Absorptive Capacity and Appropriability (Ritala, P et al 2012)	Evaluates potential absorptive capacity and appropriability regime on cooperation innovation. Separates incremental and radical innovations. Analyses explanatory variables for each innovation type.	Cross-industry survey for research. Multivariate multiple regression analysis. Investigates the effects on both incremental and radical innovation.	A cross-industry sample of Finnish companies, specifically engaged in R&D. Sample comprises 762 companies.	Potential absorptive capacity positively affects incremental and radical innovation in cooperation. Appropriability regime moderates the relationship between AC and innovation outcomes.	Importance of KS and AC in cooperation for value creation. Emphasizes the need for firms to find a balance between KS and protection.

6	Orchestrating R&D networks: Absorptive capacity, network stability, and innovation appropriability (Hurmelinna-Laukkanen, P. et al 2012)	Explores how absorptive capacity, network stability, and innovation appropriability contribute to the success of R&D networks.	Survey data from 213 R&D-intensive Finnish firms are analyzed using linear regression to test hypotheses derived from the theoretical framework.	Networked R&D and innovation activities in Finland	AC and network stability boost alliance success. AC and innovation appropriability improve firm-level innovation performance. Network stability has limited impact on innovation performance.	KS in a network boosts AC, facilitating effective knowledge utilization for innovation
7	External knowledge acquisition and innovation output: an analysis of the moderating effect of internal knowledge transfer (Segarra-Ciprés, M. et al 2014)	Identify conditions favouring external knowledge integration in innovation, focusing on internal knowledge transfer.	Uses structural equation models to test hypotheses on 188 innovative technology-based firms (ITBFs) in Spain	Spanish Centre for the Development of Industrial Technology national database	External knowledge acquisition positively impacts innovation output, especially when R&D personnel can share knowledge effectively.	KS improves AC by leveraging external knowledge and fostering innovation, a process influenced by the willingness and competence of R&D personnel and the internal transfer environment.
8	Redesigning the model of the initiation and evolution of inter-firm knowledge transfer in R&D relationships (Galati, F., et al 2019)	Elaborate the model of inter-firm knowledge transfer in R&D relationships, originally developed by Faems et al. (2007)	Case-study approach, data through interviews and uses deductive analysis.	34 dyadic inter-firm R&D relationships. Only engineering to order (ETO) firms were selected	Enhance Faems et al.'s model by confirming its structure and identifying key differences leading to R&D relationship dissolution.	Indirectly Implies that absorptive capacity is vital for effective knowledge sharing in inter-firm R&D collaborations.
9	Characteristics of knowledge, people engaged in knowledge transfer, and knowledge stickiness: evidence from Chinese R&D team (Huan, H., et al 2017)	Explore factors influencing knowledge stickiness in Chinese R&D teams.	Employs a survey to collect data from 276 R&D employees in China. Utilizes confirmatory factor analysis (CFA) and regression analysis.	Chinese R&D teams, known for high knowledge intensity and complexity	Knowledge retention factors are transfer capacity, willingness, location, articulation, and AC. Transfer capacity mediates willingness, while location mediates articulation. AC moderates' knowledge retention	Emphasizes AC role in KS. Proposes its role in counteracting knowledge residence. Encourages it through updates, external learning, and internal integration.
10	When a firm's centrality in R&D alliance network is (not) the answer for invention: The interaction of centrality, inward and outward knowledge transfer (Canet, T., et al 2014)	Explore centrality, inward, and outward knowledge transfer's impact on invention output in the biopharmaceutical industry.	Employs a two-stage instrumental variable regression with generalized method of moments estimator for panel data analysis using a dataset of 2209 firm-year observations from 287 biopharmaceutical firms over 18 years	US biopharmaceutical industry, characterized by patenting, R&D alliances, and out-licensing activities,	Inward knowledge transfer boosts centrality's impact on invention output, while outward transfer weakens it but together enhances invention output.	Inward knowledge transfer like AC enhances the assimilation, transformation, and utilization of external knowledge, improving the efficiency of integrating network knowledge for invention creation.
11	From learner to innovator: knowledge transfer from a parent MNE and foreign subsidiaries' local innovation (Zhou, N., et al 2023)	Examine the impact of knowledge transfer from a parent multinational enterprise (MNE) on local innovation in foreign subsidiaries. Investigate moderating factors influencing this relationship.	Analyzes panel data of patent applications. Employs negative binomial regression models to test hypotheses	Foreign subsidiaries of 75 large MNEs in China.	An inverted U-shaped link between knowledge transfer and local innovation, with various moderators.	Knowledge transfer boosts AC but excessive transfer can impede local innovation, suggesting an optimal balance.

12	Research and development project management best practices and absorptive capacity: Empirical evidence from Spanish firms (Vicente-Oliva, S., et al 2015)	Explore the link between R&D project management and absorptive capacity (AC) in Spanish firms and the role of past experiences in bolstering AC	Qualitative interviews and a quantitative survey. Employs factor analysis and structural equation modelling.	69 Spanish firms with R&D projects or collaborating with the University of Zaragoza [2005-2010]	R&D project management boosts AC, with varying effects on AC dimensions. Learning from past R&D experience enhances external knowledge utilization.	Emphasizes the role of project managers in promoting KS to enhance AC. Project management practices enhance a firm's AC through KS and learning from past R&D experiences.
13	Knowledge transfer and home-market innovativeness: A comparison of emerging and advanced economy multinationals (Stemberg, P. J., et al 2021)	Compare knowledge transfer mechanisms of EMNEs and AMNEs for home-market innovation	Primary data from a survey and regression analysis to examine relationships	MNEs with R&D activities from China and India and Germany and the U.S., excluding pharmaceuticals..	EMNEs gain more from mechanisms boosting recipient capabilities and sender motivation, especially when pursuing technology-seeking internationalization.	KS is vital for MNEs' home-market innovation, relying on AC..
14	Determinants of knowledge transfer in inter-firm new product development projects (Lawson, B., et al 2012)	Investigate factors influencing knowledge transfer in inter-firm new product development (NPD) projects.	Utilizes survey data. Employs structural equation modeling (SEM).	153 R&D-intensive manufacturing firms in the UK	Learning intent increases inter-firm knowledge transfer and supplier protectiveness. AC reduces knowledge ambiguity and promotes knowledge transfer.	Learning intent enhances inter-firm KS and supplier protectiveness, which creates knowledge ambiguity. AC diminishes knowledge ambiguity and facilitates knowledge transfer.
15	The Paradox of Openness: How Product and Patenting Experience Affect R&D Sourcing in China? (Wang, T., et al 2017)	Investigating the impact of a firm's product and patenting experience on its external R&D sourcing in the context of China	Utilizing panel data from high-tech firms. Applying a fixed-effect model to test hypotheses. Addressing potential endogeneity issues using instrumental variables	575 high-tech firms, within China's National High-Tech Industrial Development Zones	Product experience fosters external R&D sourcing, while patenting experience hinders it. Moreover, patenting experience reduces the positive impact of product experience on external R&D sourcing, highlighting the paradox of openness in R&D sourcing.	A firm's technological experience impacts KS and AC, with product experience promoting these through tacit knowledge and openness, while patenting experience hinders them by signalling explicit knowledge and protectiveness.
16	Absorptive Capacity in R&D Project Teams: A Conceptualization and Empirical Test (Nemanich, L. A., et al 2010)	Propose a new AC model for R&D teams emphasizing external knowledge recognition, assimilation, and innovation application.	Survey and archival data and structural equation modelling for hypothesis testing	100 R&D project-team level in the computer industry	Identifies the link between team members' external knowledge evaluation, assimilation, and innovation application. Moderating effects of prior knowledge (negatively) and team autonomy (positively) on individual assimilation-application link.	KS through team cognition enhances communication, coordination, consensus, and problem-solving, increasing the team's AC.

17	The invention performance implications of cooperation: How technological, geographical, and product market overlaps shape learning and competitive tension in R&D alliances (Runge, S., et al 2022)	How technological, geographical, and product market overlaps in R&D alliances impact a firm's invention performance.	Value-weighted patent count as the dependent variable and measures independent variables (technological, geographical, and product market overlaps) using patent data, zip code data, and SEC 10-K filings.	215 R&D alliances among 94 U.S. pharmaceutical firms from 1996 to 2013.	Technological and geographical overlap improve a firm's invention performance, but product market overlap has a negative impact.	KS is influenced by technology, geography, and product market overlaps; AC benefits from the former but is hindered by the latter.
18	Knowledge diversity and coordination: the effect of intrafirm inventor task networks on absorption speed (Moreira, S., et al 2018)	Investigates how intrafirm inventor task networks impact the speed at which pharmaceutical firms absorb external knowledge acquired through licensing deals.	Employs event history analysis. Absorption speed is measured using patent data.	113 pharmaceutical firm, known for its high R&D intensity.	Shows that diversity and density in intrafirm inventor task networks enhance absorption speed, especially when the licensed technology is less related to the firm's existing knowledge,	Intrafirm KS enhances AC, especially when dealing with distant knowledge. Intrafirm inventor networks enable knowledge access and tacit coordination, aiding assimilation and exploitation.
19	Absorptive routines and international patent performance (García-Muñia, F. E., et al 2017)	Analyzes the effect of AC on international patents, and how external knowledge sources and search strategies influence international patenting.	Empirical multiple linear regression models to explore the impact of AC routines and external knowledge sources on international patents.	Spanish firms participating in the Spanish Business Strategies Survey (SBSS) from 1997 to 2007.	Acquisition routines impact international patent rates; assimilation routines moderate the acquisition phase, transformation routines directly influence patent rates, and exploitation routines moderate the transformation phase.	KS, drives firms AC for external knowledge, foster innovation, and increase their international patent rate.
20	Dynamic simulation research on the effect of resource heterogeneity on knowledge transfer in R&D alliances (Zhang, H., et al 2021)	Investigate the impact of resource heterogeneity on knowledge transfer in R&D alliances using the system dynamics method	Uses system dynamics, to quantitatively model dynamic behaviours in the system	Context of R&D alliances, which are collaborative arrangements between firms and universities	Finds an inverted U-shaped link between organizational resource diversity and knowledge transfer, and a positive impact of network resource diversity on knowledge transfer in R&D alliances.	AC impacts knowledge transfer; enhancing AC involves increasing the receiver's knowledge base and minimizing the knowledge gap with the sender.
21	The dark side of knowledge transfer: Exploring knowledge leakage in joint R&D projects (Frishammar, J., et al 2015).	Explore knowledge leakage in joint R&D projects and its impact on firms' competitiveness.	Inductive multiple case study approach, incorporating interviews, document analysis, and feedback workshop	24 respondents from 11 organizations engaged in collaborative R&D projects in the mineral and metal industry in Sweden.	Knowledge leakage processes are direct, indirect, and leakage from the focal firms use of shared knowledge. Both core and non-core knowledge can be implicated in leakage, leading to a model with diverse states and processes impacting the focal firm's competitiveness.	KS enhances AC (external knowledge), but with a potential knowledge leakage that may affect a firm's competitive advantage. The need is to balance the benefits and risks in collaborative R&D projects.

22	<p>Giving fish or teaching to fish? An empirical study of the effects of government research and development policies (Xu, K., et al 2014)</p>	<p>To assess the influence of government R&amp;D subsidies and knowledge transfer from universities and public research institutions on driving innovation in Chinese firms.</p>	<p>Survey method and hierarchical regression models to test the hypotheses</p>	<p>270 Chinese firms across different industries, where government R&amp;D support plays a significant role in funding innovation and facilitating knowledge transfer for firms</p>	<p>Government R&amp;D subsidies and knowledge transfer drive new innovation capabilities. Subsidies replace external knowledge, while knowledge transfer complements it.</p>	<p>Knowledge transfer from universities and research institutions improves a firm's AC, allowing firms to acquire, assimilate, transform, and leverage external knowledge for new product development.</p>
23	<p>Those Who Know, Do, Those Who Understand, Teach. Disseminative Capacity and Knowledge Transfer in the Automotive Industry (Schulze, A., et al 2014)</p>	<p>Analyzing the impact of source firm capability on knowledge transfer success in R&amp;D alliances, focusing on the automotive sector.</p>	<p>Survey to gathering data and multiple regression analyses to assess hypotheses.</p>	<p>59 R&amp;D alliance projects in the automotive industry, emphasizing on knowledge transfer for innovation outcomes.</p>	<p>Concluded that three aspects of disseminative capability enhance knowledge transfer success, while two aspects have adverse effects.</p>	<p>Disseminative capability complements AC, fostering balanced knowledge transfer in R&amp;D alliances that preserve specialized knowledge while integrating diverse expertise.</p>
24	<p>The cost of integrating external technologies: supply and demand drivers of value creation in the markets for technology (Cecagnoli, M., et al 2013)</p>	<p>Examines factors affecting technology licensing choices between suppliers and buyers, with a focus on integration costs, supplier knowledge transfer capabilities, buyer AC, and R&amp;D cospecialization in the buyer's industries.</p>	<p>Validates its hypotheses through Poisson regression, using a panel dataset spanning 1996 to 2007,</p>	<p>U.S. technology-based firms with fewer than 500 employees. This sample is derived from the Small Business Administration (SBA) database.</p>	<p>Provides empirical evidence for three main hypotheses: (1) Supplier knowledge transfer boosts technology out-licensing probability, (2) The impact of supplier knowledge transfer is greater when buyers have limited absorptive capacity, and (3) The importance of supplier knowledge transfer is elevated in industries with extensive cospecialization in R&amp;D and downstream activities.</p>	<p>KS lowers integration costs and enables technology licensing. Buyer's AC directly influences integration costs and the value of KS, particularly in industries with low AC and high cospecialization between R&amp;D and downstream activities.</p>
25	<p>Casting a Wide Net for Innovation: Mediating Effect of R&amp;D Human and Social Capital to Unlock the Value from Alliance Portfolio Diversity (Garcia Martinez, M., et al 2017)</p>	<p>Explores how the variety of R&amp;D partnerships impacts a company's innovation, and how R&amp;D human and social capital play a role in this connection.</p>	<p>Employs a structural equation model. Innovation performance is measured by percentages of radical and incremental innovations. R&amp;D human capital is assessed through education levels, R&amp;D social capital is linked to innovations in management, procedures, and external relationships</p>	<p>Spanish manufacturing sector, with low R&amp;D intensity, and innovation output.</p>	<p>U-shaped link between R&amp;D alliance diversity and innovation performance. R&amp;D human and social capital mediate this relationship, highlighting the importance of internal capabilities in utilizing diverse alliance portfolios.</p>	<p>KS in R&amp;D alliances is complex, requiring firms to have AC, relies on the R&amp;D human and social capital, enabling knowledge integration and recombination within the firm.</p>

26	Public research and the innovation performance of new technology-based firms. (Fudickar, R., et al 2019)	How interactions with public research institutions (PRIs) affect innovation in German new technology-based firms (NTBFs).	Uses selection models for binary outcomes to assess the effects of knowledge interactions on introducing market novelties	2879 German NTBFs established between 2001 and 2006 seen as drivers of technological change and economic growth.	Formal and informal PRI interactions boost NTBFs' innovation. The impact varies with consistency, internal R&D, and academic backgrounds. Complementary interactions occur in non-R&D NTBFs, while R&D ones see substitution.	KS with PRIs boosts NTBFs' innovation, affected by AC tied to internal R&D and academic backgrounds
27	Many are called, few are chosen: the role of science in drug development decisions (Colen, L., et al 2023)	Impact of scientific research on advancing patented drugs into clinical development and identify the primary driver of development,	Quantitative analysis of patent, publication, and clinical trial data. Qualitative analysis includes interviews with senior R&D managers	Pharmaceutical industry, characterized by high scientific intensity	Scientific research-based patented drugs are likely to reach clinical development, when the research is done internally. External development is preferred when the patent owner lacks clinical development expertise.	Emphasizes KS between researchers and developers as vital for successful drug development. Internal scientific research enhances the AC of the patent owner to leverage its discoveries.
28	The knowledge spillover of innovation (Audretsch, D. B., et al 2022)	Analyze knowledge spillovers' effects on firm innovation and imitation, and their connection to a firm's R&D investment	Using UK firm data (2002-2014) from multiple sources, employs a probit model with Heckman correction to evaluate how intra- and inter-industry knowledge spillovers impact new-to-market product innovation and imitation.	UK Innovation Survey, Business Registry, and Business Enterprise Research and Development Survey.	Knowledge spillovers show an inverted U-shaped relationship with innovation, affected by a firm's R&D investment. Firms with greater R&D investments tend to innovate more and imitate less.	AC is essential for firms to utilize external knowledge spillovers, but its effectiveness decreases as spillovers rise, introducing higher costs and risks in KS, both enabling and constraining innovation spillover.
29	National innovation policies and knowledge acquisition in international alliances (Friedmann, J.-C., et al 2023)	Examines how home country innovation policies affect knowledge acquisition in global alliances.	Uses patent citations to measure knowledge acquisition, executive surveys for national innovation policies, and various financial, patent, and country data to control for confounding factors. Structural equation modeling to account for self-selection and test for mediation effects.	Global chemicals, machinery, and electronics industries characterized by frequent international alliance	Firms' home country supply-side innovation policies and partner's demand-side policies boost knowledge acquisition, mediated by R&D investment and partner's knowledge accumulation. Cross-national distance influences these effects.	KS in alliance partnerships is shaped by AC, influenced not only by national innovation policies but also by factors like prior knowledge, organizational routines, and alliance features.

30	Strategies of industry-science cooperation in the Russian manufacturing sector (Roud, V., et al 2020)	Explores factors influencing industry-science cooperation in Russian manufacturing, surveying 805 innovation-active firms.	Uses two econometric models: bivariate probit for university and R&D organization cooperation and multinomial logit to categorize four interaction modes: no cooperation, S&T services acquisition, R&D results leading to new-to-firm innovation, and R&D results leading to new-to-market innovation.	Russian context, characterized by a developed network of R&D organizations and universities	Different factors drive R&D-oriented and consulting-oriented cooperation. R&D namely firm size, age, sector, continuous R&D, and public support, foreign ownership, market orientation, innovation spending, and appropriability mechanisms.	AC important for effective KS between industry and science. It finds that staff skills, particularly the proportion of university graduates within a firm, significantly impact the propensity to cooperate, especially for R&D-oriented cooperation.
31	Knowledge spillovers in science and technology parks: how can firms benefit most? (Diez-Vial, I., et al 2015)	Assesses science and technology parks' influence on firm innovation performance.	Utilizes a longitudinal database covering innovation activities of Spanish firms from 2007 to 2011	focuses on Spain science and technology parks	Shows firms in science and technology parks benefit more from university and research institution cooperation and higher internal R&D investment.	KS in science and technology parks depends on each firm's AC, shaped by their internal efforts and strategies. Firms with stronger AC utilize local knowledge spillovers, leading to improved innovation performance.
32	The temporal effects of relative and firm-level absorptive capacity on interorganizational learning (Schmidt, H., et al 2012)	Examines AC determinants in longitudinal alliances.	Quantitative analysis of patent cross-citations	Information and communications technology industries	Learning in alliances follows an inverted U-shaped pattern over time. The effects of technological focus and R&D intensity on learning change as time progresses.	KS in alliances is shaped by firm-level and relational factors, with distinct impacts at different alliance stages. Early stages are limited by AC, while later stages are constrained by exploitation capacity.
33	Which governance of university-industry interactions increases the value of industrial inventions? (Fassio, C., et al 2019)	how governance in university-industry interactions affects the value of academic knowledge-based industrial inventions.	Utilizes original data from survey, focused on European patent inventors in Italy. Utilizes econometric models to tackle selection bias and endogeneity issues. Relative invention value metric.	Piedmont, a technologically advanced region in Italy with a strong manufacturing base.	Personal contracts between firms and individual academics generate higher-value inventions than institutional contracts.	The value of industrial inventions using academic knowledge, hinges on a firm's AC and KS to absorb academic knowledge. KS is influenced by appropriability, while AC is affected by alignment of collaboration objectives. Enhanced KS and AC result in improved integration of academic knowledge and more valuable inventions.

**Managing Knowledge Leakage:** KS within and across organizations can support the development of AC, but it also carries the risk of valuable information slipping beyond intended boundaries (Balle 2020). The potential knowledge leakage due to KS is mentioned (Frishammar, J., 2015). Further research is needed to explore techniques and tools for mitigating this risk and safeguarding a firm's competitive advantage in collaborative R&D projects (Bloodgood, J. M., 2022; Durst, S., 2014).

**Knowledge Spillover Risks:** As AC is essential for utilizing external knowledge spillovers, more research is required to explore the effectiveness of AC in managing higher spillovers, which can introduce higher costs and risks in knowledge sharing (Audretsch, D. B., 2022; Bloom, N., 2013).

**Knowledge Transfer in Alliances:** The distinction between early and later stages of alliances in terms of AC and exploitation capacity is mentioned (Schildt, H, 2012; Esen, A., 2017). Research can explore the dynamics and challenges faced by firms in these different stages, and how they can optimize knowledge sharing.

**Alignment of Collaboration Objectives:** The role of co-opetition, as well as social and relational factors in knowledge transfer, should also be emphasized. Recent research indicates that knowledge sharing can foster both cooperation and competition, ultimately enhancing team effectiveness (Zhang, X.-B 2019; Gast. 2017). Future research should delve into industry-specific practices, the roles of project managers, and the stages of alliances, while also considering how absorptive capacity (AC) influences team-level effectiveness (Bikard 2018). The integration of academic knowledge into industrial innovation is vital for enhancing team effectiveness (Bikard 2017; Loebecke et al. 1999).

#### **Risks in R&D Knowledge Sharing/Transfer:**

**Knowledge leakage:** Knowledge leakage is the unintended diffusion of valuable knowledge, potentially harming the source's benefit or aiding competitors (Vafaei-Zadeh, 2019). Frishammar et al. (2015), categorizes the adverse impacts of knowledge leakage in joint R&D projects, and suggest mitigation through frameworks like contracts. Devarakonda et al. (2018) view knowledge leakage in multinationals as sometimes beneficial, promoting innovation if proactively managed. Ceccagnoli et al. (2013) link leakage to external technology integration costs, highlighting its influence on licensing fees through factors like absorptive capacity and bargaining power.

**Opportunism:** This refers to the self-interested behaviour like withholding or misusing knowledge, which can damage trust and cooperation (Yang, 2020). Tortoriello (2015), delves how social network closure reduces opportunism by fostering trust, while diverse networks increase it due to asymmetry and conflict. Runge et al. (2022) found that reducing uncertainty improves conservation outcomes and lowers opportunistic risks.

**Conflict:** This refers to disagreements between knowledge source and recipient due to differing goals or expectations, which can hinder knowledge exchange and innovation (Kiecolt-Glaser, 2007). Hurmelinna-Laukkanen et al. (2012) show that integrating and compromising conflict styles aid knowledge protection, while avoiding and dominating harm it; trust, power, and cultural distance moderate these effects. Schulze et al. (2014) found that conflict asymmetry reduces knowledge transfer through poor communication and sharing willingness. Friedmann et al. (2023) reveal that problem-solving and compromise boost knowledge creation, whereas forcing and avoidance hinder it, moderated by team diversity, cohesion, and leadership.

### Scope for future research

1. Future research should optimize KS in R&D by balancing capacity, minimizing leakage, leveraging spillovers, and enhancing AC. Investigating academic integration, impact metrics, and competitiveness in diverse R&D contexts is crucial for practical advancements. Some of the potential avenues for further research in the context of AC and KS, with the goal of advancing knowledge and providing actionable insights for R&D organizations are listed below:
2. How can KS practices be optimized to balance the benefits and risks of AC and knowledge leakage in collaborative R&D projects?
3. How can higher levels of AC be leveraged to manage and harness knowledge spillovers from external sources, while mitigating the costs and risks involved?
4. How can R&D organizations enhance their AC and KS through internal network structures, social and relational factors, and project management practices in different stages of R&D alliances?
5. How can academic knowledge be integrated into industrial innovation more effectively, and what are the roles of AC and KS in this process?

How can R&D organizations measure and evaluate the impact of AC and KS on their innovation performance and competitiveness?

### Conclusion

After applying the eligibility criteria, 33 articles were selected for systematic analysis. The study employed 2 research questions to direct its examination of the chosen articles. **Table 6** provides a summary and comparison of the selected papers, encompassing the systematic review's inclusion criteria.

1. In this systematic literature review, we sought to demonstrate that the relationship between knowledge sharing (KS) and absorptive capacity (AC) within the R&D context is multifaceted and closely intertwined. Our analysis reveals several key insights that help unpack this dynamic:
2. **Mutual Reinforcement:** KS and AC are not isolated concepts but are interconnected. Potential absorptive capacity enriches KS, while KS, in turn, strengthens realized absorptive capacity. This reciprocal relationship suggests that effective knowledge sharing enhances a firm's ability to absorb and utilize external knowledge.
3. **Knowledge Utilization and Protection:** AC is crucial for increasing knowledge utilization, but it also raises concerns about knowledge misappropriation. Managing knowledge spillovers and safeguarding intellectual assets through steering committees and protective mechanisms is essential while enabling effective knowledge sharing.
4. **Innovation through KS:** KS plays a pivotal role in utilizing external knowledge for innovation. Internal network structures are vital in this process as they facilitate knowledge flow within the organization, strengthening AC and fostering an innovative culture.
5. **Collaboration and Trust:** KS not only enhances AC but also promotes a culture of collaboration and trust within the organization. This collaborative environment further facilitates innovation.

6. **Balancing KS and Protection:** Finding a balance between KS and protection is crucial, particularly in the context of cooptation. Striking this balance is essential in collaborative R&D projects, where knowledge sharing is vital for innovation but must be managed to prevent competitive disadvantages.
7. **AC in Knowledge Transfer:** AC significantly impacts the effectiveness of knowledge transfer. Successful knowledge transfer requires increasing the recipient's knowledge base while minimizing the knowledge gap with the sender.
8. **Complex Dynamics in Alliances:** The relationship between KS and AC in R&D alliances is intricate, with different factors influencing it at different alliance stages. Early stages may be limited by AC, while later stages could be constrained by exploitation capacity.

Academic Knowledge Integration: Firms benefit from the integration of academic knowledge, relying on both AC and KS. Enhanced KS and AC result in better integration of academic knowledge and more valuable inventions.

In summary, this systematic review reveals a dynamic and multifaceted relationship between KS and AC in the R&D context. The effectiveness of KS and AC is influenced by various internal and external factors. Striking a balance between sharing and protecting knowledge is crucial, as is fostering a culture of collaboration and trust to drive innovation in R&D settings.

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# Met Expectations and Academicians Turnover Intention: Mediating Role of Organizational Citizenship Behavior and Subjective Career Success

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## Abstract

This study looked at the association between academicians' met expectations and turnover intention. A model suggesting that the influence of met expectations on turnover intentions mediated by organizational citizenship behavior (OCB) and subjective career success (SCS) was measured. A total of 634 questionnaires were taken into consideration for analysis after data from 700 academics employed by 50 Private Higher Education Institutions in North India were gathered. The findings showed that a sizable portion of academics believed their expectations were not fulfilled in a variety of areas related to their jobs. Teaching and research (54.57%) was the most unmet expectation followed by pay and benefits (50.0%), organizational practices (49.68%), recognition (38.01%), and work/home interface (25.23%). The results demonstrated that unmet expectations have a significant effect on turnover intention and also, OCB and SCS mediates the effect of met expectations on turnover intention of academicians. The study's conclusions imply that higher education establishments can reduce academicians' turnover intentions by meeting their expectations which can additionally enhance the perception of subjective career success and voluntary behaviors.

**Keywords:** met expectations; academicians; organizational citizenship behavior; subjective career success; organizational commitment; job satisfaction

## INTRODUCTION

In India, Higher education institutions (HEIs) have augmented exponentially over the past twenty years. As per an economic survey by the Union Finance Minister in the parliament, Over the previous eight years, the overall number of HEIs in the nation has increased by 13.8%, from 51,534 to 58,643 and Gross Enrolment ratio from 23.7% to 28.4% (TOI Education, 2025) Furthermore, private institutions have outnumbered government institutions in the last two decades (Brookings, 2019). However, even if the number of HEIs is increasing, India is at present experiencing an acute shortage of talented and qualified faculty. Approximately 30 to 40 per cent of the faculty posts remain unfilled (Business World, 2020). Moreover, many Indian universities, like various universities in the world, are witnessing high faculty turnover (Monga & Monga, 2017). Employee turnover, which emanates from employees' long thoughtful process of leaving the organization called "turnover intention" (TI) (Mashile et al., 2019) is influenced by several factors such as demographic variables, professional characteristics (like

tenure, academic rank), work environment, salary, misuse of power, quality of work-life, job satisfaction, commitment, perceived fairness, and so forth (Ambrose et al., 2005; Mashile et al., 2019; Zhou & Volkwein, 2004; Rosser, 2004).

Before joining an organization, individuals have certain expectations. In addition to the work itself, other characteristics of the workplace are included in the expectations such as the team, organization culture, growth opportunities, and so forth. After joining, individuals compare their expectations with real job experiences. In higher education institutions, academicians are most likely to form expectations about the conditions of employment, salaries, workload allocation, job composition, academic autonomy, project funds, family-friendly resources, a voice in decision making, and other aspects (Meyer & Evens, 2005; Kraimer et al., 2018; Gladies & Kennedy, 2015; Sutherland, 2015; Kramer et al., 2013; Bozeman & Gaughan, 2011; Xu, 2008b). Faculty members' work attitudes and behaviors will suffer and their desire to remain with the organization will be diminished if these expectations are not fulfilled (Ababneh, 2016).

Both the institution's reputation and the quality of instruction will suffer from a high faculty turnover rate (Daly & Dee, 2006). Faculty turnover is not ideal for academic institutions and is associated with numerous undesirable consequences such as cost of hiring and training the new faculty members, increased workload and decreased efficiency of the existing employees, diminished morale of the co-workers, and disruption in teaching and research (Tilden et al., 2012; Saleem & Qamar, 2017; Rosser, 2004).

#### ***Met expectations, organizational citizenship behavior, and turnover intention***

It has been shown by researchers that met employee expectations has a favorable impact on organizational commitment, life satisfaction, mood, and desire to stay (Nabi, 1999; Mahonen et al., 2013; Ababneh, 2016; Wanous et al., 1992). However, not much research has looked at the upshot of met expectations on employees' organizational citizenship behavior (OCB). In reality, only two research that have empirically examined the connection between met expectations and OCB were discovered in the current analysis. According to Turnley and Feldman's (2000) research, which included 800 managers as participants, employees' willingness to participate in OCB is negatively impacted when their expectations are not fulfilled. Met expectations and OCB were found to be positively correlated by Vigoda (2000), using a representative group of 411 employees. The present study envisages that met expectations will positively influence employees' OCB. It is anticipated that meeting expectations will have a positive impact on OCB as when workers believe their employers are meeting their expectations, employees may choose to engage in voluntary and extemporaneous behaviors which are not specified in their job requirements. Furthermore, such behaviors result in organization effectiveness i.e., OCB.

Many research have suggested and shown a positive connection between OCB and employees' intention to stay (Shanker, 2018; Khalid et al., 2009; Yoon & Suh, 2003). For example, Rezaei (2019) OCB and turnover intention were shown to be negatively correlated, according to data collected from a representative group of 140 employees. When taken as a whole, the OCB definitions above and the empirical evidence indicate that OCB is the most likely mediator of the link between academics' intent to stay and met expectations. It prompts the research to hypothesize:

H<sub>1a</sub>: OCB mediating between met expectations and academicians' turnover intention.

### *Met expectations, Subjective career success (SCS), and turnover intention*

Career success is a concern for individuals as well as organizations because the success of employees can ultimately aid to the organizations' success (Ng et al., 2005). According to Seibert et al. (1999) defined career success as “the positive psychological or work-related outcomes or achievements one accumulates as a result of work experiences”. SCS is a person's evaluation of his/her career progress based on certain self-defined standards (Gattiker & Larwood, 1986). Various key indicators of SCS include job satisfaction, career satisfaction, growth and development, and life satisfaction (Ng et al., 2005; Greenhaus et al., 1990; Shockley et al., 2016). SCS is assessed based on organizational commitment & satisfaction at work. As previously said, studies have shown that employee met expectations positively impact work satisfaction, organizational commitment, and intention to stay. (Nabi, 1999; Mahonen et al., 2013; Ababneh, 2016; Wanous et al., 1992).

Additionally, a number of studies have shown that job satisfaction and organizational commitment have a beneficial impact on intention to stay (Hefny, 2020; Imran et al., 2017). For example, Guzeller and Celiker (2019) performed a meta-analysis on thirteen studies and found a correlation of -.34 between organization commitment and turnover intention. Choi and Kim (2016) conducted a meta-analysis to study the influence of job satisfaction on turnover intention and found a correlation of -.47 based on eleven studies. In sum, the above research findings suggest that met expectations result in subjective career success which in turn influences intention to stay. Thus, the study hypothesizes:

H<sub>2a</sub>: SCS mediating between met expectations & academicians' turnover intention.

### *Research Model*

The study proposes a model for investigation in Figure 1.

Figure 1: Model for Investigation



## Methodology

### *Contributors and the Techniques*

Academicians are the chosen group for this investigation, employed in various HEI's of the Northern part of India. A sample size of  $n = 700$  from fifty private higher education Institutes/Universities were chosen (Kline, 2011). Techniques for snowball sampling, or referral sampling, and convenience were applied to collect data during the period of four months i.e., from March 2024 to August 2024. 634 replies in all were obtained, among which 267 (42.1%) were female and 367 (57.9 %) were male. 415 (65.4 %) participants were married and 219 (34.6 %) were single/divorced. 138 (21.8 %) were in the "25-34" age spectrum, 252 (39.8 %) were in the "35-44" age spectrum, 164 (25.9 %) were in the "45-54" age spectrum and 79 (12.4 %) respondents were in the "55 and above" age spectrum. 42 (6.6 %) of respondents were Bachelors, 184 (29.1 %) were Masters, 144 (22.7 %) were M.Phil., 215 (34.0 %) were Doctorates and 48 (7.6 %) originated from diverse educational backgrounds. 58 (9.2 %) were lecturers, 244 (38.5 %) were Assistant Professor, 200 (31.6 %) were Associate Professor and 131 (20.7 %) were Professor.

The present study used hypothesis testing and an exploratory procedure. Confirmatory Factor Analysis (CFA) was employed because this investigation's goal was explanatory. With SPSS 21, the theories put out for the different relationships in the model were examined. Furthermore, the type-4 Hayes process model was employed to look into the impact of the mediating variable on the relationship between the variables.

### *Measures*

*Met expectations:* The twenty-one-item scale for met expectations was fostered based on previous investigations (Houston et al., 2006; Bozeman & Gaughan, 2011; Sabharwal & Corley, 2009; Leung et al., 2000). A 5-point rating scale was used; participants were requested to assess how well they felt that their expectations were met by their employer. Responses addressed five work-related elements: teaching and research, pay and benefits, recognition, organizational practices, and work/home interface.

*Subjective career success:* A six-item organizational commitment scale from Mowday et al. (1979) and a three-item global job satisfaction scale by Hackman and Oldham (1975) were used to gauge SCS.

*OCB:* Deckop et al.(1993) ten-item scale was used to gauge. Deckop et al. (1993) adapted the items from Smith et al. (1983).

*Turnover Intention:* The four-item Cook et al. (1981) scale was employed to gauge the participants' intention to quit.

## RESULTS

### Preliminary analysis

**Table 1: Descriptive statistics**

Variables	Mean	Std. Dev.
Met Expectations (ME)	2.44	0.88
Organizational Citizenship Behavior (OCB)	2.43	0.77
Subjective Career Success (SCS)	2.83	0.93
Turnover Intention (TI)	2.90	1.19

Source: Calculates using SPSS 21

Table 2: Classification of academicians

Met Expectations	Classification								
	Low			Average			High		
	N	Percent	Mean	N	Percent	Mean	N	Percent	Mean
Teaching & research	346	54.57	2.43	143	22.56	2.50	145	22.87	2.30
Pay and benefits	317	50.00	3.41	220	34.70	2.52	97	15.30	2.21
Recognition	241	38.01	3.56	228	35.96	2.73	165	26.02	3.13
Organizational practices	315	49.68	2.75	171	26.97	3.81	148	23.34	2.29
Work/home interface	160	25.23	3.75	246	38.80	2.22	228	35.96	3.65

Source: Calculates using SPSS 21

Table 1 shows the mean along with the standard deviation of descriptive data. For each factor of the met expectations scale, academicians' perceptions of their expectations—met or unmet—were calculated (see Table 2). According to the scores they received, the faculty members were divided into three groups (Table 2), as those with a) unmet expectations: score  $< (\text{Mean} - 0.5 * \text{Std.Dev.})$ ; b) met expectations: score between  $(\text{Mean} - 0.5 * \text{Std.Dev.})$  and  $(\text{Mean} + 0.5 * \text{Std.Dev.})$  and c) more than expected: score  $> (\text{Mean} + 0.5 * \text{Std.Dev.})$ . A significant number of academicians perceived that their expectations were not met by their institutes. Teaching and research (54.57%) was the most unmet expectation followed by pay and benefits (50.0%), organizational practices (49.68%), recognition (38.01%) and work/home interface (25.23%)

### ***Measurement Model***

In the research, both convergent and discriminant validity were used to guarantee the goodness and suitability of the instruments used. Using composite reliability and average variance expected (AVE), convergent validity was assessed. AVE ought to be higher than or equal to 0.5.(Fornell & Larcker, 1981; Hair et al., 2010) and composite reliability (CR) should be equal to or above 0.7(Nunnally, 1978; as cited in Cheah et al.,2016).

To evaluate the discriminant validity between the constructs, the square root of AVE was compared with a correlation value among constructs as recommended by Fornell and Lacker (1981) and correlation value that is smaller than AVE's square root is desirable. The average variance extracted (AVE) must exceed the maximum shared squared variance (MSV) or the average shared squared variance (ASV) to confirm discriminant validity. Confirmatory factor analysis (CFA) was undertaken in SPSS AMOS (version 21.0) to further validate the suggested tools. Goodness-of-fit (GoF)is represented by the values of CFI, GFI, and AGFI. A value equal to or above 0.90 is generally considered a good model fit (Hu & Bentler, 1999; Jaccard & Wan, 1996; Kline, 2005). Badness-of-fit (BoF)is represented by the values of RMSEA and standardized RMR. When both values are below the threshold, they are regarded as having a good fit; the acceptable fit for RMSEA is 0.08 and for the standardized RMR is 0.05 (Jaccard & Wan, 1996; Kline, 2005).

#### **a. *Validity and Reliability***

CR and AVE were used to quantify convergent validity. Item (1) of recognition and item (3) of organizational policies had standardized regression weight of less than 0.5 and hence these items were thus eliminated for further analysis. Following the elimination of these items, composite

reliability was identified to be more than 0.8 and AVE was shown to be greater than 0.5 for all constructs (see Table 3). Further, testing for discriminant validity, the AVE square root's value was found to be higher than the correlation values among constructs. Further, discriminant validity was significant as AVE is greater than the MSV. Results are shown in Table 3.

Table 3: Convergent validity and Discriminant validity of construct (n=634)

	CR	AVE	MSV	ME	OCB	SCS	TI
ME	0.950	0.502	0.128	<b>0.708</b>			
OCB	0.905	0.515	0.327	0.358***	<b>0.717</b>		
SCS	0.905	0.516	0.327	0.310***	0.572***	<b>0.718</b>	
TI	0.793	0.657	0.026	-0.154**	-0.138**	-0.162**	<b>0.810</b>

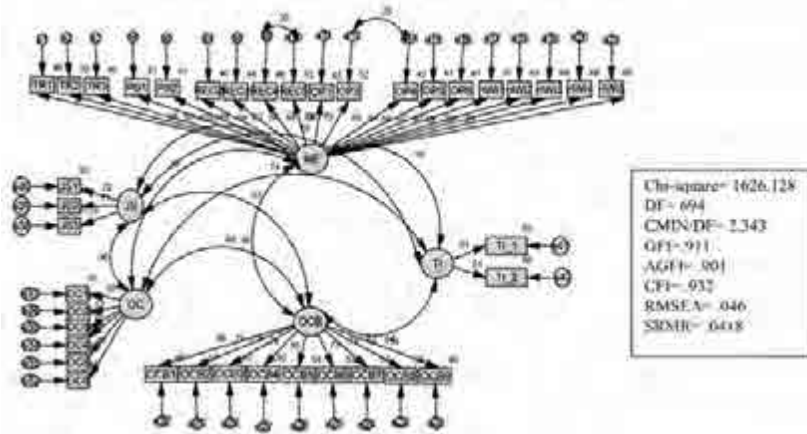
Source: Calculates using SPSS 21

Note: Significance of Correlations: \*\* p < 0.010; \*\*\* p < 0.001

b. *Confirmatory Factor Analysis*

SPSS AMOS was used to do the CFA for the full model in order to further validate the suggested model. CFA is measured using goodness-of-fit indices and badness-of-fit indices. Goodness-of-fit is represented by the values of CFI, GFI, AGFI, and NNFI. A value equal to or above 0.90 is generally considered a good model fit (Hu & Bentler, 1999; Jaccard & Wan, 1996; Kline, 2005). Badness-of-fit is represented by the values of RMSEA and standardized RMR. Both values are considered as a good fit when they are lower than the threshold; the acceptable fit for RMSEA is 0.08 and for the standardized RMR is 0.05 (Jaccard & Wan, 1996; Kline, 2005). Given that the minimal divergence was recorded, confirmatory factor analysis indicated a good fit as CMIN/DF=2.343, CFI=0.93, GFI=0.91, AGFI=0.90, RMSEA = 0.04 and SRMR= 0.04.

Figure 2: Model used for measuring validity, reliability, and goodness of fit indices



Source: AMOS 21.0

**Hypothesis Testing**

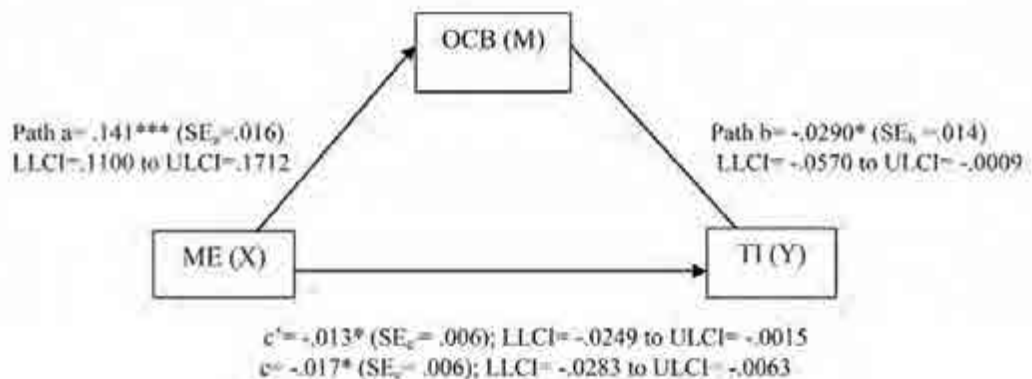
Baron and Kenny (1986) have established certain requirements for mediation analysis. The independent variable's ability to predict the dependent variable is one such need. A significant correlation between the independent and dependent variables was discovered, as Table 3

illustrates. The ME variable showed strong positive correlations with OCB ( $r=.358, p<.001$ ), SCS ( $r=.310, p<.001$ ), and negatively with TI ( $r= -.154, p<.01$ ). The OCB variable showed a strong positive correlation ( $r=.572, p<.001$ ) with SCS and negatively with TI ( $r= -.138, p<.01$ ). SCS was significantly and inversely associated with TI ( $r= -.162, p<.01$ ).

To investigate the hypothesis that the turnover intention of academicians is influenced by met expectations and more precisely, if the relationship between met expectations and turnover intention is mediated by subjective career success and organisational citizenship behavior, Using SPSS 21 and the PROCESS macro formed by Andrew F Hayes (2013), regression testing was conducted. The mediating effect is shown by Hayes model template 4. Therefore, template four was adopted to examine the hypotheses addressed in this study. The Preacher & Hayes (2004) suggested sample size of 5000 was used when applying the bootstrapping technique. Using PROCESS macros and Hayes' (2013) suggested model 4, path  $c'$  was computed.

*a. Organizational Citizenship Behavior as a mediator in met expectations – turnover intention relationship:* The association between the variables indicates that more mediation research will be beneficial, according to the mediation model (refer to Figure 3). Regression analysis revealed a substantial and positive connection between ME and the mediator variable SCS  $\{B=.141, t(632)=9.02, p=.001\}$ . Also, it was shown that OCB, the mediator, had an strong negative correlation with TI ( $B= -.029, t(631) = -2.03, p= .04$ ). Since each pathways, a and b, were significant, the impact of mediation was examined applying a bootstrapping method using bias-corrected confidence values. A significant indirect result of ME on TI was confirmed by the mediation analysis's result, which was mediated by the variable OCB ( $B= -.013, CI= -.0249$  to  $-.0015$ ). Additionally, the results showed that the previously significant association between SCS and SDP persisted ( $B= -.017, CI= -.0283$  to  $-.0063$ ). As a result, partial mediation in the model was suggested by the Sobel test, which was deployed ( $z= -2.016, p=.04$ ). Hence hypothesis  $H_{1a}$  is accepted.

Figure 3: Effect of OCB on ME and TI



Note: Significance of Correlations: \* $p<.050$ ; \*\*\*  $p < 0.001$

Path a = ME(X) to the OCB(M)

Path b = OCB(M) to the TI(Y)

Path c = ME(X) to TI(Y) (Total effect, i.e., direct effect+ indirect effect)

Path  $c'$  = ME(X) to the TI(Y), controlling for the OCB (direct effect)

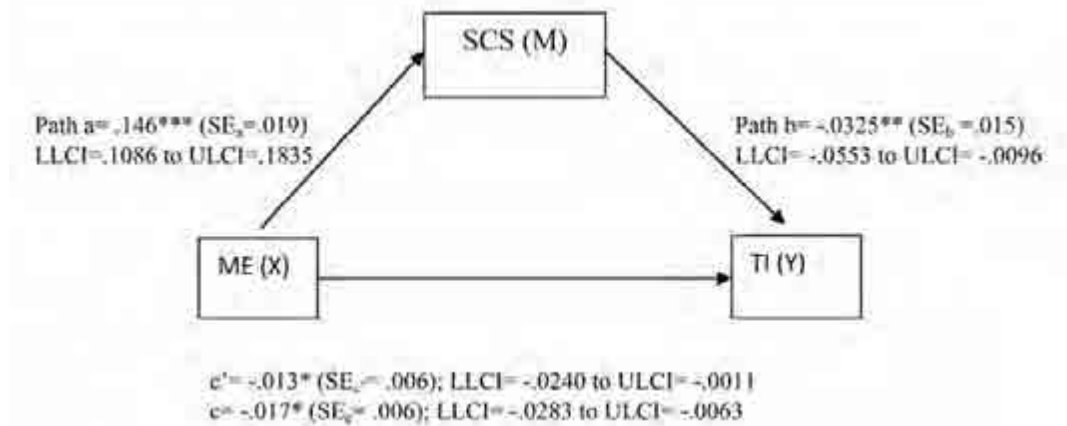
Indirect effect of OCB(M) =  $c - c'$  or product of a and b (i.e.,  $ab$ )

ULCI & LLCI = Upper levels & Lower levels for the confidence interval

Source: Output SPSS 21

*b. SCS as a mediator in ME and TI relationship:* The mediation model (refer to Figure 4) indicates that additional mediation analysis will be beneficial based on the relationship between the variables. The Regression investigation revealed that ME and mediator variable SCS { $B=.146$ ,  $t(632)=7.65$ ,  $p=.001$ } had a positive and significant relationship. Furthermore, a significant negative relationship between TI and the mediator, SCS, was discovered { $B=-.0325$ ,  $t(631)=-2.79$ ,  $p=.005$ }. The influence of mediation was tested using a bootstrapping approach with bias-corrected confidence estimates because both paths, a and b, were notable. A significant indirect effect of ME on TI was confirmed by the mediation analysis's result through the mediating variable SCS ( $B=-.013$ ,  $CI=-.024$  to  $-.0011$ ). Additionally, the results showed that the previously significant association among SDP and SCS persisted ( $B=-.017$ ,  $CI=-.0283$  to  $-.0063$ ). As a result, the Sobel test was utilised, suggesting that the model include partial mediation ( $z=-1.96$ ,  $p=.04$ ). Hence the *hypothesis*  $H_{2a}$  is accepted.

Figure 4: Effect of SCS on ME and TI



Note: Significance of Correlations: \*\*  $p < 0.010$ ; \*\*\*  $p < 0.001$

Path a = ME to SCS

Path b = SCS to the TI

Path c = ME to TI (Total effect, i.e., direct effect + indirect effect)

Path c' = ME to the TI, controlling for the SCS (direct effect)

Indirect effect of SCS =  $c - c'$  or product of a and b (i.e.,  $ab$ )

ULCI & LLCI & = Upper & lower levels for confidence interval

Source: Output SPSS 21

## Discussion

The current study looked at the effects of met expectations (ME), subjective career success (SCS), and organizational citizenship behavior (OCB) on turnover intention (TI) in Indian higher education institutions. According to the study's findings, ME have a favorable impact on both SCS and OCB, and they also have an indirect effect on TI through them. The current study's findings corroborate the findings by Ababneh (2016) concerning the effect of perception of met expectations on academicians' work attitude and behavioral intentions.

First, the study reported that ME have a adverse effect on turnover intention indirectly through dimensions of SCS. This implies that met expectations make employees' feel more successful in their careers. These workers are more committed to the organisation and have higher job

satisfaction, which strengthens their desire for staying in the organization. The findings support the studies of Wanous et al. (1992), Kim et al. (1996), and Ababneh (2016). Second, According to the study's findings met expectations have a negative impact on turnover intention indirectly through OCB. This entails that met employee expectations induce employees to take up any voluntary work outside the purview of their job responsibilities and these employees have a higher likelihood to stay with their present employer. The findings support the studies of Turnley and Feldman (2000) and Vigoda (2000). Third, the present study shows the perception of academicians of met or unmet expectations. According to the findings, a sizable portion of academicians believe that their universities fell short of their expectations. Of all the expectations, teaching and research fell short the most (54.57%) followed by pay and benefits (50.0%), organizational practices (49.68%), recognition (38.01%), and work/home interface (25.23%). Using information from academic members at UAE universities, Ababneh (2016) also found that a significant portion of participants believed their employers had fallen short of their expectations.

### ***Implications***

Policymakers and representatives of HEIs should be aware of the implications of the current study. First, Representatives from higher education institutions, such as recruiting managers, should ensure that the job profiles for vacant positions are provided realistically. An overstated positive profiles can engender unrealistic expectations among the academicians which may have an undesirable effect on their attitude and behavior. Second, The majority of academics believed that their institutions had failed to live up to their expectations and therefore it is recommended that the HEIs policymakers/governing bodies should examine the teaching and research load, salary structure, benefit-sharing programs, and other organizational practices of the academic institutions. Third, expectations are dynamic and are changed over time. Therefore, universities should consider monitoring faculty expectations regularly in order to design the pay and benefits, rewards and recognitions, and other HR policies and programs. Fourth, job characteristics should be re-designed or enhanced so as to increase the probability of meeting faculty members' expectations. Job characteristics can be improved using numerous approaches such as fairness in workload assignment, flexibility for work-life balance, and teamwork opportunities.

### ***Limitations and Forthcoming Investigates***

The current study has some limitations. First, the current investigation is founded upon a cross-sectional design, precluding the confirmation of the research variables' causality direction. As an illustration, this research suggests that perceived career success and OCB are the result of met expectations. However, perceived career success and OCB can also lead to high ME. Consequently, future research may use a longitudinal design to confirm the directions of the variables examined in this research. Second, there isn't a general scale available to measure ME. The study's findings, which have their foundations on the twenty-one item met expectations scale can vary if different items were used. Third, there are several ways that job expectations might come from outside the workplace, such friends' experiences or standard work practices (Ababneh, 2016). The origins of expectations were not distinguished in this investigation. Future research might examine how job expectations are created and how can they affect turnover intention. Lastly, the present study measured SCS only in terms of JS and OC. SCS entails various other aspects such as growth and development. Future research can take into account other SCS aspects.

### Conclusion

In HEI, academicians enact a significant part in learning process. Therefore, any educational institution must succeed in comprehending its expectations and seeking to be efficacious in its teaching and process of learning. The current investigation sheds light on the TI phenomena of academicians in private HEI. The research exhibited a positive affiliation between academics' satisfied expectations and their perceptions of SCS and OCB, which is in a negative connection with TI.

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# How do the Gen Z engage at Work? A Research Review and Conceptual Model

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## Abstract

Gen Z or the digital natives (born between 1997 and 2013) is the latest generation to enter the workforce. They are a unique generational group oriented towards technology and a relatively high degree of achievement orientation when compared to the other generations. Indian businesses expect to hire 30 per cent of the world's Gen Z workforce by 2030. Thus, a central concern for organizations regards the work engagement of Gen Z for greater retention and organizational prosperity. Exclusive focus on this generation is critical to bringing about the much-needed generational transition and excelling at integrating them with the retiring workforce. The current study is a review paper on the individual and organizational determinants of work engagement of Gen Z. The study also presents a conceptual framework and future research implications.

**Keywords:** Generation Z; Work Engagement; Loyalty, Retention, Organizational factors; Individual Factors

## 1. Introduction

Generation Z (Gen Z), or iGen, Generation 2020 digital natives and Gamers, is rapidly changing the workplace. One of the common themes among these nicknames is the generation's deep entwinement with technology at an early age, distinguishing them from their predecessors (Pandita & Kumar, 2022). Gen Z is different from other generations in that they value flexibility, innovation, inclusivity and meaningful work roles, and therefore their expectations from employers are distinct and more dynamic. Companies that fail to achieve these expectations risk losing their top Gen Z talent (Loring & Wang, 2022). Being digital natives, Gen Z expects companies to utilize technology in efficiency, collaboration, and engagement.

### 1.1 Work Engagement and the Gen Z Workforce

Work engagement as passion, commitment and involvement in work by an employee is a predictor of organizational success. Engaged employees are more productive, creative and committed. Traditional models of engagement may not accurately capture the expectations of Gen Z employees whose work behaviors and motivations differ significantly from previous generations (Arora et al., 2020). In contrast to Millennials, who tend to prioritize job security, Gen Z workers are more inclined to pursue opportunities that offer instant growth, ongoing feedback and work life balance.

Gen Z's need for office flexibility, digital literacy and corporate social responsibility calls for a shift in organizational engagement strategies. Studies have established that Gen Z values career clarity, direction and meaningful projects toward a higher public good. Companies that foster a culture of diversity, innovation and employee well-being are more likely to attract and retain this future talent (Aggarwal et al., 2022).

## **1.2 Research Problem and Gaps in the Literature**

In spite of Gen Z's growing numbers in the labor market, studies on their work engagement are still anecdotal and practice-focused (Loring & Wang, 2022). Most studies today are centered on Gen Z as consumers or students, with a big gap in knowledge regarding their work engagement. Though some of the studies have scrutinized factors like digital integration, work flexibility, and leadership, such findings are scattered and lack a strong theoretical framework (Ayoobzadeh et al., 2024). Such an unorganized study hinders the formulation of effective engagement strategies considering the unique preferences of Gen Z by organizations.

## **1.3 Objectives of the Study**

In order to fill these research gaps, this research seeks to:

1. Synthesize existing research on Gen Z work engagement: The study will synthesize and summarize findings from existing literature to identify key factors influencing Gen Z engagement, such as workplace culture, leadership styles, and career development (Anisykurli et al., 2024).
2. Develop a conceptual model of Gen Z work engagement: Based on the integration of literature, this study will propose a model that captures the interplay between individual expectations and organizational practices in affecting engagement outcomes.
3. Provide a future research agenda: Because of the largely anecdotal nature of existing research, this study will give guidelines for future research to synthesize a more robust body of knowledge concerning how to recruit and retain Gen Z workers (Barhate & Dirani, 2022).

## **1.4 Significance of the Study**

This study matters theoretically and practically. Theoretically, it contributes to growing work engagement literature on generations by offering a systematic examination of Gen Z workforce patterns. It enlightens us on how Gen Z's digital literacy, need for flexibility and expectation for inclusive workplaces affect engagement levels. Practically, it offers firms real-life strategies to craft engagement programs that resonate with Gen Z employees, thereby boosting retention, productivity and overall job satisfaction (Achmad et al., 2023).

## **1.5 Structure of the Paper**

The subsequent sections of this paper will review the literature on work engagement across generations, present a conceptual model and address implications for researchers and practitioners. Drawing from this analysis, the study aims to offer a thorough understanding of how organizations can effectively engage employees from Generation Z and adapt to the evolving workforce landscape (Barhate & Dirani, 2022). By bridging the research-applied gap, this study intends to offer an organizational manual on how to build a highly motivated and engaged Gen Z workforce.

## 2. Methodology

This research review follows Torraco's (2005) guidelines for conducting integrative reviews to systematically synthesize the existing body of knowledge relevant to the study. An integrative review is particularly suitable for this research as it allows for the comprehensive synthesis of diverse studies, theories and perspectives, helping to develop a conceptual framework that addresses key gaps in the literature. By using this method, the study aims to provide a structured analysis of the literature on Generation Z work engagement and offer insights into its future research directions.

The study primarily relies on secondary data, which was sourced from bibliometric databases such as Scopus and the Web of Science (WOS). These databases were chosen due to their extensive coverage of high impact academic journals and peer reviewed studies across multiple disciplines, ensuring a robust and credible data foundation. Apart from these databases, additional scholarly sources were collected from online repositories such as JSTOR, Emerald and EBSCO. These repositories contain a wealth of empirical and theoretical studies, making them valuable for identifying relevant research contributions on Generation Z workplace engagement (Busold & Husten, 2020).

To ensure the comprehensiveness of the review, supplementary literature was gathered from grey literature sources, including Google Scholar. Grey literature, which consists of reports, working papers, dissertations and industry white papers was considered important for capturing emerging trends and practitioner insights that may not yet be published in traditional academic sources. Including grey literature broadens the scope of the review and allows for a more nuanced understanding of how engagement strategies for Generation Z are being discussed beyond academic circles (Achmad et al., 2023).

The data collection process involved systematic searches using a combination of keywords such as 'Generation Z work engagement,' 'employee retention,' 'flexible work environments,' 'digital natives in the workforce,' and 'Gen Z workplace expectations.' Boolean search operators were applied to refine search results and filter studies that specifically addressed the research objectives (Dimitrov, 2022). Inclusion and exclusion criteria were established to ensure that only high quality, relevant and peer reviewed studies were considered for synthesis. The inclusion criteria encompassed studies published in the last two decades, with a particular focus on research published post 2010 to capture the most recent developments in Gen Z work engagement.

After collecting the relevant literature, Torraco's (2005) integrative review framework was applied to synthesize the data into meaningful insights. This process involved identifying common themes, theoretical perspectives and empirical findings that contribute to the understanding of Gen Z work engagement. The literature was categorized based on key themes such as workplace flexibility, digital integration, career expectations, leadership styles and job satisfaction. A thematic analysis approach was employed to highlight patterns and relationships across different studies, enabling the construction of a conceptual framework that integrates existing research findings.

The final stage of the review process involved proposing a conceptual framework based on the synthesized literature. This framework serves as a foundation for future research by mapping the key drivers of Gen Z work engagement and identifying gaps that require further exploration (Fleeton, 2024). By systematically integrating existing research and practitioner insights, this

study provides a structured approach to understanding how organizations can effectively engage and retain Generation Z employees. This study adopts a rigorous and structured methodological approach to reviewing and synthesizing the literature on Gen Z work engagement. By leveraging Torraco's (2005) integrative review framework and incorporating diverse sources from bibliometric databases, online repositories and grey literature, the study ensures a holistic understanding of the topic. The synthesized findings contribute to the development of a conceptual model that organizations can use to align their engagement strategies with the expectations of Generation Z employees.

### **3. Theoretical Foundations**

In order to understand employee engagement, one requires a cohesive theoretical framework that captures the interplay between workplace motivation, job demands, and organizational support. Several well-established theories can provide explanations for these processes, including the Job Demands Resources (JDR) Model, Self-determination Theory (SDT), and Social Exchange Theory (SET). These theories describe how employees react to workplace challenges and leverage available resources to enhance their job engagement and overall satisfaction. In addition, understanding differences across generations of what is required in the workplace, that is, Gen Z, Millennials, Gen X and Boomers, is crucial in developing effective strategies to enhance engagement in evolving workplaces (Ayoobzadeh et al., 2024).

#### **3.1 Job Demands Resources (JDR) Model**

The JDR Model postulates that work engagement is impacted by the interaction between job demands and job resources. Job demands refer to physical, psychological and emotional stressors such as workload, time pressure and emotionally demanding work. When these demands are excessive and not cushioned by adequate support, they lead to burnout and disengagement (Chala et al., 2022). On the other hand, job resources such as supportive leadership, training and developmental opportunities, mentorship and autonomy, are protective factors that not only buffer the negative effect of job demands but also promote motivation and resilience at work.

##### **3.1.1 How Job Resources Enhance Engagement**

Organizations that possess robust job resources create the environment that boosts employee commitment and motivation. Availability of formal mentorship and professional development opportunities boosts employee confidence through building career development capabilities. Skill development support employees exhibit higher levels of engagement and productivity. Besides, autonomy in decision-making transfers power to employees, allowing them to take ownership of work and contribute meaningfully towards organizational goals.

Leadership plays an important role in maximizing work resources (Celestin & Vanitha, 2020). Supervisors who promote open communication, value employee contribution and facilitate career growth establish an environment of trust and respect. Employee recognition schemes that compensate employee achievements promote a sense of worth and belonging, further facilitating engagement. Career growth opportunities also provide employees with a sense of stability and direction, increasing their organizational commitment (Barhate & Dirani, 2022).

##### **3.1.2 How Job Demands Hinder Engagement**

While job resources are engagement facilitators, high job demands have the opposite effect. Employees with unrealistically high workloads, conflicting priorities and ongoing stress without adequate support are at greater risk of burnout and disengagement. Role confusion, unrealistic

performance expectations and insufficient recovery time increase work stress, leading to reduced motivation and retention.

These problems have to be solved beforehand by keeping balance in the workload, specifying the job roles and offering psychological support programs (Busold & Husten, 2020). Building up a culture of open discussion about workload problems and mental health can help employees manage stress better. Flexible work schedules, such as home working and flexible work hours, can also mitigate the negative consequences of high job demands, enabling workers to have work life balance.

### **3.2 Self-determination Theory (SDT)**

SDT centers on intrinsic motivation to employee engagement and asserts three psychological needs as central to its theory: autonomy, competence and relatedness. When these needs are fulfilled, employees have greater motivation, commitment and workplace satisfaction.

#### **3.2.1 Role of Intrinsic Motivation in Engagement**

Employees with freedom to perform tasks feel more engaged, as they can freely input accordingly. Employees who are held responsible and who serve as starters give a higher level of responsibility and ownership. Ability, by development of capabilities through skill construction and continuous education, gives greater faith in their workability by the workers, thereby providing an engine to improve on their job description (Fleeton, 2024).

A sense of relatedness, or good rapport with leaders and colleagues, also enhances engagement. Organizations that value teamwork, group activities and effective communication give the employee a setting in which he feels important and appreciated. Once the employees perceive these internal drives, they become committed to the organization and also engage to succeed with it (DeMaria, 2022).

#### **3.2.2 Why Gen Z Values Purpose Driven Work Environments**

Gen Z's work expectations reflect a strong desire for meaningful work environments. Unlike previous generations, Gen Z employees prefer organizations that align with their personal values, emphasizing sustainability, diversity, and corporate social responsibility. They wish to perform purposeful work that benefits society, so purpose- and ethics-based engagement initiatives are essential. Flexibility also propels Gen Z engagement (Kgarimetsa & Naidoo, 2024). They support hybrid work designs, remote work and work-life balance programs that allow them to seamlessly integrate their work and life. Organizations investing in mental health resources, continuous skill development and ethical leadership are more likely to engage and retain Gen Z employees.

### **3.3 Social Exchange Theory (SET)**

SET defines employee engagement as a two-way relationship between employers and employees. Employees are more likely to demonstrate commitment, effort and loyalty when they believe they are being treated fairly, supported and invested in their welfare.

#### **3.3.1 The Role of Reciprocal Employer Employee Relationships**

Organizations that prioritize workers' well-being foster a give-and-take culture, leading to higher engagement, which is greater than in those organizations that don't. Proper communication, equal remuneration and clearly defined career progression routes enhance worker confidence

and satisfaction. Careful listening by managers to workers' concerns and policy-making in favor of work life balance establish a culture in which workers feel valued and encouraged (Mullen, 2021).

Organizational interventions such as mentorship programs, wellness support systems and employee value programs strengthen the employer employee relationship. Employees reciprocate by demonstrating higher levels of commitment, productivity, and teamwork when they perceive their organization as being supportive (Nieżurawska-Zajac et al., 2023).

#### **4. Impact of Perceived Organizational Support (POS) and Leadership Styles on Engagement**

Perceived Organizational Support (POS) occurs when employees perceive that their organization values their contributions and is concerned about their well-being. High POS is linked with high job satisfaction, motivation, and retention.

POS is strongly influenced by leadership styles, and transformational and resonant leadership are most effective in generating engagement. Transformational leaders inspire employees through a clear and compelling vision and stimulating innovation. They call employees to become professional and provide the care required to achieve their goals. Resonant leaders, through their attention to emotional intelligence and interpersonal connections, create a workplace where employees are heard and valued (Reddy; Tarigan et al., 2022). Organisations can create an engaged and driven workforce by adopting these leadership styles.

##### **4.1 Comparison with Earlier Generations (Millennials, Gen X, Boomers)**

Though both Gen Z and Millennials like digital workplaces, Gen Z's focus is more extreme on remote collaboration and seamless technology adoption. Having grown up in a digital native world, they expect organizations to implement agile workflows, real-time collaboration tools, and cloud-based software for collaboration. Their extreme focus on work-life balance also sets them apart, as they want flexible work schedules that can accommodate their professional needs along with personal priorities. Compared to Gen X and Boomers, Gen Z is less committed to traditional hierarchical career structures (Ayoobzadeh et al., 2024). They prioritize career mobility, continuous skills development and varied work experiences over long-term job tenure. As opposed to Boomers, who tended to stay with one employer for decades, Gen Z workers actively pursue varied jobs that enable flexibility and personal development (Wennqvist, 2022). To engage Gen Z, organizations need to embrace dynamic career development initiatives, rotational assignments and individualized learning experiences. Allowing employees the flexibility to try various jobs within an organization guarantees that they will stay engaged and motivated, to the advantage of both the individual and organization.

#### **5. Individual Factors Affecting Work Engagement**

Work engagement is shaped by several individual factors that influence motivation, commitment and productivity. One of the key determinants is belongingness and workplace community. Employees who feel connected to their peers and the organizational culture are more likely to be engaged. Generation Z prioritizes inclusive and diverse workplaces where mutual respect and collaboration are encouraged. These environments create a sense of psychological safety and professional growth. Strong peer networks, mentorship programs and team bonding activities enhance engagement by providing social support and opportunities for learning (Waworuntu et al., 2022). Organizations that facilitate structured mentorship and networking enable employees

to integrate more effectively into the workplace. This strengthens their commitment and reduces disengagement.

Another crucial factor is self-efficacy and career confidence. Employees with strong confidence in their abilities are more likely to take initiative and seek new learning opportunities. They also show greater resilience in the face of challenges. Generation Z has entered the workforce during a time of rapid technological and economic change. This has created uncertainty about career trajectories and job stability. Confidence building interventions such as skill development programs and leadership training are essential. Organizations that provide structured learning pathways and clear career progression frameworks contribute to a sense of competence and security. This reinforcement strengthens engagement and fosters long-term commitment (Suryakumar et al., 2024).

Digital skills and technological adaptation also play a vital role in shaping engagement. Generation Z, as digital natives, expects seamless technology integration in their work environments. High digital literacy influences how employees interact with workplace tools, collaborate with teams and complete tasks. Organizations that incorporate advanced digital tools, AI driven learning platforms and gamified training modules create more interactive and productive work experiences (Taibah & Ho, 2023). Realtime communication tools and virtual collaboration platforms enhance engagement by enabling flexibility and immediate feedback. Workplaces that fail to modernize their technological infrastructure may struggle to engage younger employees who expect efficiency and innovation in their workflow.

The presence of purpose driven work is another critical factor influencing engagement. Unlike previous generations who prioritized financial stability, Generation Z seeks meaningful work that aligns with their personal values. Employees are more engaged when they perceive their work as having a positive impact on society. Sustainability, diversity and corporate social responsibility are key areas that attract commitment from younger workers (Sono et al., 2024). Organizations that integrate social impact initiatives and ethical business practices into their operations foster deeper engagement. Employees who find alignment between personal and professional values demonstrate higher job satisfaction and emotional investment. These individual factors interact to create environments where employees feel valued, capable and motivated. By addressing these factors, organizations can sustain high levels of engagement and empower employees to contribute meaningfully to their roles.

## **6. Organizational Factors Influencing Work Engagement**

Perceived Organizational Support (POS) is the driving force towards gaining employee engagement. It provides the employees with feelings of being appreciated and supported, leading to greater commitment and less turnover. Firms providing flexible working schedules, mental health support and opportunities for development boost job satisfaction and commitment. Workers receiving high POS experience enthusiasm and resiliency, driving organizational effectiveness. Further, POS provides a feeling of job security, in which employees can focus on their job without the possibility of job loss (Vanpetch & Chearnkaitpradab, 2024). Psychological safety arising from high POS motivates employees to speak freely and contribute to decision-making activities, further boosting engagement. Companies who knowingly recognize and reward their employees strengthen trust and commitment culture, ultimately leading to a higher level of engaged employees.

Empathic Leadership (EL) & Mentorship are critical in developing a caring work culture. Leaders who speak openly, give constructive criticism and demonstrate emotional intelligence build trust and motivation in employees. Contemporary organizations are moving towards coaching leadership instead of hierarchical systems, which promotes employee development and workplace inclusivity. Successful mentorship programs enhance employee loyalty and organizational performance (Wennqvist, 2022). Mentorship leaders, as opposed to authoritative leaders, build a deeper relationship with the team members and make them feel a sense of belonging. The organization where the leaders embrace mentorship not only increases the engagement level of employees but also brings about a learning culture where the employees are always developing new skills and honing their abilities. EL has also been linked to effective conflict resolution, which reduces the tensions at workplaces and enhances teamwork.

EWorkLife Balance (EWOL) has become more pertinent with the growing trends of hybrid and remote work models. No meeting days and digital detox rewards work well to contain burnout and boost productivity. Studies have shown that the companies that implement flexible work models see decreased absenteeism and improved retention (Sidorcuka & Chesnovicka, 2017). Workers who can manage their work life do better and are more engaged. Companies that encourage well-planned breaks, set up digital communication standards, and inculcate personal time appreciation eliminate work-life clashes, rendering workers happier and effective. With shifting work dynamics, organizations must align their policies in a way to deal with sustainable engagement and efficacy.

Diversity, Equity & Inclusion (DEI) strategies have a strong impact on employee engagement, especially among Gen Z employees who support gender, race and LGBTQ+ workplace policies. Organizations that infuse DEI strategies through equal hiring, representation of leadership and inclusive policies facilitate a sense of belonging, thus leading to improved employee engagement and innovation. An ethnically diverse workforce enhances innovation and collaboration, which enhances the overall organizational performance (Hernandez-de-Menendez et al., 2020). Apart from that, unionized employees that are represented and involved in making decisions are more committed to their organization. Implementing inclusive benefits, equal opportunities for growth and a zero-tolerance approach for discrimination boosts the level of engagement because employees are secure in the development of their careers.

The Future of Work Engagement lies in integrating supportive organizational structures, leadership, work life balance and inclusivity. Companies that prioritize these elements not only retain top talent but also create an innovative and productive work environment. Organizations that adapt to these evolving employee expectations will secure a competitive edge in workforce engagement and sustainability. Future oriented workplaces focus on employee wellbeing, flexibility and a culture of continuous learning (Choudhary & Pandita, 2024). As technology advances, engagement strategies must evolve, incorporating digital wellbeing measures and AI driven personalized learning programs. Companies that proactively address employee concerns through feedback driven policies ensure long-term satisfaction and sustained engagement. Ultimately, a workplace where employees feel valued, supported and empowered will continue to thrive in an everchanging corporate landscape (Fleeton, 2024).

## 7. Conceptual Model for Gen Z Work Engagement

Integrating Individual and Organizational Factors: The conceptual model for Gen Z work engagement integrates both **individual** and **organizational** factors to provide a comprehensive understanding of how young professionals interact with their work environments. At the

**individual level**, key determinants include *belongingness*, which fosters a sense of inclusion and psychological attachment to the workplace and *self-efficacy*, which strengthens resilience and the ability to navigate workplace challenges (Anisykurli et al., 2024). Additionally, *digital adaptability* is particularly crucial for Gen Z, given their immersion in technology driven environments, shaping their expectations for seamless digital tools and remote work flexibility. Furthermore, *purpose driven work* plays a central role, as Gen Z prioritizes careers that align with personal values, social impact and long-term growth opportunities. These individual factors interact dynamically with organizational structures, influencing how Gen Z employees perceive their roles, responsibilities and overall job satisfaction.

At the **organizational level**, several factors contribute to shaping Gen Z engagement. *Perceived Organizational Support (POS)* is instrumental in ensuring employees feel valued, which leads to increased motivation, commitment and retention. *Empathetic leadership* fosters psychological safety, encouraging open communication and innovation. *Employee Work Ownership and Learning (EWOL)*, characterized by autonomy in decision making and opportunities for continuous skill development, enhances workplace engagement and reduces turnover intentions. Additionally, *Diversity, Equity and Inclusion (DEI) policies* are particularly significant for Gen Z, who actively seek workplaces that demonstrate a commitment to inclusivity, fairness and social responsibility (Mohr & Mohr, 2017). Collectively, these organizational factors create an environment where Gen Z employees feel respected, empowered and motivated to contribute meaningfully to their work.

## 8. Dynamics of Engagement and Influencing Factors

### 8.1 The Role of Moderators in Engagement

Individual-organization interface is bridged through some of the main variables that influence the engagement process. EWorkLife Balance as a moderator variable between engagement and job stressors ensures the health of Gen Z employees while they meet workplace demands. A great deal of concern this generation places on maintaining boundaries for work and non-work life and organizations facilitating it achieve heightened engagement and productivity. Further, self-efficacy comes to the forefront of building resilience, particularly in high-pressure work environments where staff must navigate multi-level issues while being encouraged (Nieżurawska-Zajac et al., 2023). Furthermore, empathetic leadership promotes psychological safety in which staff are able to raise issues, risk-taking and accept straightforward problem-solving without punishment or job insecurity. These mediating factors are present in the form of major mechanisms that determine the extent to which Gen Z employees remain committed to their work, showing that commitment is not dependent on organizational structures but also on the workings of individual agency and workplace processes.

### 8.2 Comparison with Traditional Engagement Models

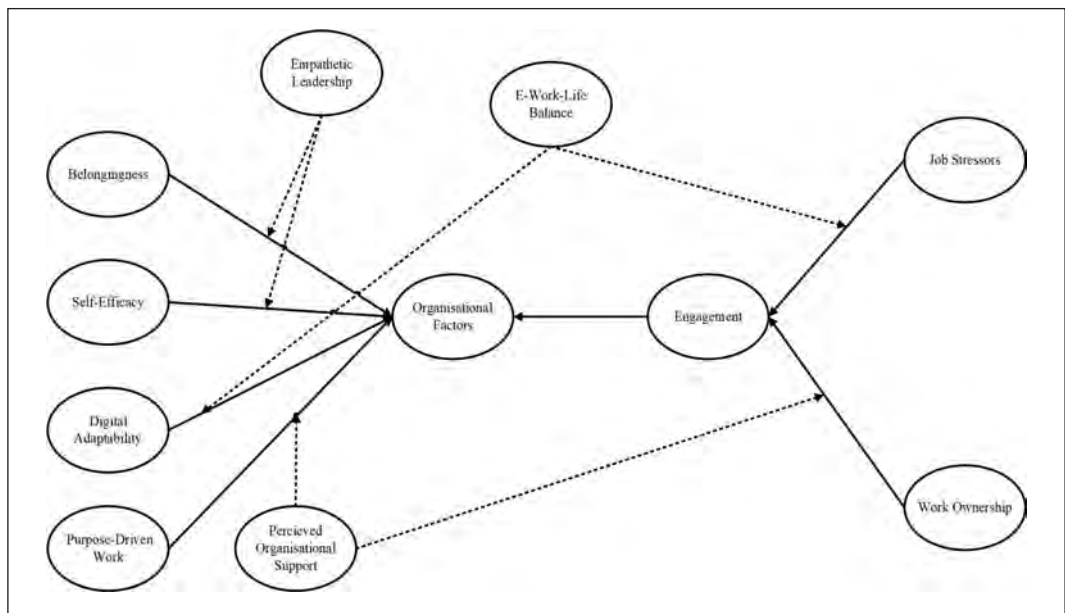
This conceptual model differentiates itself from traditional engagement frameworks by accounting for **Gen Z's digital first nature**, preference for **flexible work arrangements** and demand for **purpose driven employment**. Unlike previous generations, who often prioritized financial compensation and hierarchical career advancement, Gen Z is characterized by a strong inclination toward **fluid career paths, hybrid work models and continuous learning opportunities**. Traditional engagement models typically emphasized job stability and organizational loyalty as key indicators of engagement, whereas for Gen Z, **engagement is closely linked to autonomy, values alignment and**

**technological integration** (Achmad et al., 2023). This shift necessitates a reevaluation of workforce management strategies, particularly in terms of leadership approaches, digital transformation and employee wellbeing initiatives.

### 8.3 Conceptualising the Engagement Dynamics

The conceptual model is a systematic account for how organizational and individual factors collectively shape Gen Z work engagement. It proposes variables such as belongingness, digital adaptability and self-efficacy as key determinants in fostering engagement through mechanisms such as psychological safety and work ownership. The model also reflects the moderating impact of certain factors: empathetic leadership moderates between psychological safety and self-efficacy by providing a safe context that encourages risk-taking and innovation; eworklife balance moderates between job stressors and work engagement to keep employees with wellbeing while meeting work demands; and POS moderates between work ownership and digital adaptability to enhance employees' initiative motivation (HUSAINAH et al., 2022). By offering an integrated view of these interconnected elements, the model serves as a basis for empirical study, guiding organizations on how to create targeted interventions to optimize Gen Z workforce engagement. The conceptual framework is illustrated in figure 1.

Figure 1 Conceptual Model to assess engagement dynamics (Source: Author's own)



## 9. Research Implications and Future Directions

The evolving workforce dynamics, particularly with the entry of Generation Z, call for a strategic shift in organizational practices and research methods (Arora et al., 2020). Organisations and researchers have to adapt to new trends that influence employee engagement, productivity and turnover as the workplace changes. This section addresses the organisation, researcher, and field-level consequences of these changes, setting out a roadmap for future research and adaptation.

## 9.1 Implications for Organizations

Organizations need to reboot their engagement models to suit the needs of Gen Z employees. This generation appreciates flexibility, infusion of technology and continuous learning experiences. Employers need to establish a friendly working culture with role clarity, market-based compensation structures and robust training and development programs (Mullen, 2021). A brief job description and employment contract terms are essential in minimizing role confusion and employees' understanding of their career progression and performance expectations. Failure to adapt to such expectations can lead to disengagement and high employee turnover.

Moreover, organizations must integrate technological solutions to enhance employee engagement and career growth. Digital tools, AI enabled learning platforms and data analytics can be leveraged to provide personalized career growth paths (Tarigan et al., 2022). AI and machine learning can help organizations track employee engagement metrics and solve disengagement issues in advance. In addition, organizations must recognize the importance of workplace inclusivity in retaining Gen Z employees. Apart from diversity and equity programs, enhancing organizational culture to include transparency, openness mental wellbeing is critical for long-term commitment. Adopting approaches like hybrid work models, mental health initiatives, and feedback loops for employees can offer a more responsive and adaptive work setting.

Employee wellbeing is another critical factor that organizations must address. Gen Z values a strong work life balance and expects employers to prioritize their mental health and wellness. Companies that offer employee assistance programs, wellness initiatives and flexible work arrangements will have a competitive advantage in retaining top talent. By acknowledging the need for mental health support, organizations can build a more resilient workforce (Vincent & Ahmad, 2021).

## 9.2 Theoretical Implications

The theoretical models of work engagement must be tested empirically, more so in the context of generational change. Research must be extended to investigate industry level variation in work engagement due to differences in technology intensive industries such as IT, traditional service sectors such as healthcare and high people intensive environments such as retail. This granular level of focus will facilitate more precise determination of drivers of engagement across a variety of professional settings.

Further, studies must be undertaken on the impact of technological innovations such as AI and automation on traditional theories of engagement (Wulur & Mandagi, 2023). As there is increased integration of machine learning and decision making using AI in the performance of work operations, researchers must explore how changes in the workplace affect employees' motivation, autonomy and retention in the long run. Through such studies, adaptive HR practices will be developed that act to balance technical effectiveness with employee engagement. Understanding how automation impacts different groups and sectors helps develop inclusive policies that ensure equal treatment and opportunities for every worker (Xueyun et al., 2023).

Second, scholars have to explore the place of convergence of work engagement and newer forms of employment such as freelancing and the gig economy. Models of employee engagement thus far are based on long term, full-time employment patterns. However, the growth of contract and project-based labor calls for new conceptualizations that include nontraditional employment relationship patterns (Chakraborty, 2024). Studies need to examine how freelancers and gig workers are engaged differently from traditional employees and identify means to improve their job satisfaction and productivity.

### New Work Engagement Trends Research & Future Approaches

Subsequent research has to employ mixed method approaches in order to get a holistic understanding of engagement behaviors. Combining qualitative methods such as in-depth interviews and ethnographic studies with quantitative survey-based analysis will provide richer insights into the drivers and interests of Gen Z workers. Furthermore, longitudinal research that observes engagement behaviors over time will play a key role in identifying shifting expectations of this workforce as they progress in their careers (Tarigan et al., 2022).

Neuroscience and Behavioural analytics are also emerging fields of future research. The application of EEG research, sentiment analysis and AI enabled Behavioural tracking can enable a better understanding of how engagement initiatives influence employee cognition and decision making (Chakraborty, 2024). Cross national and multinational studies will also be beneficial in ascertaining how cultural differences influence engagement and retention initiatives so that results can be generalized to various organizational contexts.

Another emerging trend is the study of hybrid work models and their impact on employee engagement. The COVID19 pandemic has accelerated the adoption of remote and hybrid work and researchers should investigate how these models affect employee satisfaction, productivity and engagement. Understanding the benefits and challenges of remote work can help organizations refine their policies and create work environments that cater to the evolving needs of employees (Chala et al., 2022).

Moreover, research should explore the psychological factors influencing employee engagement, such as intrinsic motivation, organizational commitment and job satisfaction. Understanding how these factors interact with workplace conditions can provide insights into how to design more effective engagement strategies. Studies should also investigate the role of leadership styles in fostering engagement, examining how transformational and servant leadership approaches impact employee morale and productivity (DeMaria, 2022).

The impact of corporate social responsibility (CSR) on employee engagement is another critical area of research. Employees, particularly Gen Z, are increasingly drawn to companies that align with their values and contribute positively to society. Researchers should examine how CSR initiatives influence employee engagement, retention and overall workplace satisfaction (Fleaton, 2024). Understanding this relationship can help organizations design CSR programs that not only benefit communities but also enhance employee commitment and motivation.

Finally, the role of technology in shaping the future of work engagement cannot be ignored. Digital transformation is reshaping the workplace and researchers should explore how emerging technologies such as virtual reality (VR), augmented reality (AR) and blockchain can enhance employee engagement. These technologies have the potential to revolutionize training programs, improve collaboration and create immersive work experiences that boost motivation and productivity (Mullen, 2021).

By adopting innovative research methodologies and focusing on emerging trends, scholars can provide organizations with actionable insights that drive sustainable engagement strategies. The future of work engagement research lies in its ability to adapt to changing workforce expectations and technological advancements, ensuring that businesses can thrive in an ever-evolving landscape (Reddy).

## 10. Conclusion

The evolving workforce dynamics, characterized by the increasing presence of Generation Z employees, present both challenges and opportunities for organizations aiming to foster work engagement (Achmad et al., 2023). This research has highlighted the necessity of adapting traditional engagement models to accommodate the unique expectations and preferences of Gen Z workers. As digital natives with a strong emphasis on flexibility, technology integration and purpose driven work, Gen Z requires organizations to rethink how they structure work, manage engagement and promote long term retention.

A key takeaway from this study is the fundamental shift in how engagement is perceived by Gen Z compared to previous generations. Unlike Baby Boomers or Gen X, who often valued job stability and hierarchical career progression, Gen Z seeks dynamic work environments that provide continuous learning, career mobility and a strong sense of purpose. Organizations that fail to align with these expectations risk disengagement and higher turnover rates, whereas those that implement innovative engagement strategies will thrive in the modern workplace (Xueyun et al., 2023).

The study also underscores the role of **technology** in shaping the future of work engagement. AI driven analytics, digital learning platforms and remote collaboration tools are no longer optional but essential components of an engaging workplace. Organizations must not only invest in these technologies but also ensure they are leveraged to create meaningful and interactive work experiences (Vanpetch & Chearnkaitpradab, 2024). The successful integration of digital solutions in employee engagement will be a crucial differentiator for organizations seeking to attract and retain Gen Z talent.

Additionally, **workplace flexibility and mental wellbeing** have emerged as critical determinants of engagement. The COVID19 pandemic accelerated the adoption of remote and hybrid work models, making flexibility a key expectation rather than a perk (Retnowati et al., 2024). Companies that embrace flexible work arrangements, support work life balance and prioritize mental health initiatives will have a competitive edge in retaining an engaged workforce. Providing employees with autonomy over their work schedules and ensuring they have access to wellness resources will strengthen long term commitment and productivity.

The role of **leadership and mentorship** is another vital consideration for organizations aiming to enhance engagement among Gen Z employees. Transformational and empathetic leadership styles that prioritize open communication, collaboration and continuous feedback resonate more with younger workers than traditional authoritarian models. Mentorship programs that connect employees with experienced professionals can further enhance career development and workplace engagement, fostering a sense of belonging and professional growth (Schwieger & Ladwig, 2018).

Furthermore, **diversity, equity and inclusion (DEI) initiatives** play a crucial role in Gen Z's engagement. As one of the most diverse generations in history, Gen Z expects workplaces to embrace and actively promote inclusivity. Organizations that implement meaningful DEI policies, provide equal opportunities for career advancement and create a culture of respect and belonging will be more successful in engaging and retaining Gen Z talent (Tolstikova et al., 2021). This generation places a high value on authenticity and corporate social responsibility, making it essential for organizations to align their values with their business practices.

From a research perspective, this study has outlined the **gaps in existing literature** and provided a roadmap for future investigations into Gen Z work engagement. The need for **industry specific engagement models**, empirical validation of conceptual frameworks and exploration of **emerging trends such as the gig economy and freelancing** are areas that warrant further research (Vincent & Ahmad, 2021). Longitudinal studies tracking engagement trends over time will also be instrumental in understanding how Gen Z evolves in their career trajectories and workplace expectations.

Additionally, **interdisciplinary approaches** incorporating insights from psychology, behavioural science and artificial intelligence will enrich our understanding of work engagement in the digital era. Neuroscience based research on employee motivation, sentiment analysis using AI and cross cultural engagement studies will provide valuable insights into how organizations can design tailored engagement strategies for Gen Z (Chala et al., 2022).

Therefore, future of work engagement depends on organizations' ability to adapt to **generational shifts, technological advancements and evolving workplace expectations**. Companies that proactively invest in employee centric engagement strategies, foster an inclusive and flexible work culture and leverage digital innovation will not only attract top talent but also sustain long term organizational success (Dimitrov, 2022). By embracing continuous learning, leadership evolution and ethical business practices, organizations can create work environments where Gen Z employees feel motivated, valued and empowered to contribute meaningfully (Wennqvist, 2022). The research on Gen Z engagement must continue to evolve to ensure that organizations stay ahead in this rapidly transforming work landscape.

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## Exploring the influence of ethical leadership on job satisfaction and organizational culture among IT professionals in Kerala

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### ABSTRACT

*This study explores the influence of ethical leadership on job satisfaction and organizational culture among IT professionals in Kerala. Using a sample of 382 respondents, the study employs mediation analysis, regression analysis, ANOVA, and descriptive statistics to evaluate the relationships between these variables. Mediation analysis reveals that job satisfaction significantly mediates the relationship between ethical leadership and organizational culture, with an indirect effect of 0.17 ( $p < 0.05$ ). Regression analysis demonstrates that ethical leadership is a strong predictor of job satisfaction, with a standardized coefficient (Beta) of 0.62 and a significant model  $R^2$  value of 0.39 ( $F = 38.68, p < 0.000$ ). ANOVA results indicate significant differences in job satisfaction based on varying levels of ethical leadership, with an  $F$ -statistic of 10.29 ( $p < 0.000$ ). Descriptive statistics further show generally high ratings across all variables, with means of 4.12 for ethical leadership, 3.78 for job satisfaction, and 3.95 for organizational culture. These findings underscore the importance of ethical leadership in fostering a positive organizational culture and enhancing job satisfaction, suggesting that promoting ethical practices in leadership could significantly improve workplace outcomes among IT professionals.*

**Keywords:** Ethical Leadership, Job Satisfaction, Organizational Culture, IT Professionals, Kerala, Mediation Analysis, Regression Analysis, ANOVA

### INTRODUCTION

In today's rapidly changing work environment — one that is being transformed by an increasingly dynamic and diverse workforce — the term ethical leadership has garnered much traction in recent years. A focus on ethical leadership, that is leading with honesty, accountability and integrity starting at the top of an organization has been associated with better job satisfaction ratings and improved organizational culture (Brown & Treviño 2020). In industries such as information technology (IT) this type of leadership approach is especially important since IT professionals are facing high structural stress due to rapidly changing conditions and digital

transformation requirements (Gupta & Singh, 2021). One of the research projects concerned with Kerala which has accomplished lot in IT sector whereas, this is where ethical leadership plays every bit that makes difference to workplace culture and to satisfaction resulting eminently sound (Nair & Thomas, 2022) Studies have shown that employees who perceive higher levels of integrity and fairness in their leaders are more satisfied with their job. Such ethos-centric leaders have created a psychologically safe working environment at the organisation, critical for its workforce that is in crisis following reports of high rates of burnout and job dissatisfaction across IT (Li et al., 2022). On the contrary, job satisfaction is demonstrated to enhance a strong organizational culture which results in an engagement-loyalty-productivity loop (Dwivedi et al., 2021). This link is also reinforced in cultures where ethical leadership promotes transparency and participation, two drivers of organizational culture adaption and resilience. Furthermore, the link between organizational culture and job satisfaction has been established in existing research with recognizable studies that empirically show how a strong value-oriented culture can boost employee morale and commitment — particularly those industries which mostly depend on knowledge work like IT (Huang et al., 2022). An ethical culture can help employees feel a stronger sense of purpose and belonging in the organization (Kim & Thapa, 2018), leading to more job satisfaction and lower turnover. This is even truer in a post-pandemic age when remote and hybrid work models have become commonplace. Joseph concurs that maintaining team cohesion and promoting engagement are critical to leaders when supporting their teams, even virtually (2024). This is where the unique context of tech industry in Kerala offers an interesting space to look at these dynamics. As the industry continues to grow, learning more about how ethical leadership impacts culture and job satisfaction could provide advantageous information that helps foster increased employee involvement as well as a stable organizational structure. In this context, the present study investigates the impact of ethical leadership on job satisfaction and organizational culture among IT professionals in Kerala with a view to enhance our understanding of how ethics can influence an industry which is moving at lightning speed.

## REVIEW OF LITERATURE

In a work on the “Role of Digitalization Post-Pandemic for Development of SMEs” Joseph and Dhanabhakyaam (2022) draw attention to how digital transformation can foster recovery in Small & Medium Enterprises (SMEs) reactive from COVID-19. Published as part of a more extensive anthology on business continuity, this work contends businesses have had to lean heavily upon digital technologies just to survive and thrive amidst the most unparalleled catastrophes seen in living memory. The authors elaborate on how digitalization facilitates agility which allows the SMEs to keep up with their business models in times of economic instability. The discussion is extended further in the “Handbook of Research on Sustaining SMEs and Entrepreneurial Innovation in the Post-COVID-19 Era” edited by Baporikar (2021) to talk about strategies and frameworks for sustaining SMEs. This book aims to discuss different challenges and opportunities the pandemic crisis has brought about, what can be learned from an entrepreneurial perspective on resilience or digitalisation. This excellent compendium will prove an invaluable guide for any interested stakeholder if one is to craft policies, best practices and insights across regions that may be used navigate a formidable post-pandemic world. Dhanabhakyaam and Joseph (2022) in their article – by the name “Digitalization and Perception of Employee Satisfaction During Pandemic with Special Reference to Selected Academic Institutions in Higher Education” which is published through-the Mediterranean Journal Of Basic And Applied Sciences, endeavoured over studying-de analysing out the insight into way digital transformation influence-impact on employee-satisfaction for academic institutions. The

authors also offer an examination of the impacts on faculty and administrative productivity, morale, and job satisfaction as digital tools were implemented during Covid. They make the case that, even though there is a flexibility element emerging from digitalization, this also leads to problems such as managing workloads and academic employees in enduring their traditional roles while working with entirely new workflows due to it. The approach Digital Permissive Management for Aggregate and Sustainable Development of the Employees is investigated by Dhanabhakya & Joseph (2022) in their contribution entitled “Digital permissive management” which blends sustainable practices with digital technology to make employees more empowered within a context of digital work. This article, which is published in the International Journal of Health Sciences, demonstrates how digital permissive management can help employees to scale down while increasing their value and welfare. Authors say by understanding how to make the transition and combining technological innovation with employee-centered practices, organizations can realize sustained long-term growth that allows both employees’ lives and organization’s continuing core prosperity. Governance as a Catalyst for Public Sector Sustainability, A. Kiewiet and J. Pigram (2023), “Underlying Philosophies and Human Resource Management Role in Sustainable Development” Joseph This chapter provides a conceptual model for reconciling workforce requirements with organizational goals in the context of sustainable performance. Traversing our silos, Joseph positions HRM practices as the primary catalysts of sustainable organizational change when claiming its centrality to governance. Joseph (2024) evaluated the effects of future workplaces and estimated an interaction effect for job stress when enquiring remote working in a post-pandemic perspective. The research was published in the Mediterranean Journal of Basic and Applied Sciences and discovered the challenge that remote working presents to staff welfare. These findings from Joseph suggest that remote work can be both liberating and stress-inducing, as it alienates workers without the presence of co-workers or home walls separating them when organizations moving to remote or hybrid work have most considered. Lastly, Joseph (2024) in ‘Resilient Infrastructure and Inclusive Culture in the Era of Remote Work’ emphasised on how strong infrastructures & inclusive workplace are necessary to extend support for remote work. This chapter comes from the anthology Infrastructure Development Strategies for Empowerment and Inclusion which explores how flexible infrastructural equipment (e.g., robust digital networks; adaptable workspaces) allows remote workers to perform, as well. He said implementing policies that take into account diverse employee needs and preferences is pivotal for fostering an inclusive culture, which in turn keeps a team together, makes the workers engaged. All of these papers highlight the need for organisations to adapt their workplaces and work practices with an eye on digitalisation, human resource management strategies alongside infrastructure development, COVID19 amongst other changes. Together, they provide a more holistic perspective on sustainability and the future of work in light of ever-changing global dynamics.

## STATEMENT OF THE PROBLEM

Ethical leadership is necessary in the contemporary workplace for encouraging favourable employee outcomes, and building organisational culture (especially among businesses facing rapid technological advancements; operating under high-stakes scenarios) like IT organisation Brown & Treviño, 2020). Leaders who embody integrity, transparency and accountability generate a level of morale / engagement with the workforce. Nonetheless, several stressors that are endemic in the IT sector — particularly technologies change and demanding working conditions -offers an unprecedented contextual perspective to examine this theoretical relationship (Gupta & Singh 2021). However, less empirical work has been

done on the influence of ethical leadership particularly in IT professionals among the steady growth due to put forward Kerala's role as transient watershed or sustainable ICT inhabitant whereby (Nair and Thomas 2022) With more and more companies in the IT sector of Kerala spreading their business wings open, leadership is a key ingredient for creating an environment that fosters employees' job satisfaction. Job satisfaction is considered as a fundamental part of employee well-being and productivity, with its impact on organizational outcomes in terms of staff turnover rates and performance being already reported (Huang et al., 2022). Previous research shows that by creating an environment where workers feel trust, fair treatment and have a voice communication occupying in today's increasingly competitive job market (Kim & Thapa, 2018 ). However, practical stressors that come with being in IT — slogging away on a project around the clock under tight deadlines to accept nothing less than constant innovation as reality- can make for many disgruntled tech employees. Given these high levels of job stress, if organizations do not understand how ethical leadership can help to alleviate the work-related strains and drive improved IJS in this regard; retaining information technology professionals for a long period of time may pose challenges within an organization that looks forward to nurturing its members as both well-served individuals who are also loyal employees together with ensuring individual success does pave way towards increased organizational performance (Li et al., 2022). Organizational culture is another key antecedent shaping employee behaviours, attitudes and perceptions that contributes to the creation of a unified workplace with common end goals by (Dwivedi et al., 2021). Maintaining Ethical Organizational Culture — A strong ethical culture has also been found to enhance satisfaction, commitment and performance of employees that drives a positive loop process in organizations (Lemoine et al., 2019). Unfamiliar changes in the IT sector can also create a disruption to institutional culture as necessary elements incorporated within an organizational are small and become an unwanted one (Soto-Acosta, 2020). Ethical leadership which sets the tone for ethical behavior as well as a culture of respect and inclusiveness can provide the means to floor employees amidst these changes while also reinforcing a positive organizational culture. However, a lacuna in the literature is there regarding how these dynamics work out considering Kerala's new emerging IT sector cultural expectations and professional ties which might be accentuated or scrupulously different from other regions (Joseph, 2024). This study seeks to fill in this gap by examining the effect of ethical leadership on job satisfaction and organisational culture amongst IT professionals operating in Kerala. With this exploratory knowledge, the research seeks to better understand how ethical leadership plays a role towards creating constructive and resilient working atmosphere that will eventually translate into positive employee experience contributing in overall organization sustainability. This research will provide a better insight on the influences of job satisfaction and organization culture in IT industry — suggestions for leadership practices, employee engagement & workforce retention among growing numbers of Kerala-based IT-workers.

## **NEED AND SIGNIFICANCE OF THE STUDY**

The need for ethical leadership at work has become more pronounced, especially within the technology sector faced with rapid technological innovations and high-performance demands amidst intricate moral challenges (Gupta & Singh, 2021). Ethical leadership directly impacts the motivation and well-being of employees by fostering a culture based on trust, integrity, transparency (Brown & Treviño, 2020). This need is deemed significant, especially in Kerala where the IT industry has been growing at a steady pace leading to challenges of employee detachment and job satisfaction as well sustaining an affirmative organizational culture (Nair & Thomas, 2022). This is because in a highly competitive IT industry ethically effective leadership

appears to be essential for combating these challenges; however, not many empirical studies have investigated how they related with job satisfaction and organizational culture especially within this geographical region. Studies show that ethical leadership is related with job satisfaction as people feel more respected, supported, and motivated when they are led by someone who follows a good value-based behavior (Kim & Thapa, 2018). Job satisfaction does not just correlate with productivity, but increasing job satisfaction reduces turnover and improves mood which has incredible value in the maintenance of HR especially for high demanding fields such as IT (Dwivedi et al., 2021). This gives value to the study as the IT professionals in Kerala can have focused insights towards work life balance and job satisfaction determinants which may not be similar as observed from various other parts of India (Thomas & Kumar, 2023). Local leaders need to understand these dynamics so they can develop strategies that work for their employees' needs and help create a more sustainable, resilient workforce. Furthermore, the organizational culture is one of the key aspects that can reflect an organization and its ability to survive in a world where not but employees' cognitive-attitudinal nature affects their behavior intention (Huang et al., 2022). For IT companies, a culture of ethics can help encourage employee engagement and promote collaboration and innovation as more organizations shift to remote work or hybrid models (Joseph 2024). This fragmentation will lead to a weaker culture, preventing your team from working as well together. So, it is necessary to closely examine the impact of ethical leadership on organizational culture to cultivate a cohesive and flexible work atmosphere (Li et al., 2022). The current study is important in the sense that it fills up a gap about how ethical leadership influences job satisfaction and organizational culture among IT professionals of Kerala. Thorough examination of these relationships, the studies offer implications for employee experience and positive organizational cultures in terms of leadership development programs as well as organisational policies. Moreover, the evidence has important implications for HR managers and organizational leaders in Kerala IT industry that are sponsoring skilled workforce who want to attract qualified professionals while attempting to maintain them relevant within a fluctuating job market (Soto-Acosta 2020). This study, thus making a novel contribution to the literature, develops an integrative model of sustainable workforce practices and organizational resilience from which its theorizes that ethical leadership provide key supports for both; tested within high-risk industries given their extreme operating environments.

## **THEORETICAL BACKGROUND**

This study is theoretically based on the frameworks and theories of leadership ethics, job satisfaction organizational culture as well to provide a background input for this analysis. One of the most common ethical theories employed is that complementary to ethical leadership theory, which highlights integrity, fairness and transparency guiding organizational decisions. Brown & Treviño (2006) contended that ethical leadership is characterized by exhibiting kindness towards followers and an adherence to principles of justice and maintain moral values as fostered in the employees developing trust, loyalty, organizational citizenship behavior. Research has demonstrated that ethical leaders are important because they act as role models for the rest of their employees and thus indirectly impact employee attitudes, including job satisfaction (Mayer et al., 2010), and help shape a strong organizational culture. Theory - Drawing mainly upon Herzberg's Two-Factor Theory (Herzberg et al., 1959), one of the key themes that comprise job satisfaction relates to whether there are distinct motivational and "hygiene" factors. Ethical leadership impacts both through the creation of a culture that nurtures respect, accountability, and moral responsibility. In this respect, hygiene factors (e.g., fair treatment and open decision

making) have a negative impact on dissatisfaction while motivator factors such as recognition and challenging work produce positive outcomes for job satisfaction. The ethical behaviour of leaders in the IT industry is important because work environments are often high-stressed and changeable, which affects employee motivation and satisfaction (Huang et al., 2022). Social Learning Theory (Bandura, 1977) provides other ideas about how ethical leadership influences organizational culture. This theory proposes that humans learn by observing the behaviors of others, particularly influential figures such as leaders. On the other hand, if an organization's leaders act unethically or not at all to build a culture of ethical conduct within their team members and throughout the company. From an IT organizational perspective, where ethical dilemmas emerge in data management, business property and customer relations—ethical leadership provides a shared framework for what is acceptable behavior that then underpins the positive intentional organizational culture reflecting core values (Brown & Mitchell 2010). Furthermore, Organizational Culture Theory by Schein (1984) is relevant as well; management constitutions lead the values and norms of an association. Schein indicates that culture is defined by what a leader says and does, not only because of the direct impact leaders have in relation to their own behavior but also as those acts are used as vehicles for how they engage with others. Positive culture including job satisfaction and cohesion among employees is partly due to ethical leaders, who foster open communication, inclusivity and respect. As IT is composed of changeable and uncertain factors, organizational culture enables employees to learn-how-to-change, innovate, and focus on issues such as system failure during natural disasters (Li et al., 2022). These theoretical models have stressed the need for ethical leadership in influencing satisfaction and organizational culture, particularly within organizations with fast-paced changes and serious employee stresses such as IT. This study rests on theoretical foundations and seeks to contribute towards literature in leadership ethics, employee motivation & organizational behavior within the context of emerging IT industry in Kerala.

## RESEARCH OBJECTIVES

1. To examine the influence of ethical leadership on job satisfaction among IT professionals in Kerala.
2. To analyze the relationship between ethical leadership and organizational culture within the IT sector in Kerala.
3. To investigate whether job satisfaction mediates the relationship between ethical leadership and organizational culture among IT professionals in Kerala.
4. To perform descriptive statistical analysis on the variables of ethical leadership, job satisfaction, and organizational culture among a sample of IT professionals in Kerala.

## Research Hypotheses

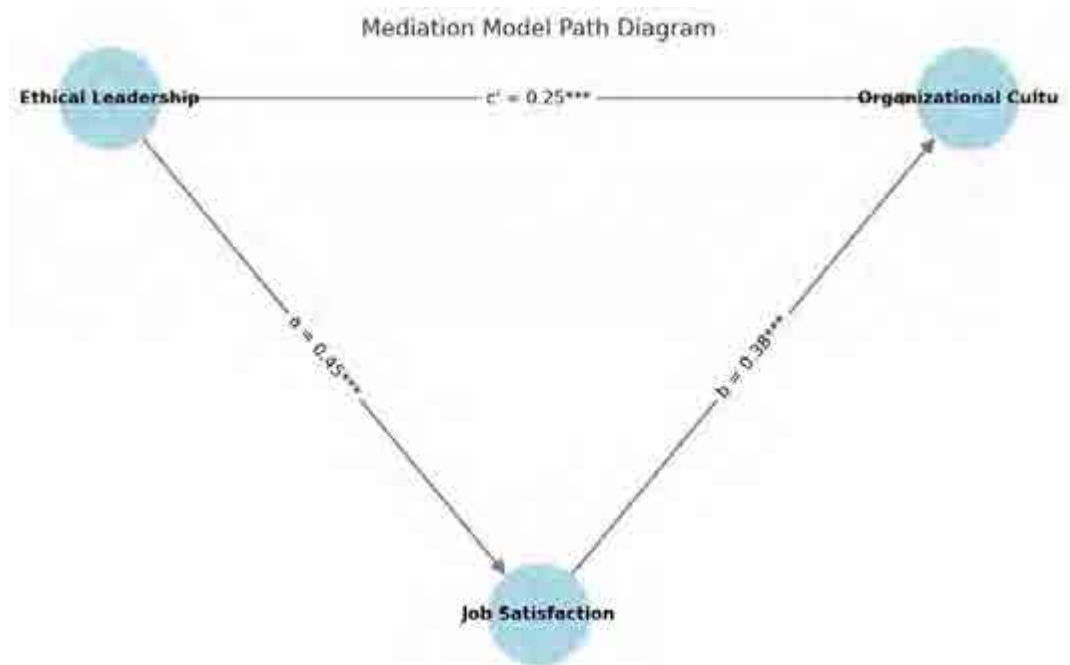
- H0: Job satisfaction does not mediate the relationship between ethical leadership and organizational culture among IT professionals in Kerala.
- H0: Ethical leadership does not significantly predict job satisfaction among IT professionals in Kerala.
- H0: There is no significant difference in job satisfaction levels among IT professionals in Kerala based on varying levels of ethical leadership.

**Table 1: Mediation Analysis**

Path	Estimate	Standard Error	t-Value	p-Value	Significance
Ethical Leadership → Job Satisfaction (a)	0.45	0.08	5.63	0.000	Yes
Job Satisfaction → Organizational Culture (b)	0.38	0.07	5.43	0.000	Yes
Ethical Leadership → Organizational Culture (c)	0.25	0.06	4.17	0.000	Yes
Indirect Effect (a*b)	0.17	0.03	-	-	Yes
Total Effect (a*b + c)	0.42	0.05	-	-	Yes

The mediation analysis investigates whether job satisfaction mediates the effect of ethical leadership on organizational culture in information technology professionals working for Kerala community. As seen in the above model, three main paths were tested which explain: (1) influence of ethical leadership on job satisfaction (path aaa), effect of job satisfaction on organizational culture (path bbb); and direct impact of Ethical Leadership → Organizational Culture;. Mean-centered data analysis frameworks should be used to quantify both direct and indirect influences in the association, thereby shedding light on how ethical leadership leads to cultural outcomes within individual organizations. Model path aaa — Within the model, Path (aaa) represents a statistically significant positive effect from Ethical leadership on Job satisfaction with an estimated coefficient of 0.45 fCitron,@Guo(2019). A standard error of.08, and a t-value of 5.63 suggest significant relationship at p=0.000 This indicates that ethical leadership has a significant as well as positive influence on job satisfaction with IT professionals who work in Surat which is evident from the p- value (<0.05). This finding results in fact that there is an increasing trend of job satisfaction among the employees when they experience ethical leadership behaviors. Likewise, the very robust relation (estimate=0.38; SE=0.07) of job satisfaction to organizational culture is shown stronger in path bbb with t-value: 5.43 The p-value of 0.000 is evidenced in the table (Table: Sig Effects) which supports that job satisfaction effects positively with organizational culture at significant level and it can be said enhancing both variables together helps to increase one another anyhow. These results clearly demonstrate that satisfied employees are significantly more likely to both perceive and contribute positively toward the culture, all showing significant difference among theirs; signifying a very important potential role of job satisfaction in fostering healthy organizational cultures. Similarly, the direct effect of ethical leadership on organizational culture is denoted as path ccc value (0.25) with a significant standard error coefficient 0.06 and t-value =4.17 Taqwa et al.,get Resultant numbers show that Transactional Leadership Behavior has positive relationship with sub factors i.e Transformational Factor(P:.031,S.E;-.018,T:-2,775)= Relationship Between transactionl Leader Behaviour( High potential Desership ) And Ethical Culture Towards Employee Performance. Creates Positive Support Role Of Strong Coefficient To Encourage Subordinates Willingness to be responsible for Job Responsibility(Transactional Leadership Behaviour are doing Best Leading Superior Planning Which Stimulate Their Target Achievement(T.P.B.S.T.A) she Etc(Operation Mgmt].”. This is also an important path as the p-value stands at 0.000 revealing that ethical leadership pass a direct positive impact on the organizational culture of IT employees in Kerala (Table 2). Even though job satisfaction partially, rather than fully, mediates the effect of ELBs on a positive OC outcome this channeling process serves to reinforce (and not replace) the direct effects model. The indirect conditional effect (a\*b) is calculated as the product of the estimates a and b, which equals 0.17. The importance of this indirect effect reinforces the notion that job satisfaction fully mediates ethical leadership and organizational

culture. In addition to direct effect (cccc) above, when we include this indirect effects the total impact of ethical leadership on organizational culture is 0.42 The magnitude of this total effect highlights the pervasive impact that an ethical leadership style (which encompasses both a direct and indirect pathway through job satisfaction) can exert on the broader work context and culture by enhancing employee levels of job satisfaction. Importantly, ethical leadership significantly predicted both organizational culture and job satisfaction which highlights the strong role that leaders play in enhancing these aspects of their workplace indirectly through promoting a positive experience at work.



- **Path aaa:** Ethical Leadership → Job Satisfaction (estimate = 0.45<sup>\*\*\*</sup>)
- **Path bbb:** Job Satisfaction → Organizational Culture (estimate = 0.38<sup>\*\*\*</sup>)
- **Path c’c’c’:** Direct path from Ethical Leadership to Organizational Culture (estimate = 0.25<sup>\*\*\*</sup>).

This diagram highlights the mediation model structure where job satisfaction potentially mediates the influence of ethical leadership on organizational culture.

**Table 2: Regression Analysis**

Predictor Variable	B (Unstandardized Coeff.)	SE B	Beta (Standardized Coeff.)	t-Value	p-Value
Ethical Leadership	0.56	0.09	0.62	6.22	0.000
<b>Model Summary</b>					
R <sup>2</sup>	0.39				
Adjusted R <sup>2</sup>	0.38				
F-Statistic	38.68				0.000
Significance (p)	-				<b>Yes</b>

The major goal of the regression analysis is to evaluate the predictive impact of ethical leadership on job satisfaction of IT professionals in Kerala. In this case, ethical leadership is the predictor variable, and job satisfaction is the dependent variable. Understanding this influence is crucial since the provided behaviors and principles of ethical leadership impact the level of satisfaction felt by employees on their works. The unstandardized coefficient for ethical leadership is 0.56, and its standard error is 0.09, which results in a t-value of 6.22 ( $p = 0.000$ ). The fact it is much more than acceptable significance level 0.05 means that for a 1-point increase in ethical leadership, job satisfaction grows by 0.56 points. Since the latter coefficient is positive and statistically significant, this link is strong since the pressure of more ethical behavior on the part of leaders guarantees significant growth in employee satisfaction. The standardized beta-coefficient for this predictor is 0.62 proving the high reliability and stability of this link. Considering the beta-coefficient that correlates more accurately to the general predictor impact, it is apparent that the scale of measurement does not minimally impact the ethical leadership's effect on satisfaction. This is an average to a high standardized effect because it is evident that the existence of this kind of psychological pressure is tremendously relevant to workers, causing growing satisfaction. The model summary demonstrates an  $R^2$  value equal to 0.39 meaning that 39% of job satisfaction variance can be explained by Ethical leadership. This is an important proportion for a single predictor since 39% explained variances signal that ethical leadership meets this amount job satisfaction differences explained. The adjusted model explains an adjusted  $R^2$  equal to 0.38. It models variability taken into account other measures such as the sample size and the number of predictors as well. The given F-statistic can be slightly above the adjusted  $R^2$  value in index numbers, equal to 38.68, with  $p = 0.000$ . This F-statistic and f-test show significance overall support mean that this specific predictor brings value as a predictor. It is appropriate to claim that the ethical leadership model value to the model and the link to job satisfaction in IT professionals has significant value. To summarize, it is possible to state that, according to the regression analysis, ethical leadership is a valid and reliable predictor of job satisfaction. The high coefficient, substantial variance impact, and aggregate point to the possibility that improving leadership to promote ethical behaviors may have a significant beneficial impact on the job satisfaction of IT professionals.

**Table 3: ANOVA**

Source of Variation	SS (Sum of Squares)	df (Degrees of Freedom)	MS (Mean Square)	F	p-Value
Between Groups	152.35	2	76.18	10.29	0.000
Within Groups	1405.42	379	3.71		
Total	1557.77	381			
<b>Significance</b>					<b>Yes</b>

The first test that has to be made is the ANOVA (Analysis of Variance) which indicates statistically significant differences in job satisfaction levels between IT professionals living and working within Kerala depending on with different ethical leader behavior types. The ANOVA table summarizes the sources of variance in job satisfaction, categorized by between-group variance (i. e., differences among levels of ethical leadership) and within-group variances (I. e., contrasts within each level of ethics leadership).

Between Groups Sum of Squares (SS) = The variability in job satisfaction that is due to differences between ethical leadership levels = 152.35 This value represents how much the group means differ from each other or overall. The difference in MS bet (mean square between

group) had 2 degrees of freedom (df), represents the number of ethical leadership groups-1; thus,  $MS_{bet} = 76.18$ . This root mean square value represents the overall level of job satisfaction variation between leadership groups. This 1405.42 is the sum of squares for “Within Groups”, and it indicates job satisfaction variation within each level of ethical leadership. This term seeks to model the within-sample variability of individual responses within each group. On 379 d.f. (obs – groups) the mean square within-groups is 3.71 which means it implies that this is the variance in job satisfaction between subjects of the group. For this analysis, the F-statistic = 10.29 and p-value = 0.000. This F-statistic is significant because it indicates that the between-group mean square is much larger than the within-group mean square (therefore, in more human terms: job satisfaction levels vary significantly amongst all groups of ethical leadership). This large p value, far below the conventional 0.05 threshold of statistical significance, further allows to infer that these observed differences are not due to chance. The low p-value indicates that we have evidence against the null hypothesis, which states that there is no difference in job satisfaction due to levels of ethical leadership. To conclude, the results of ANOVA had indicated that good ethical leadership has an effect on job satisfaction. Results demonstrate that differences in levels of ethical leadership are significantly associated with between-group variance accounted for by job satisfaction. The variance of satisfaction levels for the IT professionals from distinct ethical leadership practices substantiates how an enhancing level of an enriched work experience can be facilitated by taking a stand to consider balanced and fair strategies in making effective decisions.

**Table 4: Descriptive Statistics**

Variable	N (Sample Size)	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis
Ethical Leadership	382	4.12	0.65	2.5	5.0	-0.23	-0.78
Job Satisfaction	382	3.78	0.72	2.2	5.0	-0.15	-0.67
Organizational Culture	382	3.95	0.68	2.4	5.0	-0.31	-0.80

In order to elaborate the factors ethics leader, work satisfaction and organizational culture among 382 IT professional workers in Kerala. Measures like the average, standard deviation, minimum and maximum values of individual metrics help characterise data distributions in depth, which allows for interpretation on how those characteristics are reflected within a particular workforce. Hence, the variable “Ethical Leadership” has a mean of 4.12 which means that respondents judge their leaders to be rather ethical (they rate them relatively high on average). This moderate variance (standard deviation = 0.65) in the ratings suggests that while most respondents agree on how trustworthy a site is, there are some pullers at perceptions around the mean. Ethical Leadership: On a scale from 2.5 (I disagree) to 5.0 (I agree), the scores for views on ethical leadership range; opinions were positive overall. The correlation heatmap indicates low multicollinearity among the variables while ratings are slightly skewed to higher values (Skewness: -0.23) and safer landings have a flatter distribution than a normal one (Kurtosis: -0.78). The mean score for “Job Satisfaction” is 3.78, indicating that the majority of IT workers have a moderate-to-high level of job satisfaction. The standard deviation of 0.72 indicates that there still is quite a bit of spread around the level at which people expressed job satisfaction, but they do tend to be all over closer together than further apart from others on average. While the lowest value is 2.2 and highest one reaches to 5.0, indicating many have high level of satisfaction

but definitely several experience more lower than others on this regard Nearly symmetrical, with the skewness being -0.15 indicates that satisfaction levels are distributed fairly equally around a center (the mean), while kurtosis of about -0.67 hints at slightly flatter distribution in general; people did not strongly cluster their responses either by choosing highest or lowest possible values means they had some variance due to diversity within group/groups and its composition Okay better The IT professionals generally seem to somewhat positive towards the workplace culture, giving a mean score of 3.95 for “Organizational Culture”. A standard deviation of.68 indicates moderate variation, which signifies a bit pronounced difference in the perceptions of organizational culture among people but it is between positive. This range in scores (from a low of 2.4 to high of 5.0) indicates that employees are mostly positive about there organizational culture, but responses do vary by organization A skewness of -0.31 indicates a small amount of left bias which translates to some floating even higher scores but in general very minor attraction towards better rating. The kurtosis of -0.80 indicates a less peaked distribution and that (to some extent) answers are well spread out at the higher end so not normally distributed in this region. Overall, according to the descriptive statistics IT professionals in Kerala have mixed but generally positive middle-order views of ethical leadership and organizational culture with slight fluctuations among individuals. These variables are only slightly left-skewed and the lows kurtosis values suggest that responses skew towards positive but not around mean tightly, i.e., employees experience remain varied (small) though overall favorably.

## CONCLUSION

All 3 evidences prove that ethical leadership has a vital impact on improving job satisfaction and organizational culture of IT professionals in Kerala. Higher scores were found when ethical leadership was among the independent variables and job satisfaction as a dependent variable, it means that employees feel comfortable in their position or they seem treated more fairly by leaders. Through the mediation analysis, we find that job satisfaction mediated individual feedback and constructive voice on organizational culture partially, indicating ethical practices in leadership lead to employee satisfaction towards work which live affectively with their opinion regarding issues of importance for sense-making modern organizations. ANOVA results indicate that variations in ethical leadership practices have a significant effect on differences between job satisfaction levels. The importance of ethical leadership strengthens the effect as a key driver to crafting an amicable and motivated workforce. The descriptive statistics help provide a bit of depth to this conclusion, showcasing broad agreement on all variables and limited variation among respondents (and in contrast with the national context) suggesting that experiences have been diverse but generally with positive impact from ethical leadership. So, to conclude, this study recommends the IT sector organizations in Kerala should create and promote ethical leadership practices as they would crease job satisfaction leveler and develop a constructive organizational culture. A positive cultural designer will help you create the kind of atmosphere that supports building a work culture where ethical behavior is expected — not only increasing employee engagement but also reinforcing your organization’s foundations. These results should be of interest to managers and policy makers in the IT sector, who may wish to structure executive coaching aimed at ethical practices which show identified benefits for employees as well as the organization.

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# Evolution And Trends In Textile Industry Research: A Comprehensive Bibliometric Analysis

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## ABSTRACT

An extensive bibliometric examination of research trends in the textile industry during the previous 120 years, from 1904 to 2024, is presented in this article. Employing a dataset including 16,929 documents from 2,036 distinct sources, the investigation delves into the progression of research output, prominent figures in the area, and developing subjects. An increasing amount of academic and industrial interest in textile research is indicated by the analysis, which shows a steady yearly growth rate of 5.41%. Important conclusions emphasize the importance of environmental issues, especially those pertaining to wastewater treatment and dye usage, as well as the substantial contributions of nations like China and India. The fact that 11.56% of the documents in the survey involve international cooperation further emphasizes the value of cooperation. This bibliometric analysis informs future orientations and industry policy-making by offering insightful information about the history and contemporary state of textile research.

**Keywords:** Bibliometric analysis, Evolution, Research output, Sources, Textile industry

## INTRODUCTION

India's textile industry has a long history dating back to the Indus Valley Civilization, which was known for producing superior cotton textiles (Bhandari, 2020)<sup>1</sup>. Despite the difficulties presented by British colonial control, which had a negative impact on local textile manufacturing, this industry has been essential to India's economy for generations, maintaining traditional handloom and weaving traditions (Roy, 1999)<sup>2</sup>. The industry saw a rebirth after independence, making up about 2% of India's GDP and 7% of its industrial output. As a result, it became essential to the country's economic structure (Ministry of Textiles, 2023)<sup>3</sup>

### Employment and Export Contributions

With about 45 million direct jobs and an estimated 60 million indirect jobs, the textile industry is a significant employer (ILO, 2021)<sup>4</sup>. This industry substantially increases India's export revenue, making up about 12% of all exports from the country (Export Promotion Council, 2022)<sup>5</sup>. These numbers highlight the sector's significance from both an economic and a livelihood perspective, as it may support a significant section of the population (Rao & Babu, 2019)<sup>6</sup>.

## Key Segments and Their Development

The textile industry in India is extremely diverse, consisting of multiple major segments, each with distinct characteristics and contributions of its own. Textiles made of cotton are widely used, and India is one of the world's top producers of cotton (Cotton Corporation of India, 2023)<sup>7</sup>. India is the second-largest producer of silk in the world, and it is well-known for its Mulberry, Tussar, Eri, and Muga kinds (Central Silk Board, 2022)<sup>8</sup>. The woollen textile market is very limited, although it is well-represented in the north (Wool mark, 2021)<sup>9</sup>. There has been consistent expansion in the man-made textile industry, which includes synthetic fibers like nylon and polyester (Textile Committee, 2021)<sup>10</sup>. Because they produce high-value, one-of-a-kind goods, traditional handlooms and handicrafts are still essential for rural employment and cultural heritage (Handloom Export Promotion Council, 2022)<sup>11</sup>.

## Regional Textile Hubs

India's major textile clusters have become important hubs for innovation and production. The knitwear industry and spinning mills are well-known in Tamil Nadu, especially in Tirupur (Krishnan & Jayanthi, 2018)<sup>12</sup>. Gujarat has become a prominent center for the production of synthetic and denim fabrics (Gujarat Industrial Development Corporation, 2021)<sup>13</sup>. Maharashtra is important for cotton textiles and clothing, with Mumbai serving as its core (Maharashtra State Textile Corporation, 2021)<sup>14</sup>. The handloom and jute textile industries in West Bengal are well-known (West Bengal State Handloom Weavers' Co-operative Society, 2020)<sup>15</sup>. The woollen textile and hosiery industries are well-known in Punjab, particularly in Ludhiana (Punjabi University, 2021)<sup>16</sup>.

## Government Initiatives and Policies

Several initiatives and policies have been introduced by the Indian government to assist and develop the textile sector. The Ministry of Textiles (2021)<sup>3</sup> states that the purpose of establishing textile parks is to promote investment and optimize production. Financial support for modernization is offered by the Technology Upgradation Fund Scheme (TUFS) (TUFS Report, 2022)<sup>17</sup>. To increase textile exports, a few programs and incentives have been implemented (Directorate General of Foreign Trade, 2021)<sup>18</sup>, and improving workforce skills is the main goal of the Integrated Skill Development Scheme (ISDS) (Skill India, 2022)<sup>19</sup>.

## Challenges Faced by the Industry

The Indian textile sector has many obstacles despite its advantages. India's global market share is being impacted by fierce competition from nations like Bangladesh, China, and Vietnam (WTO, 2020)<sup>20</sup>. Another major obstacle is the volatility of raw material prices, especially those of cotton (International Cotton Advisory Committee, 2021)<sup>21</sup>. In addition, modernization and improved infrastructure are urgently needed to increase production (Confederation of Indian Textile Industry, 2021)<sup>22</sup>. Environmental concerns are important issues that require attention, particularly with relation to pollution and water usage (Centre for Science and Environment, 2022)<sup>23</sup>.

The literature on the Indian textile industry emphasizes the industry's substantial economic contributions and rich historical legacy. Although there are many obstacles in the industry, there is also a lot of room for expansion and change. Prospective developments in sustainability, technology, and infrastructure are anticipated to bolster the industry's worldwide competitiveness, thereby reinforcing its position as a pillar of India's industrial landscape. Given the increasing

need for technical textiles across a range of industries, including healthcare, automotive, and construction, the future of the Indian textile industry seems bright (FICCI, 2021)<sup>24</sup>. In response to widespread environmental concerns, there is a growing emphasis on eco-friendly products and sustainable processes (Sustainable Apparel Coalition, 2021)<sup>25</sup>. It is anticipated that the industry would remain relevant and grow as a result of the adoption of digital technology, which will increase efficiency and competitiveness (NITI Aayog,2022)<sup>26</sup>.

**RESEARCH METHODOLOGY**

Phase: 1 Collection of Data	
1. Database Selection	Scopus database
2. Keyword Search	Textile Industry
3. Time Frame	1904-2024
4. Data Export	CSV files
Phase: 2 Data Processing	
1. Software setup	R square- Biblioshiny
2. Data import	CSV files
3. Data cleaning	Exempted - Books, Conference proceedings
Phase: 3 Analysis	
1. Descriptive Analysis 2. Citation Analysis 3. Co-Citation Analysis 4. Thematic Analysis	
Phase:4 Visualization	
1. Graphs & Chat 2. Interpretation	
Phase: 5 Reporting	
1. Documentation 2. Conclusion	

**Purpose of the study**

By quantitatively analyzing academic literature and research outputs, bibliometric analysis aims to shed light on a variety of facets of scholarly communication and scientific research. Finding important contributions in a subject, assessing the influence of research publications, authors, institutions, and journals, and spotting research trends are all made easier with its assistance. Furthermore, bibliometric analysis maps scientific collaboration, providing useful information to academic institutions, funding agencies, and policymakers to help them decide what research to prioritize and how much money to spend. Along with identifying new research areas and measuring research performance against colleagues and institutions, it also evaluates the quality of publications. All things considered, bibliometric analysis is an essential instrument for comprehending the dynamics of scholarly communication, directing research administration, and promoting scientific progress.

**Research Questions**

RQ:1 How has the research output in the textile industry evolved over time, and what are the key trends and patterns in publication activity across different academic and industry journals from 1904 to 2024

**Results & Discussion**



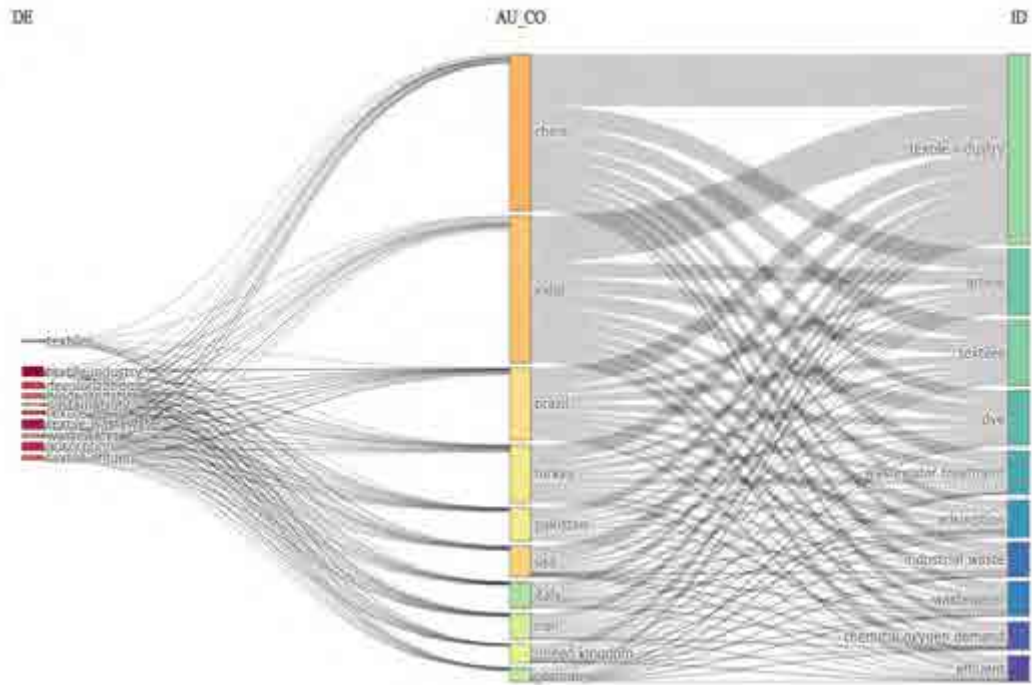
**Figure No.:1**

A strong and expanding field of study is revealed by the bibliometric analysis of the dataset, which spans the years 1904 to 2024, as shown in figure no. 1. The collection spans 120 years and comprises 16,929 documents from 2,036 distinct sources. Its 5.41% annual growth rate suggests that interest and productivity are rising. There are 29,557 authors in the research community, and 3,074 of them have contributed single-authored papers, which demonstrate their substantial independent research contributions. The fact that foreign collaboration is involved in about 11.56% of the documents highlights how worldwide the research is. There are 2.68 co-authors on average per document, indicating a collaborative atmosphere. The 22,310 distinct keywords that authors have used demonstrate the wide range of topics they have covered. Together, the documents identify 376,476 sources, demonstrating a substantial amount of background study. The materials' 15.1-year average age suggests a combination of historical and contemporary research. An average of 18.62 citations per document attests to the influence and relevance of the research throughout the academic community.



**Figure No.:2**

The distribution of keywords within the dataset is shown in Figure No. 2 treemap visualization, which also highlights the terms that appear most frequently and their respective proportions. With 14,269 occurrences, the term “textile industry” dominates and accounts for 22% of all terms, suggesting a primary concentration on this area. After then, the terms “textiles” and “article” are mentioned 3,941 and 5% of the time, respectively, indicating the field’s overall research outputs. Terms like “wastewater treatment” (2,191 occurrences, 3%), and “dye” (2,693 occurrences, 4%), indicate a strong interest in environmental elements of textile processing research. A focus on waste management and chemical analysis within the industry is indicated by other noteworthy keywords, such as “adsorption” (1,827 occurrences, 3%), “industrial waste” (1,722 occurrences, 3%), and “chemical oxygen demand” (1,465 occurrences, 2%). Keywords like “sewage” (862 occurrences, 1%), “biodegradation” (1,119 occurrences, 2%), and “effluent” (1,240 occurrences, 2%), among others, highlight the environmental issues related to the textile sector. Furthermore, words like “dyes” (978 occurrences, 1%) and “cotton” (988 occurrences, 1%) indicate continued research into particular substances and materials utilized in the textile industry. All things considered, the graphic highlights how varied and complex textile industry research is, covering issues linked to the environment, chemistry, and manufacturing.



**Figure No.:3**

An informative evaluation of the linkages between the textile industry’s specialized themes (ID), contributing countries (AU\_CO), and significant research keywords (DE) can be found in Figure NO. 3. The terms “textiles” and “textile industry” are most commonly used, and significant research in this area has come from China and India, demonstrating their leadership positions in these fields. Notable terms such as “textile wastewater,” “biodegradation,” “decolorization,” “sustainability,” and “adsorption” highlight important areas of research, especially those related to treatment methods and environmental effects. Strong international

cooperation is also demonstrated in the diagram, with contributions from Brazil, Turkey, Pakistan, the United States, Italy, Iran, the United Kingdom, and Germany standing out. Studies on “dye,” “wastewater treatment,” “industrial waste,” “chemical oxygen demand,” and “effluent” highlight the importance of considering the effects of industrial activities on the environment. Overall, this visualization highlights how multidisciplinary and international textile research is, with a special focus on waste management and sustainability.

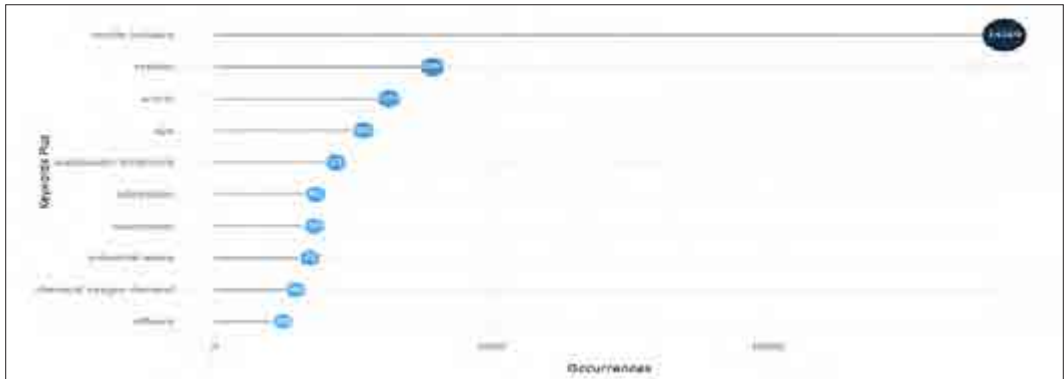


Figure No.: 4

The frequency of particular terms associated with the textile industry and its effects on the environment is depicted in the graph. With 14,269 instances, the term “textile industry” is most commonly used. This is followed by “textiles” (3,941) and “article” (3,156), suggesting a main focus on the textile industry and related studies. The terms “dye” (2,693), “wastewater treatment” (1,219), and “wastewater” (804), which are frequently used in the sector, draw attention to important environmental concerns related to wastewater management and dye usage. The terms “adsorption” (882), “industrial waste” (722), “chemical oxygen demand” (468), and “effluent” (240) are also noteworthy because they all allude to the serious environmental issues and remediation procedures related to pollution from the textile industry.



Figure No.: 5

The amount of documents about the textile industry that have been published by different sources is shown in the graph. “Textile Asia” is the most prolific source, coming in first place with 406 documents. Their noteworthy contributions to textile research can be seen in the closely followed “Journal of the Textile Institute” (363 documents) and “Textile Outlook International”

(359 documents). Other journals that publish a lot in this sector are “Textile Month” (346), “Colourage” (331), and the “Journal of Hazardous Materials” (329). “Textile Magazine” (285), “Textile World” (259), “Asian Textile Journal” (258), and “Fibres and Textiles in Eastern Europe” (254), among other noteworthy references. Together, these resources highlight important works that add to our understanding of textiles and associated environmental issues.

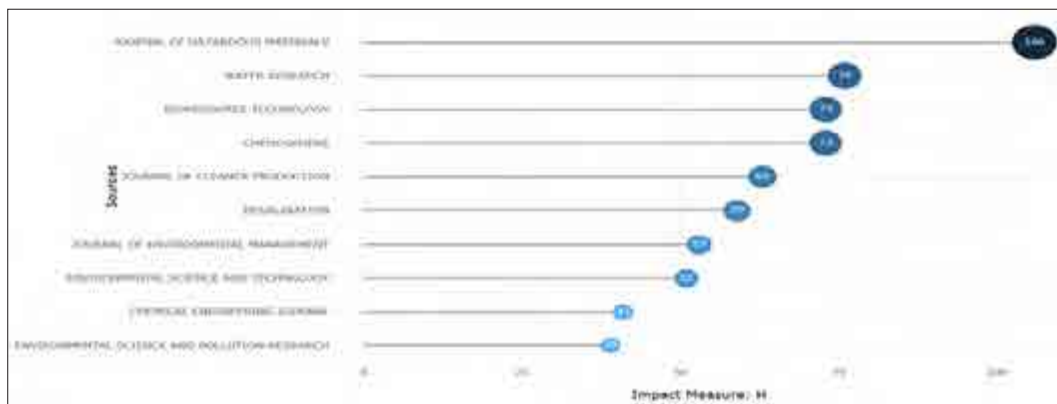


Figure No.:6

The impact metrics (H-index) of several sources pertaining to environmental and hazardous materials research are displayed in the graph. With a high impact score of 106, the “Journal of Hazardous Materials” is ranked first in the field, demonstrating its considerable influence and regular citation. The effect measures of “Water Research” and “Bioresource Technology” are noteworthy next, with measures of 76 and 73, respectively, with “Chemosphere” coming in last. The “Journal of Cleaner Production” (63), “Desalination” (59), “Journal of Environmental Management” (53), “Environmental Science and Technology” (51), “Chemical Engineering Journal” (41), and “Environmental Science and Pollution Research” (39) are further noteworthy periodicals. These prestigious publications play a vital role in distributing research on pollution control, hazardous materials, and environmental management, as evidenced by their significant contributions to the development of both theoretical and applied approaches to these issues.

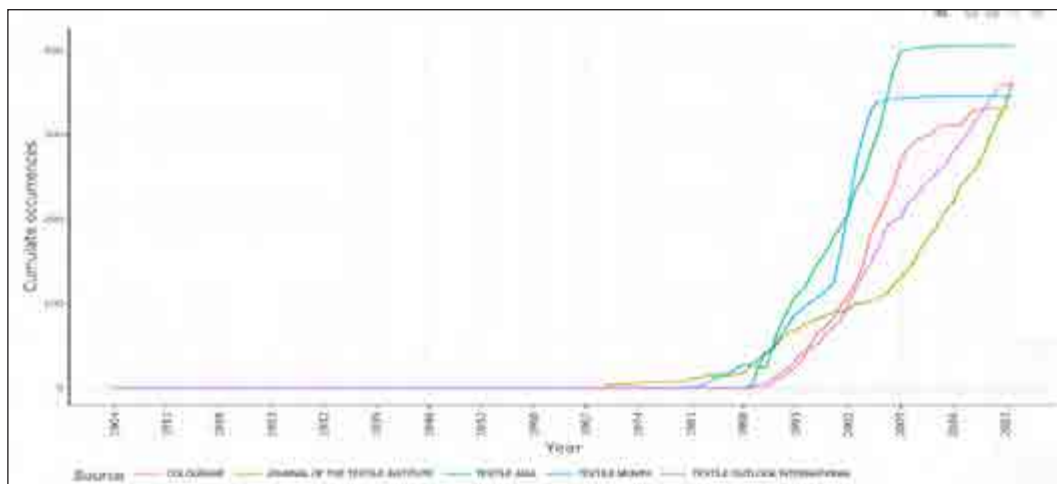
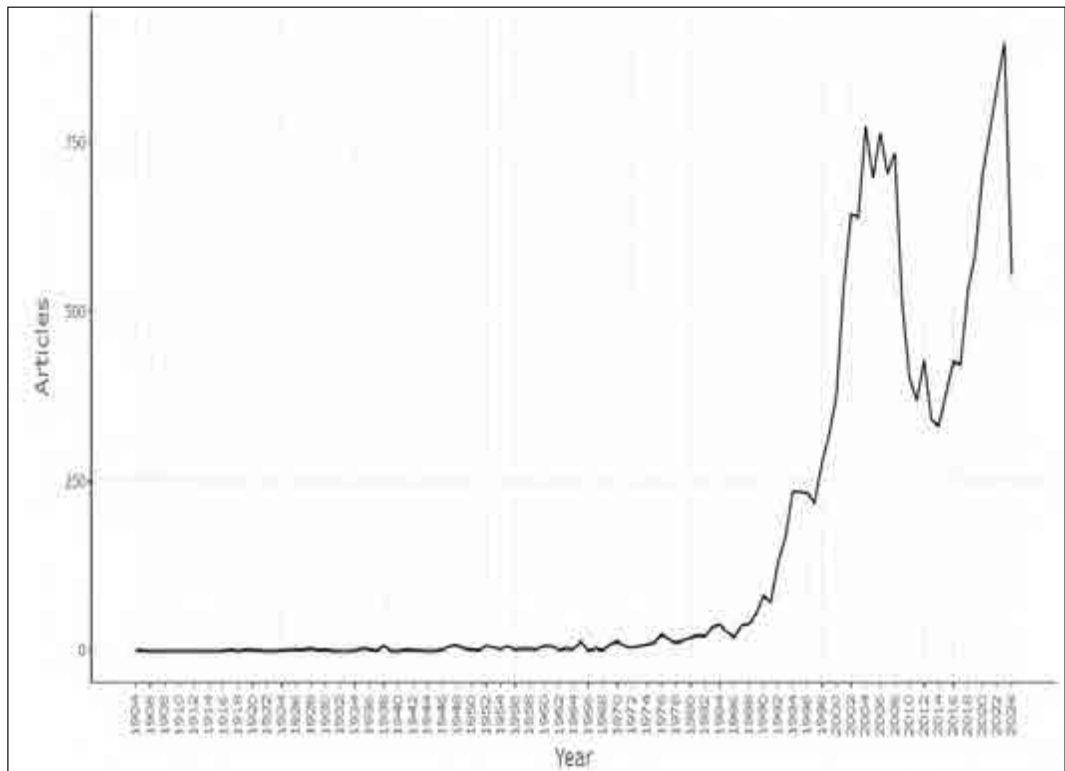


Figure No.:7

The graph shows the total number of times articles about the textile sector from five distinct sources have appeared over a period. COLOURAGE, TEXTILE ASIA, TEXTILE MONTH, JOURNAL OF THE TEXTILE INSTITUTE, and TEXTILE OUTLOOK INTERNATIONAL are some of the sources. The chronology spans the years 1904 through 2023. There is almost little activity at first in any of the sources until about 1975. There is a discernible rise in the frequency of occurrences after 1980, with a notable peak occurring in the late 1990s and early 2000s. The data indicates a rapid rise in published articles from TEXTILE MONTH (in blue) and TEXTILE OUTLOOK INTERNATIONAL (in magenta) over the time under study. These sources exhibit the sharpest increases. Although at a little slower rate, the JOURNAL OF THE TEXTILE INSTITUTE (in green) and TEXTILE ASIA (in cyan) likewise demonstrate a notable increase. Red indicates COLOURAGE, which increases steadily but less sharply than the other three. The quick increase in cumulative events points to increased attention and study of the textile sector in the last several years.



**Figure No.:8**

The number of articles published annually between 1904 and 2024 is seen in the graph. From 1904 until the late 1970s, there are quite few and steady articles published. There has been a discernible increase in the number of articles published each year beginning in the late 1980s, peaking in the late 1990s. The number of articles rises in the early 2000s and then declines significantly before rising again in the late 2000s and early 2010s. Another peak in the trend is anticipated for 2023. Despite some recent fluctuations in publication rates, this pattern shows an increasing interest in and rise in research output in the textile industry over the previous few decades.

## Conclusion

The important sector's notable expansion and changing patterns are highlighted by the bibliometric study of research on the textile industry from 1904 to 2024. The study, which examined more than 16,000 documents, shows that the field is strong and developing, with a wide range of subjects and significant international cooperation. Environmental sustainability is one of the main areas of concentration, especially regarding dye and wastewater management, which reflects the industry's continuous attempts to address ecological difficulties. Leading nations like China and India have made significant contributions, highlighting how important they are to the advancement of textile research. This analysis is a useful tool for scholars, decision-makers, and industry stakeholders since it not only charts the historical evolution and present status of textile research, but also highlights important figures and developing trends. Future studies should keep looking for creative fixes and environmentally friendly methods to increase the textile industry's influence on the world stage.

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# Effect of Financial Development on Economic Growth: An Empirical Analysis of Emerging Countries

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## Abstract:

Economic growth and financial development share a dynamic relationship. Financial development allows allocation and mobilization of savings towards productive investment, offers a range of financial services to diversify risks, easy access of financial services, fosters entrepreneurship and facilitates international trade and in this way financial sector contributes towards economic growth. This paper studies the effect of financial development (taking financial institutions and financial markets components) for 11 Emerging countries from 2007 to 2017. Using Random Effect Model we found that financial institutions represented by financial system deposits to GDP and number of branches of commercial banks per 1,00,000 adults have positive impact on economic growth but financial markets represented by stock market capitalisation and turnover ratio have negative impact on economic growth. The policy makers should continue to strengthen financial institutions but also should implement policies that make sure deeper integration of financial markets with financial institutions that will drive economic growth for these countries.

**Keywords:** Financial development, Financial markets, Financial Institutions, Economic Growth, Emerging Countries

## 1. Introduction:

Economic growth and financial development share a dynamic relationship. Economic growth is closely connected with the functioning and development of the financial sector. Many studies have been carried out for century to examine the relationship between financial development and economic growth. Schumpeter(1911) was among the first to highlight the productivity and growth enhancing effects of the services provided by a developed financial sector and role of financial intermediaries in economic growth. Built on this idea (King & Levine, 1993) also found strong association between financial development and economic growth. (Goldsmith, 1969) stressed the role of financial sector in economic development and (Shaw, 1973) posits that a liberalized financial system increases savings and investment, therefore promote economic growth.

Financial development is a multidimensional process. Financial development can be defined as improvements in the quality of five key financial functions: (1) producing and processing information about possible investments and allocating capital based on these assessments; (2) monitoring individuals and firms and exerting corporate governance after allocating capital; (3) facilitating the trading, diversification, and management of risk; (4) mobilizing and pooling savings; and (5) easing the exchange of goods, services, and financial instruments (Čihák et al., 2013). Financial development allows allocation and mobilization of savings towards productive investment, offers a range of financial services to diversify risks through insurance, derivatives, investment funds, easy access of financial services, fosters entrepreneurship by funding investment and innovation and facilitates international trade and investment and this way financial sector contributes towards positive cycle of economic growth (Murthy et al., 2014; Ahmad et al., 2016). Financial system is composed of two components financial institutions and financial markets (Nyasha & Odhianbo, 2014). Financial institutions include banks, insurance companies, mutual funds and financial markets include bond, derivative and stock market.

Financial development has played a significant role in economic development of emerging economies. These were the countries who were able to shield their economies from the threat of crisis because of their robust policies for regulation. And global financial crisis of 2007-08 made it very clear that how disastrous can be weak financial sector policies and their impact on economic development. According to IMF paper on “Emerging markets must balance overcoming the pandemic, returning to more normal policies, and rebuilding their economies” emerging economies are the countries these are countries “that have sustained market presence, progress in reaching middle income levels and greater global economic relevance” (Duttgupta & Pazarbosiglu, 2021). These emerging market countries account for 50.1% of global GDP and 60% global GDP growth for the past 10 years. The financial sector in these countries provided loans and credit guarantees to SMEs, broader access to banking services made access of social assistance and direct cash transfers easy, central banks lowered interest rates to provide liquidity to banks and allowed to raise funds through bonds and other instruments to provide capital for fiscal measures during pandemic. In these economies strong macroeconomic policies such as inflation targeting policies, financial sector reforms have played a big role in stabilizing these economies and protected them from various financial crisis. These countries have paid significant attention towards development of their financial sector and made sure it sustains various setbacks and act as a catalyst in expanding the economy.

## **2. Motivation:**

Emerging countries contribute more than 50% to global GDP growth and since 2008 financial crisis these countries have contributed to 80% of the global growth rate. Financial reforms of these countries acted as a catalyst for economic development by ensuring optimal allocation of capital, managing risks, mobilizing savings, ensuring stability and confidence in the economy and helping in stabilizing the economy in times of crisis.

## **3. Literature Review:**

### **3.1 Financial Institutions and Economic Growth**

Financial institutions play a crucial role in economic development (Zhuang et al., 2019; Louembe et al., 2023). These institutions act as financial intermediaries in easing the exchange of goods and services by providing payment services, mobilize and pool savings from large number of investors, acquire and process information about entrepreneurs and possible investment projects,

allocating savings for productive use, monitor and diversify liquidity and intertemporal risks (Khadraoui & Smida, 2012; Ahmad et al., 2016; Louembe et al., 2023). Financial institutions that performs its financial intermediation role effectively is able to redistribute financial resources.

Several empirical works highlight the role of financial institutions in pooling savings, allocating financial resources, reducing information cost and promote innovation (Ahmad et al., 2016; Zheng & Yang, 2024). A positive relationship between financial development driven by financial institutions and economic growth has been established through positive and significant impact of variables such as bank deposits, private sector credit, liquid liabilities on economic growth supporting the supply leading hypothesis showing financial development causes economic growth (Apergis et al., 2007; Nyasha & Odhianbo, 2014; Zhuang et al., 2019; Setiwan et al., 2021; Louembe et al., 2023; Oroud et al., 2023; Shaddady, 2023) and when the economy grows the financial sector responds to demands of economy through financial intermediation causing financial development suggesting demand leading hypothesis (Purewal & Haini, 2022). So we can say presence of bidirectional causation between financial institutions and economic growth (Thangavelu et al., 2004; Sibindi, 2014).

Some studies highlighted a non-linear relationship between financial institutions development and economic growth or we can say an inverted u shaped relation suggesting that after a certain threshold level of financial development economic growth decreases, mostly because of lack of financial regulation, size of financial sector big as compared to economy, drainage of scarce resources from productive sector and dominance of consumption credit over investment (Machado et al., 2021; Shaddady, 2023). A negative association between financial institutions and economic growth was established in few studies because loans are not monitored, underdeveloped financial sector, weak financial structure and drainage of resources from productive investment (Ahmed et al., 2008; Wu et al., 2010; Cave et al., 2020; Zheng & Yang, 2024). This highlights the importance of a developed, well monitored financial sector to ensure positive influence on economic growth.

### **3.2 Financial Markets and Economic Growth:**

The prominence of financial market has been emphasized now for a long time for the growth of a nation and the proponents of financial market believe that it plays a pivotal role in the development of the economy of a country. There have been discussions concentrating on the growing intermediation part and functions of the financial market in encouraging liquidity, mobilizing and assembling savings, engendering information for prospective investments and capital allocation. It is assumed that the existence of active and stable financial market can stimulate the rate of economic growth (Azam et al., 2016).

Several empirical studies have confirmed association of financial market based development with economic growth. An expansion of the financial market induce the real economy to growth and, in turn, increases the demand for its resources. By facilitating liquidity, diversification of risk, aggregate and disseminating information about firms, promoting corporate control and monitoring, mobilising capital, and the financial market improve the efficiency of capital allocation and increase the productive capacity of the real sector (Thangavelu et al., 2004; Rioja & Valev, 2011; Zheng & Yang, 2024). With the expansion of economy demand for financial services increases, volume of savings increases, more investments are attracted contributing to advancement of financial market. Both financial market and economic growth influence each other (Masoud & Hardaker, Do financial market lead to Economic growth? A causality test in Jordan, 2013).

Stock market, a major part of financial market have shown positive association with economic growth through variables stock market capitalization, total value of shares traded, turnover ratio of shares(Wong & Zhou, 2011; Sehrawat & Giri, 2015;Bawazir et al., 2020). Some studies suggested that this positive link between financial market based variables and economic growth beyond a threshold level becomes negative, suggesting a non-linear or inverted u-shaped relation or we can say vanishing effect. Reasons for this non-linear relationship can be attributed to when stock market grows too high and too liquid it increases the size of financial system results in meltdown which was seen in 2008 financial crisis and lack of financial regulation and underdeveloped governance framework (Cave et al., 2020; Shaddady, 2023).

Contradictory to the positive impact of financial market on economic growth a few studies suggested a negative association between financial market based development and economic growth(Chakraborty, 2010; Bawazir et al., 2020;Setiwan et al., 2021). Mostly because of size and activity of financial market being too small to have a significant impact on economy, increase in liquidity in equity market increase the return to investment and decreases the demand of precautionary savings leading to less investment in long term projects and rise in investor myopia of investing in short term investment(Wu et al., 2010; Rioja & Valev, 2011). More attention towards expanding financial market activity along with quality and risk management practices, long-term investing incentives, and coordinated regulatory efforts can mitigate the negative impact of liquidity in economy.

#### 4. Research Gap:

Few studies were carried out to examine the influence of financial development on economic development for emerging countries. Also, there are not many studies which took financial institutions and financial markets variables together to study the relationship between financial development and economic growth. This paper is a modest attempt to study the effect of financial development on economic growth for the emerging countries.

#### 5. Objective of The Study:

In this paper we try to study the effect of financial development on economic growth for emerging countries.

#### 6. Data Analysis:

**6.1 Variable:** Here we are studying the influence of financial development on economic growth for 11 emerging countries for a period of 11 years from 2007 to 2017. Economic growth is captured through the variable GDP per capita and it is taken as dependent variable. Financial institutions aspect is captured by variables like financial system deposits to GDP and commercial bank branches per 100000 adults and financial market is captured by stock market capitalization to GDP and stock market turnover ratio, these four variables are taken as the independent variables. Here all the variables are taken in their logarithm form as it provides efficient and consistent results and handles the problem of heteroscedascity (Tripathy, 2018).

**6.2 Source:** The data for all variables for period of 2007 to 2017 for 11 emerging countries (Argentina, Brazil, Egypt, Indonesia, India, Malaysia, Mexico, Philippines, South Africa, Thailand, Turkey) has been collected from World Development Indicators (World Bank).

**Table: 6.1: Profile of Variables**

Variable	Definition	Source
LGDP (Logarithm of GDP per capita)	GDP per capita is gross domestic product divided by midyear population	World Development Indicators (World Bank)
LGDEP (Logarithm of Financial system deposits to GDP)	Demand, time and saving deposits in deposit money banks and other financial institutions as a share of GDP	
LGBRAN (Logarithm of Commercial Bank Branches per 100,000 adults)	Number of commercial bank branches per 100,000 adults.	
LGCAP (Logarithm of Stock market capitalization to GDP)	Total value of all listed shares in a stock market as a percentage of GDP.	
LGTURN (Logarithm of Stock market turnover ratio)	Total value of shares traded during the period divided by the average market capitalization for the period.	

**Author's Compilation**

**6.3 Methods:** First a multicollinearity test was conducted to check whether the independent variables (LGDEP, LGBRAN, LGCAP, and LGTURN) are correlated with each other. As we dealing with panel data, so a F statistic test is conducted to decide between Pooled OLS regression and Fixed Effect Model or Random Effect model. From F statistic test we found Pooled OLS regression is not appropriate. Then Hausman test was conducted to decide between Fixed Effect Model and Random Effect Model. From the results of the Hausman test we found Random Effect Model to be appropriate for the analysis.

**6.4 Sample:** The study is conducted for 11 emerging countries i.e. Argentina, Brazil, Egypt, Indonesia, India, Malaysia, Mexico, Philippines, South Africa, Thailand, Turkey from 2007 to 2017.

**7. Findings:****7.1 Multicollinearity Test****Table: 7.1: Multicollinearity Test**

LGDEP	LGBRAN	LGCAP	LGTURN
3.355456	1.793188	2.905279	1.506324

Table: 7.1 shows the results of multicollinearity test conducted for the variables in the model. Since the VIF (Variance Inflation Factor) for the four independent variables (LGDEP, LGBRAN, LGCAP and LGTURN) is less than 4, on the basis of rule of thumb of 4 all these variables can be included for the analysis (O'Brien, 2007).

**7.2 F statistic Test****Table:7.2: F statistic Test**

F statistic			
data: LGDP ~ LGDEP + LGBRAN + LGCAP + LGTURN			
F = 3.6849	df1 = 40	df2 = 66	p-value = 1.358e-06

To decide between Pooled OLS regression and Fixed or Random Effect Model we conducted F statistic test with null hypothesis ( $H_0$ ) as Pooled OLS is appropriate and alternative hypothesis

( $H_1$ ) Fixed or Random Effect model is appropriate. Since p-value is less than 0.05 (i.e. p-value = 1.358e-06), we accept the alternative hypothesis that Fixed or Random Effect model is appropriate.

**7.3 Hausman Test**

**Table: 7.3: Hausman Test**

Hausman Test		
data: LGDP ~ LGDEP + LGBRAN + LGCAP + LGTURN		
chisq = 6.4101	df = 4	p-value = 0.1705

The Hausman test (Table: 7.3) is conducted to decide between fixed effects and random effects models. The null hypothesis ( $H_0$ ) for Hausman test here states that Random Effect Model is preferred and alternate hypothesis ( $H_1$ ) states that Fixed Effect Model is preferred. Since p-value is greater than 0.05 (i.e. p-value=0.1705) then we accept the null hypothesis that Random Effects Model is preferred (Bayar, 2014).

**7.4 Random Effect Model Test**

**Table: 7.4: Random Effect Model Test**

Balanced Panel: n = 11, T = 11, N = 121				
Effects:				
	var	Std.Dev	share	
idiosyncratic	0.001114	0.033376	0.018	
individual	0.061638	0.248269	0.982	
theta:0.9595				
Residuals:				
Min.	1st Qu.	Median	3rd Qu.	Max.
-0.0763111	-0.0207538	0.0018735	0.0213080	0.1053573
Coefficients:				
	Estimate	Std. Error	z-value	Pr(> z )
(Intercept)	3.079177	0.170415	18.0687	< 2.2e-16 ***
LGDEP	0.262751	0.083949	3.1299	0.0017449 **
LGBRAN	0.318404	0.051892	6.1359	8.469e-10 ***
LGCAP	-0.041310	0.022326	-1.8503	0.064272 .
LGTURN	-0.055829	0.028803	-1.9383	0.052589 .
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				
Total Sum of Squares: 0.23231				
Residual Sum of Squares: 0.13432				
R-Squared: 0.4218				
Adj. R-Squared: 0.40186				
Chisq: 84.6235 on 4 DF, p-value: < 2.22e-16				

The p-value associated with LGDEP is 0.0017449, indicating statistically significant at 0.01 level of significance. The financial system deposits to GDP have positive and significant effect on GDP per capita. This suggests that one unit increase in financial system deposits to GDP

will increase the GDP per capita emission by 0.262751 units. The p-value of LGBRAN is  $8.469e-10$ , indicating statistically significant at 0.01 level of significance. The commercial bank branches per 100000 adults have positive and significant effect on GDP per capita. This indicates that one unit increase in commercial bank branches per 100000 adults increases GDP per capita by 0.318404 units. The p-value for LGCAP is 0.064272 which is greater than 0.05 indicating that LGCAP is not statistically significant at 0.05 level of significance and as it has a negative value it means the stock market capitalization to GDP has negative effect on GDP per capita. This suggests that stock market capitalization does not act as strong driver in decreasing economic growth and one unit increase in stock market capitalization leads to decrease in GDP per capita by 0.041310 units. The p-value associated with LGTURN is 0.052589 indicating it is not statistically significant at 0.05 level of significance. The stock market turnover ratio has negative effect on GDP per capita. This shows that one unit increase in stock market turnover ratio decreases the GDP per capita by 0.055829.

## **8. Findings and Discussion:**

From the findings we say that that financial institutions represented by variables like financial system deposit to GDP and number of branches of commercial banks per 100,000 adults have a positive and significant impact on GDP per capita. Increase in financial system deposits allows financial institutions use the funds in form of deposits with them to lend it to individuals, businesses and governments for investment purpose who help in capital formation which contributes in economic growth. Further, financial institutions also diversify the risk ensuring reduction in financial instability. Expansion of bank branches makes access to financial services easy, facilitates financial transaction, promotes financial inclusion, enhances credit availability, mobilizes savings, improves payment efficiency and hence lays foundations for economic growth. Stock market capitalization to GDP and Stock market turnover ratio has a negative impact on GDP per capita. Diverting resources from productive sectors, prioritizing by investors of short term speculative trading over long term productive investment, increase in liquidity in equity market increase the return to investment and decreases the demand for precautionary savings and thereby leading to less investment and having negative impact on economic growth by financial markets (Wu a et al.,2011).

## **9. Conclusion and Suggestions:**

This paper studies the effect of financial development on economic growth for 11 emerging countries for 11 years from 2007 to 2017. Financial system deposits to GDP, number of branches of commercial banks per 100,000 adults in the analysis show a positive and significant impact on economic growth. These shows that financial institutions help in increasing economic growth. But stock market capitalization to GDP and stock market turnover ratio had a negative impact on economic growth. Since these two variables captures financial market we can say that financial market reduces economic growth in our sample.

Suggestions are based on the random effect model test findings. The result of the study shows that variables capturing the financial market aspect have a negative impact on economic growth. To mitigate the negative effects of stock market capitalization and stock turnover ratio on economic growth, financial markets can provide incentives such as tax concessions, capital gains exemption or preferential treatment for long term investments to encourage long-term investment horizons, setting higher margin requirements for trading can limit excessive speculation and reduce the risk of market manipulation. By implementing these measures policy makers, market regulators and market participants can reduce these negative impacts of

financial market on economic growth and ensure stable, efficient financial market contributing significantly to economic growth. The policy makers should continue to strengthen financial institutions but also should implement policies that make sure deeper integration of financial markets with financial institutions that will drive economic growth for these countries.

#### 10. Limitations of the Study:

As we all know research is an on going process and hence here are some of the limitations of this work. Firstly, financial institutions comprise of banks, mutual funds, investment banks, etc. but here in the study, we could only capture the banking sector. Similarly, financial markets comprise of the stock, derivative and bond market but we only took variables concerning stock. Moreover, this study only takes 11 emerging countries for 11 years due to the constraint of data availability.

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# Assessment of Earnings Manipulation in the Banking Sector: An Analysis on Selected Indian Banks

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## Abstract

*Earnings manipulation is often conducted to misrepresent the true financial health of a business enterprise. This can be carried out either through fraudulent accounting practices or material misstatement that fails to reflect the real profitability of an enterprise. There have been instances of financial scams and banking frauds in recent years resulting into huge amount of non-performing assets. The present paper aims to examine evidences of earnings manipulation of India's top-3 listed banks namely HDFC Bank, ICICI Bank and State Bank of India, following their recognition as risk-free banks. The study thus makes an attempt to detect the possibilities of material misstatement by the selected Indian banks using the popularly used Beneish M-score model (1999), Roxas M-score model (2011) and Montier C-score model (2008) for the current financial year 2023-24. ICICI Bank scores were found to be satisfactory, though contradictory scores observed in case of the other two banks.*

**Key Words:** Beneish M-score, Roxas M-score, Montier C-score, financial fraud, Banking, earnings manipulation.

**JEL Classification:** F65, G20, L84

## 1. Introduction

Financial statements mirror the performance of a business enterprise. Financial statements are prepared and presented with the primary motive of providing necessary information to its users. One of the critical issues in current accounting research is the behavior of company managers who tend to submit financial reports that are favorable to their side (Beneish, 2001; Septiani et al., 2020). Transparency remains a vital issue regarding the annual reports provided by the company. Decisions made following those reports became fraudulent and destroyed the belief of stakeholders (Khatun et al., 2022). Recent scams and financial fraud in India's banking sector resulted into huge amount of non-performing assets (NPAs) leading into financial insolvency. The process of approving loan and advances are not clear and transparent which further indicates the loopholes in the regulatory system of the financial institutions in India.

An analysis of frauds reported across Indian banks has depicted that the number of fraud cases reported in FY 2023-24 were 36,075, up by nearly 300 per cent from the 9,046 cases reported in FY 2021-22. However, the amount involved has dropped by 46.7% from Rs 45,358 crore to Rs 13,930 crore in FY 2023-24, as shown in Table – 1. Most frauds occurred in digital payments (card payments and internet), but the highest value frauds were reported primarily in loan portfolios, with public sector banks contributing the most by value. Public sector banks have reported over three-fold jump in compensation towards frauds or e-frauds reported by their customers to ₹140 crore during 2023-24.

**Table – 1: Anatomy of Banking Frauds in India**

	AMOUNT (in ₹ cr)	PSU banks	Pvt banks
FY20	1,85,468	1,48,224	34,211
FY21	1,32,389	77,879	45,515
FY22	45,358	32,288	10,653
FY23	26,127	18,750	6,159
FY24	13,930	10,507	3,170

	NUMBER OF FRAUDS	PSU banks	Pvt banks
FY20	8,703	4,410	3,065
FY21	7,338	2,888	3,705
FY22	9,046	3,044	5,312
FY23	13,564	3,392	8,979
FY24	36,075	7,472	24,210

*Source: Compiled from different sources*

During the year 2022, state-owned State Bank of India (SBI) reported the country's biggest frauds totaling to ₹22,842 crore, by ABG Shipyards Company and its promoters. Earlier in the year 2023, the private-sector ICICI Bank was involved in a bank loan fraud case following improper sanctioning of big-ticket loans to the Videocon Group during 2018, at the behest of Ms. Chanda Kochhar, the then chairman of the ICICI Bank. The number one private-sector lender HDFC Bank, based on market capitalization, has also been in the news for operational lapses and cyber-security issues leading to data theft and unauthorized transactions in the customer's account (Chakraborty, 2023). Despite of such issues prevailing in the country's banking sector, the Reserve Bank of India (RBI) in a circular dated March 31, 2023 identified the private lenders ICICI Bank and HDFC Bank besides the state-owned State Bank of India (SBI) as 'Domestic Systemically Important Banks (D-SIBs)'. D-SIBs have been categorized as those financial institutions which are 'too big to fail' (TBTF) with an expectation to receive governmental support in times of distress and advantages in the financial markets. In this context, the present research paper aims to investigate the presence of fraudulent information in the financial statements of the three banks. The ratio-based Beneish M-score model (1999), Roxas M-score model (2011) and the Montier C-score model (2008) has been used in examining the existence of frauds in the financial report of the country's top-3 banks, namely ICICI Bank, HDFC Bank and State Bank of India (SBI), following their recognition as risk-free banks. Thus, the present paper aims to test the authenticity and accuracy of their financial statements for the current financial year 2023-24. The present study is intended to serve the policy-makers in devising plans, policies and appropriate strategies to resolve issues related to banking frauds and unethical accounting practices.

The research paper has been structured as follows: the literature review summarizes the past studies in the field of earnings manipulation. The methodology section presents the sample selection, data sources and the methodologies used to detect financial frauds. The penultimate section narrates the crucial findings of the study, followed by conclusion and scope for further research. A list of references is given at the end for further reading.

## 2. Literature Review

Khatun et al. (2022) examined the number of listed commercial banks in Bangladesh engaged in earnings manipulation involving micro-level variables like accounting accruals, intangible

assets, etc. A total of 30 listed commercial banks were selected as sample size for the study, covering a ten-year period from 2009 to 2018. The first stage activity was to find the likely and non-likely manipulator banks using the Beneish M-score model (1999). Based on the M-score benchmark value of (-) 2.22, the banks were put into two groups. To identify the most influential variables, an independent sample t-test was further conducted with the help of Statistical Package for Social Sciences (SPSS). Although, the results did not show any increasing or decreasing trend in manipulation, however the figures of likely manipulators were more than non-likely manipulators in all the years under review. Results of the t-test further revealed that the overstating revenues, increasing intangible assets, lessening cost and accruals were the most appealing items for preparing a fraudulent financial report by the Bangladesh commercial banks. Valaskova and Fedorko (2021) have investigated the number of storage and transport companies in the selected Visegrad countries who were engaged in earnings manipulation during the period from 2015 to 2018. A sample size of 68 Slovakian and 135 Czech Republic enterprises were selected from the transporting and storage sector based on several criterions related to total assets, revenues and net profit. Using the Beneish M-score threshold limit of (-) 2.22, the study has found that 78 percent of the Slovak enterprises reported profit manipulation as compared to 62 percent of Czech enterprises, during the review period. The highest number of manipulators was recorded during the year 2016, having detected 68 Slovak and 131 Czech enterprises, constituting 100 percent and 97 percent of the total sample size respectively. Salim et al. (2020) examined the factors of the fraud triangle that influenced financial shenanigans. The study comprised of 5 independent variables; three variables of pressure elements (i.e. Financial Stability, External Pressure, and Financial Target); one variable of opportunity elements (i.e. Monitoring Effectiveness); and one variable of rationalization elements (i.e. Auditor Change). The dependent variable was Financial Shenanigans (FRAUD), which was measured based on the Beneish M-Score formula. The purposive sampling method was employed to select a sample size of 39 manufacturing companies listed in Indonesia Stock Exchange (IDX) during the years 2017 and 2018 respectively. The methodology applied was hypothesis testing using logistic regression. The results displayed Financial Stability (as proxied by the ratio of asset change), External Pressure (as proxied by Leverage Ratio), and Monitoring Effectiveness (as proxied by the percentage of Independent Commissioners) having a major influence upon Financial Shenanigans. On the other hand, Financial Target (as proxied by the Return on Assets) and External Auditor Change had no significant effects on the tendency of Financial Shenanigans. Gyawali (2021) examined the viability of the Beneish model in detecting the presence of earnings manipulation in the financial statements of private commercial banks in Nepal. The study was conducted on 16 private commercial banks in Nepal during the years 2018 and 2019 respectively. Using Beneish M-score model and its threshold value for different ratio indexes, the results showed that four Nepalese banks (Nepal Bangladesh Bank, Standard Chartered Bank, Global IME Bank, Nepal SBI Bank) were engaged in income manipulation during the study period. The researcher further pointed out that though the Beneish model was originally recommended for manufacturing companies, but its application can be extended to other sectors in predicting banking frauds. Septiani et al. (2020) used discriminant analysis to test the ability of the Beneish model in detecting financial statement frauds of listed Indonesian banks. A sample of 114 financial statements from 38 banking companies were classified into fraudulent and non-fraudulent groups based on the Beneish model covering the period from 2016 to 2018. Further analysis of each of the eight Beneish M-score ratios in the grouping classified 28 samples as fraudulent and 86 samples as non-fraudulent. The results found that the Beneish M-score was able to detect banking frauds by 89.5 percent using the discriminant

analysis method. Out of the individual eight ratios used in Beneish M-score model, days sales in receivables index (DSRI) was found as the most dominant ratio in grouping the sampled Indonesian banks.

Based on literature review, it was observed that the Beneish M-score model (1999) has been widely used by the researchers to predict and detect any firms' fraudulent financial reporting behavior. However, there is a scarcity of studies in India that dealt with the detection of fraudulent financial reporting practices in the Indian banking sector. The present study intends to fill that research gap, in the backdrop of rising banking frauds, increasing non-performing assets and evidence of bank failures.

### **3. Research Methodology**

#### **3.1 Research Objectives**

The study has three-fold objectives as given below:

- (I). To examine whether the selected banking firms in India were engaged in earnings manipulation and unethical accounting practices, using the fraud detection models of Beneish M-score (1999), Roxas M-score (2011) and Montier C-score (2008)
- (II) To identify the specific variable/(s) of the Beneish, Roxas and Montier models used in the falsification of information and earnings overstatement by the selected banking firms

#### **3.2 Sample Selection**

The study considers sample size of three listed banking firms in India, based on the Reserve Bank of India (RBI) circular on the 'Framework for dealing with Domestic Systemically Important Banks (D-SIBs)' in India dated March 31, 2023. The three private lenders namely ICICI Bank, HDFC Bank and the state-owned State Bank of India (SBI) were listed as domestic systemically important banks in India. Hence, the present study uses the purposive sampling technique to consider the above three listed banks in a bid to check evidences of falsification of information in their financial statements and qualitative disclosures for the FY 2023-24.

#### **3.3 Methodologies Used**

There has been a plethora of models to detect financial shenanigans such as the Beneish M-score model (1999), Dechow F-score (2011), Altman Z-score (1968), Benford's law (1938) and Jones model (1991) of discretionary accruals (Majidah and Aryanty, 2022). Talab et al. (2017) concluded Beneish model as the most effective model known for its popularity, simplicity and reliability in the earnings management field. Ozcan (2018), Akra and Chaya (2020), Mavengere and Dlamini (2023) has recommended Beneish M-score as the leading forensic accounting tool to spot fraud in financial accounts because it generates more findings than assessments of other fraud detection methods. The Beneish and Roxas models were regarded as efficient modern tools for detecting misrepresentations in companies' financial statements (Tkachenko et al., 2020). Further, Parikh and Shah (2022) has recommended the use of Montier C-score model as an alternative to the widely-used M-score models, in the detection of financial statement frauds. The present study has thus employed the application of Beneish (8-variable) M-score model and the modified Roxas (5-variable) M-score model in addition to the James Montier C-score model (6-variable) in detecting evidences of financial shenanigans within the financial statements of domestic systemically important banks in India for the FY 2023-24.

### 3.3.1 Beneish M-score Model (1999)

The Beneish M-Score model (1999), designed by Professor Messod Daniel Beneish, is a financial statement analysis tool to predict fraud or fraud on the company’s financial statements (Septiani et al., 2020). Beneish M-score consists of eight ratios to describe financial statement deformation resulting from earnings manipulation or identifying management preferences in earnings manipulation (Gyawali, 2021). The data inputs needed to calculate the individual variables entering the Beneish M-score model, as shown in Table-2, can be collected from the financial statements of the respective companies. The model for the calculation of Beneish M-Score (8 variable) model is given as follows.

$$M\text{-SCORE} = - 4.84 + (0.920 \times DSRI) + (0.528 \times GMI) + (0.404 \times AQI) + (0.892 \times SGI) + (0.115 \times DEPI) - (0.172 \times SGAI) + (4.679 \times TATA) - (0.327 \times LVGI)$$

Where, DSRI = Days Sales in Receivables Index, GMI = Gross Margin Index, AQI = Asset Quality Index, SGI = Sales Growth Index, DEPI = Depreciation Index, SGAI = Sales, General and Administrative expenses Index, TATA = Total Accruals to Total Assets, LVGI = Leverage Index

Table – 2: Financial Ratios to Measure Beneish- M Score

DSRI	=	$\frac{\text{Days Sales in Receivables}_t}{\text{Days Sales in Receivables}_{t-1}}$
GMI	=	$\frac{\text{Gross Margin Index}_{t-1}}{\text{Gross Margin Index}_t}$
AQI	=	$\left(1 - \frac{\text{Current Asset} + \text{Property Plant \& Equipment}}{\text{Total Asset}}\right)_t \div \left(1 - \frac{\text{Current Asset} + \text{Property Plant \& Equipment}}{\text{Total Asset}}\right)_{t-1}$
SGI	=	$\frac{\text{Sales}_t}{\text{Sales}_{t-1}}$
DI	=	$\left(\frac{\text{Depreciation}}{\text{Depreciation} + \text{Property Plant \& Equipment}}\right)_{t-1} \div \left(\frac{\text{Depreciation}}{\text{Depreciation} + \text{Property Plant \& Equipment}}\right)_t$
SGAI	=	$\left(\frac{\text{Sales, General \& Administrative Expense}}{\text{Sales}}\right)_t \div \left(\frac{\text{Sales, General \& Administrative Expense}}{\text{Sales}}\right)_{t-1}$
TATA	=	$\left(\frac{\text{Total Accruals}}{\text{Total Asset}}\right)_t$
LEVI	=	$\left(\frac{\text{Total Liabilities}}{\text{Total Asset}}\right)_t \div \left(\frac{\text{Total Liabilities}}{\text{Total Asset}}\right)_{t-1}$

Source: Beneish, 1999; Khatun et al., 2022

The limit value of the Beneish M-score model is fixed at -2.22. When the consolidated Beneish M-Score is greater than -2.22, the company can be categorized as conducting frauds. But if the consolidated M-score is below or equal to -2.22, the company can be categorized as NOT conducting frauds (non-fraud) (Salim et al., 2020). Empirically, companies with higher M-Score have higher tendency to commit fraud.

Beneish (1999) has further suggested threshold values for different ratio indexes (DSRI, GMI, AQI, SGI, DEPI, SGAI, LVGI and TATA) based on his research study across manipulating organizations and non-manipulating organizations, as given below in Table - 3.

Table – 3: Beneish Threshold Mean Values for different Ratio Indexes

Ratio Index	Manipulators	Non- Manipulators
DSRI	1.465	1.031
GMI	1.193	1.041
AQI	1.254	1.039
SGI	1.607	1.134
DEPI	1.077	1.001
SGAI	1.041	1.054
LVGI	1.111	1.037
TATA	0.031	0.018

Source: Beneish, 1999; Gyawali, 2021

If the individual ratio index surpasses the threshold value (non-manipulators) as shown in Table-3, it gives an indication that the ratio indexes bears a positive relationship with earnings manipulation, thereby corroborating the evidence of being engaged in profit manipulation. On the other hand, organizations depicting ratios within the threshold value (non-manipulators) are considered to be engaged in true and fair financial reporting practices, devoid of any kind of frauds.

### 3.3.2 Roxas Modified M-score Model (2011)

Continuing the research of Beneish, M. L. Roxas in 2011 substantiated the need to shorten the eight-variable Beneish M-score model. M.L. Roxas reduced the number of intermediate indices to five when calculating the consolidated M-score index, excluding the less significant SGAI, LVGI and TATA indicators. For the modified model of M. L. Roxas, the index coefficients of intermediate variables were changed and the threshold value of M-score (5 variable) model was fixed at -2.76. Hence, with an M-score value less than - 2.76, falsification of information in the company's financial statements is unlikely. But with an M-score value greater than - 2.76, there is a high probability of falsification of information in the company's financial statements, and hence its reliability needs to be increased (Pedchenko et al., 2022; Zhitlukhina et al., 2016).

The model for the calculation of Roxas M-Score (5 variable) model is given as follows.

$$\text{M-SCORE} = - 6.065 + (0.823 \times \text{DSRI}) + (0.906 \times \text{GMI}) + (0.593 \times \text{AQI}) + (0.717 \times \text{SGI}) + (0.107 \times \text{DEPI})$$

Where, DSRI = Days Sales in Receivables Index, GMI = Gross Margin Index, AQI = Asset Quality Index, SGI = Sales Growth Index, DEPI = Depreciation Index

### 3.3.3 Montier C-Score model (2008)

James Montier's C-score model was introduced in the year 2008 in his work titled as '*Cooking the Books, or, More Sailing under the Black Flag*' ("compilation of accounting registers"). This indicator was aimed at identifying whether the companies used creative accounting techniques to cook its information in the financial statements or not, or to short sell them (i.e. sell their shares now to profit from buying them back at a lower price in future).

C-score is a discrete score ranging from 0 to 6, each input designed to identify a part of earnings manipulation. If any of the calculated indicators of the Montier model meets the criteria for assessing the reliability of information in the company's financial statements, then the value of the assessment is given as 1, otherwise as 0. The C-score is a product of six indicators that characterize the criteria for assessing the reliability of information in the company's financial statements (Pedchenko et al., 2022), as shown below in Table-4.

Table - 4: Indicators of the Montier C-Score (2008)

Sr. No.	Variables	Indication
[1]	Growing difference between net income and cash flow from operations.	An increasing difference between net income and cash flow from operation indicate that earnings are being manipulated. In general, management has less control over a company's cash flow than it has over its earnings. Earnings can be overstated by using highly subjective estimations such as depreciation, bad debt, and pension returns, etc. An increasing Difference between net income and cash flow from operations indicates red flags of manipulation in this Model.
[2]	Increasing days sales outstanding (DSO)	Account receivables are growing faster than sales, as seen by an increasing Days sales outstanding. The primary goal of this measurement is to detect channel stuffing. (Sending inventory to customers) An increasing Days sales outstanding (DSO) provide a signal of manipulation in this Model.

[3]	Growing day's sales of inventory (DSI)	Slowing sales are indicated by rising inventory, which is negative indication for the company. An increasing Day sale of inventory (DSI) indicates financial misstatements in this Model.
[4]	Increasing Other current assets to revenues	Top management may know that investors frequently examine DSI and DSO, thus to hide the things which they don't want investors to notice they may use other current assets. An increasing Other current asset to revenues indicates earning manipulation in this Model.
[5]	Declines in depreciation relative to gross property	Firms can easily change the estimate of useful asset life to meet a quarterly or yearly profit target. Decreasing depreciation relative to gross property provide a signal of manipulation in this Model.
[6]	High total asset growth	Some firms use their acquisition strategy to distort their earnings. High asset growth companies receive a signal of manipulation in this Model.

Source: Parikh and Shah, 2022

In addition, the individual scores of all the six input criteria is further aggregated to a composite C-score value which is bounded between 0 (no evidence of earning manipulation) to 6 (all the red flags or signals of fraud are present), as shown below in Table-5.

Table – 5: Assessment of Montier C-Score Composite Values

The interval of the generalizing indicator (C-Sore)	Assessment of the reliability of information in financial statements of the enterprise
0	The probability of disclosing inaccurate information in the company's financial statements is absent
1-2	The probability of disclosing inaccurate information in the company's financial statements is low
3-4	The probability of disclosing inaccurate information in the company's financial statements is average
5-6	The probability of disclosing inaccurate information in the company's financial statements is high

Source: Pedchenko et al., 2022

### 3.4 Data Sources

The data has been collected from the audited financial statements of three domestic banks, with no emphasis on primary data. The period of the study is limited to the current financial year 2023-24, following the framework for D-SIBs published by the banking regulator RBI dated March 31, 2023.

## 4. Results and Discussion

Table-6 presents the descriptive statistics for each of the individual ratio indexes of the entire study sample for the FY 2023-24.

Table – 6: Descriptive Statistics of M-Score Ratios (All Research Samples)

Particulars	DSRI	GMI	AQI	SGI	DEPI	SGAI	TATA	LVGI
Mean	0.851	1.149	1.009	1.378	1.018	0.977	- 0.014	1.253
Median	0.852	1.132	1.007	1.285	1.003	0.926	- 0.007	1.036
Std. Dev.	0.059	0.118	0.009	0.192	0.041	0.097	0.017	0.479
Maximum	0.909	1.275	1.019	1.598	1.064	1.089	- 0.002	1.803
Minimum	0.791	1.041	1.001	1.250	0.986	0.917	- 0.034	0.921

Source: Calculated

At first, the eight ratios for calculating Beneish M-score along with the results of individual indicators entering the Beneish model were developed using M.S. excel. Compared with the

benchmark value of -2.22, the Beneish M-score helps to identify the number of banks disclosing misleading information in their financial statements and qualitative disclosures. Data collected from the 03 listed commercial banks were tested using the basic model of M. D. Beneish (8 variable) followed by the modified model of M. L. Roxas (5 variable), to find the consolidated M-score values for the period 2023-24 as shown below in Table-7.

Table – 7: Beneish and Roxas M-Scores of Selected Indian Banks (FY: 2023-24)

Indicators	Index Coefficients	ICICI Bank	HDFC Bank	State Bank of India
DSRI	+ 0.920	0.791	0.852	0.909
GMI	+ 0.528	1.041	1.275	1.132
AQI	+ 0.404	1.001	1.019	1.007
SIG	+ 0.892	1.285	1.598	1.250
DEPI	+ 0.115	1.003	1.064	0.986
SGAI	- 0.172	0.926	1.089	0.917
TATA	+ 4.679	- 0.034	- 0.007	- 0.002
LVGI	- 0.327	0.921	1.803	1.036
M-Score value modeled after M. D. Beneish (8 variable) (normal value -2.22)		- 2.52	- 2.23	- 2.28
M-Score value modeled after M. L. Roxas (5 variable) (normal value -2.76)		- 2.85	- 2.35	- 2.70

Source: Calculated

Based on the calculated values of Beneish (8-variable) M-score indicator as shown in Table-7, all the three listed Indian banks were found to have scores below the benchmark value of - 2.22. This manifested that the banks under investigation did not falsify information in their financial statements for the FY 2023-24, which is evidence of its reliability. On the contrary, the calculated values of M. L. Roxas (5-variable) model showed that only ICICI Bank was comfortably placed below the benchmark value of - 2.76 for the said FY 2023-24. Both HDFC Bank and State Bank of India fell short of the modified M-score threshold value of -2.76, though by a nominal margin, giving indications to financial statement falsification and disclosure of inaccurate information in their financial reports.

The financial data related to the individual ratio indexes constituting the Beneish M-score and Roxas modified M-score models were collected from the financial statements of the respective banks. The explanatory variables entering the Beneish and Roxas M-score models were measured based on inter-annual changes, as depicted below in Tables from 8 to 15.

Table – 8: Days Sales in Receivables Index (DSRI)

Banks	Net Receivables <sub>(t)</sub> /Sales <sub>(t)</sub> (2023-24)	Net Receivables <sub>(t-1)</sub> /Sales <sub>(t-1)</sub> (2022-23)	DSRI
ICICI Bank	0.448	0.567	0.791
HDFC Bank	0.773	0.907	0.852
State Bank of India	1.086	1.195	0.909

Source: Calculated

Days Sales in Receivables Index (DSRI), as shown in Table-8, compares the ratio of a company's receivables to sales in the current year (t) with the previous year (t-1). The calculated values of

DSRI were found to be the highest for SBI at 0.909, followed by HDFC Bank (0.892) and ICICI Bank (0.791) respectively. Further, the DSRI values of all the banks were found to lie within the Beneish threshold value of 1.031 (non-manipulators). Thus, the DSRI values failed to show any evidences of manipulation in the financial statements of the investigating banks.

Table – 9: Gross Margin Index (GMI)

Banks	Gross Margin Percent <sub>(t-1)</sub> (2022-23)	Gross Margin Percent <sub>(t)</sub> (2023-24)	GMI
ICICI Bank	0.502	0.482	1.041
HDFC Bank	0.537	0.421	1.275
State Bank of India	0.436	0.385	1.132

Source: Calculated

Gross Margin Index (GMI), as shown in Table-9, is measured as the ratio of gross margin of the previous year (t-1) to the gross margin of the current year (t). GMI is a ratio that measures the company's profitability, where this ratio represents the company's prospects. Excepting ICICI Bank, the GMI ratios of the other two banks surpassed the Beneish threshold value of 1.041 (non-manipulators), depicting possibilities of earnings overstatement. For both HDFC Bank and SBI, the ratio indicators pertaining to GMI were found to be higher than the Beneish threshold value depicting a positive relationship between GMI and earnings management.

Table – 10: Asset Quality Index (AQI)

Banks	$1 - (\text{PPE}_{(t)} + \text{CA}_{(t)})/\text{TA}_{(t)}$ (2023-24)	$1 - (\text{PPE}_{(t-1)} + \text{CA}_{(t-1)})/\text{TA}_{(t-1)}$ (2022-23)	AQI
ICICI Bank	0.919	0.918	1.001
HDFC Bank	0.936	0.918	1.019
State Bank of India	0.943	0.936	1.007

Source: Calculated

Asset Quality Index (AQI) index, as shown in Table-10, measures the non-current assets to total assets ratio for the current year (t) with reference to the previous year (t-1). The calculated values of AQI were found to be the highest for HDFC at 1.019, followed by State Bank of India (1.007) and ICICI Bank (1.285) respectively. Though the AQI values were higher than 1.0, but they lay below the Beneish threshold value of 1.031 (non-manipulators). Thus based on the asset quality index, it can be concluded that the banks may not be engaged in costs accruals and earnings manipulation.

Table – 11: Sales Growth Index (SGI)

Banks	Sales <sub>(t)</sub> (2023-24)	Sales <sub>(t-1)</sub> (2022-23)	SGI
ICICI Bank	1658487109	1290627859	1.285
HDFC Bank	2583405755	1615855367	1.598
State Bank of India	4151306555	3321030602	1.250

Source: Calculated

Sales Growth Index (SGI) index, as shown in Table-11, presents the ratio between sales in current year (t) and sales in year (t-1), in Rs.'000. The calculated values of SGI were found to be highest for HDFC at 1.598, followed by ICICI Bank (1.285) and State Bank of

India (1.250) respectively. However, the SGI values of investigating banks lay beyond the Beneish threshold value of 1.134 (non-manipulators), thereby depicting higher chances of earnings manipulation.

Table – 12: Depreciation Index (DEPI)

Banks	$DEP_{(t-1)}/(PPE_{(t-1)} + DEP_{(t-1)})$ (2022-23)	$DEP_{(t)}/(PPE_{(t)} + DEP_{(t)})$ (2023-24)	DEPI
ICICI Bank	0.514	0.512	1.003
HDFC Bank	0.613	0.576	1.064
State Bank of India	0.072	0.073	0.986

Source: Calculated

Depreciation index (DEPI), as shown in Table-12, compares the depreciation rate of the firm in the current year (t) corresponding to the previous year (t-1). The calculated values of DEPI were found to be the highest for HDFC at 1.064, followed by ICICI Bank at 1.003 and State Bank of India at 0.986 respectively. Though the DEPI values were close to zero or slightly exceeded the limit value of 1.0, but the ratio indices were found to lay close to the Beneish threshold value of 1.001 (non-manipulators). For HDFC Bank, the DEPI index was slightly on the higher side thereby raising the likelihood of unethical practices (either through increased estimates of the asset value or adoption of a new method) within the organization.

Table – 13: Sales, General and Administrative expense Index (SGAI)

Banks	$SG\&A_{(t)}/Sales_{(t)}$ (2023-24)	$SG\&A_{(t-1)}/Sales_{(t-1)}$ (2022-23)	SGAI
ICICI Bank	0.236	0.255	0.926
HDFC Bank	0.825	0.757	1.089
State Bank of India	0.362	0.395	0.917

Source: Calculated

Sales, General and Administrative Expense Index (SGAI), as shown in Table-13, compares the selling, general and administrative expenses to sales in the current year (t) with the previous year (t-1). The calculated values of SGAI were found to be the highest for HDFC Bank at 1.089, followed by ICICI Bank at 0.926 and SBI at 0.917 respectively. Moreover, the SGAI index for ICICI Bank and SBI lay below the Beneish threshold value of 1.054 (non-manipulators). But considering the SGAI index value of HDFC Bank of 1.089, there may be a possibility of earnings overstatement and a positive relationship between SGAI and earnings management.

Table – 14: Total Accruals to Total Assets (TATA)

Banks	Total Accruals <sub>(t)</sub> (2023-24)	Total Assets <sub>(t)</sub> (2023-24)	TATA
ICICI Bank	- 637260931	18715145766	- 0.034
HDFC Bank	- 234436855	36176230869	- 0.007
State Bank of India	- 96274358	61796939450	- 0.002

Source: Calculated

As depicted in Table-14, high total accrual to total assets (TATA) ratio indicates the potential condition of a business enterprise to be associated with a higher likelihood of earnings

manipulation. The TATA values of all the investigating banks were negative and well below the Beneish threshold value (non-manipulators) of 0.018, indicating least possibility of falsification of information in their financial statements.

Table – 15: Leverage Index (LVGI)

Banks	$(CL_{(t)}+LTD_{(t)})/TA_{(t)}$ (2023-24)	$(CL_{(t-1)}+LTD_{(t-1)})/TA_{(t-1)}$ (2022-23)	LVGI
ICICI Bank	0.117	0.127	0.921
HDFC Bank	0.220	0.122	1.803
State Bank of India	0.143	0.138	1.036

Source: Calculated

Leverage Index (LVGI), as shown in Table-15, compares the ratio of total debts to total assets on a year-on-year basis. The calculated values of LVGI were found to be the highest for HDFC Bank at 1.803, followed by SBI at 1.036 and ICICI Bank at 0.921 respectively. For ICICI Bank, the index was way below the threshold value with no significant increase in leverage. Though the LVGI index of SBI is above the index value of 1.0, but it lay within the Beneish threshold value (non-manipulators) of 1.037 indicating minimal likelihood of earnings manipulation. But in case of HDFC Bank, the ratio index surpassed the index value of 1.0 as well as the Beneish threshold value (non-manipulators) leading to possibilities of earnings overstatement and manipulation.

#### 4.1 Benchmarking with the Beneish Model

The summarized scores of the individual ratio indices have been presented below in Table 16.

Table – 16: Benchmarking with the Beneish Model (FY: 2023-24)

Indicators	ICICI Bank	HDFC Bank	SBI	Non-manipulators	Manipulators
DSRI	0.791	0.852	0.909	1.031	1.465
GMI	1.041	1.275	1.132	1.041	1.193
AQI	1.001	1.019	1.007	1.039	1.254
SGI	1.285	1.598	1.250	1.134	1.607
DEPI	1.003	1.064	0.986	1.001	1.077
SGAI	0.926	1.089	0.917	1.054	1.041
TATA	- 0.034	- 0.007	- 0.002	0.018	0.031
LVGI	0.921	1.803	1.036	1.037	1.111

Source: Compiled by the Author

The results showed that the SGI values of all the three selected banks under review for the financial year 2023-24 surpassed the Beneish threshold limit (1.134) for non-manipulators, indicating the possibilities of earnings manipulation. Further, the GMI values of HDFC Bank and SBI for the year 2023-24 were found to be higher than the Beneish threshold limit of 1.041 confirming higher possibilities of material misstatement. Moreover, HDFC Bank depicted higher scores in five out of the eight variables GMI, SGI, DEPI, SGAI and LVGI respectively. Hence, the possibilities of earnings manipulation by the private player HDFC Bank cannot be ruled out completely and requires further investigation for authenticity.

## 4.2 Comparisons between the Beneish, Roxas and Montier Models

A comparison of the results related to the assessment of reliability of information in the financial statements of the selected banks based on the C-Score according to the model of J. Montier (6 variables), M-Score according to the model of M. D. Beneish (8 variable) and M. L. Roxas (5 variable) has been presented below in Table-17. The results showed similarities in the scores of HDFC Bank and State Bank of India indicating signs of earnings manipulation. ICICI Bank displayed lesser chances of earnings overstatement based on similarities in the results obtained in case of Montier C-score, Beneish M-score and Roxas M-score models.

Table – 17: Comparisons between Montier, Beneish and Roxas Scores (FY 2023-24)

Banks	Value C-Score for J. Montier model (6 variables)	Value M-Score for M. D. Beneish model (8 variables)	Value M-Score for M.L. Roxas model (5 variables)	Availability misrepresentation of financial credibility enterprise reporting
ICICI Bank	2	-2.52	-2.85	+/+/+
HDFC Bank	3	-2.23	-2.35	++/+/-
State Bank of India	3	-2.28	-2.70	++/+/-

*(Note: Conventional designations: “+” - the probability of disclosing inaccurate information is low or the company's financial strength is strong; “++” - the probability of disclosing inaccurate information or the company's financial strength is average or stable; “-” - the probability of disclosing inaccurate information is high or the company's financial strength is weak).*

Source: Compiled by the Author

## 5. Conclusion

Based on the results of Beneish (8-variable) M-score model, all the selected banks under review were not found to be engaged in earnings manipulation or income overstatement as their consolidated M-scores were below the Beneish threshold value of -2.22 which further justifies their selection as domestic systemically important banks by the RBI. But the results were found to be contradictory for HDFC Bank and State Bank of India when evaluated using the modified Roxas (5-variable) M-score model, as their consolidated M-scores were found to be greater than the - 2.76 benchmark that indicated them as likely manipulators. HDFC Bank was found to be engaged in fraudulent financial reporting for the FY 2023-24 as it depicted red flags for GMI, SGI, DEPI, SGAI and LVGI scores compared to the Beneish threshold value (non-manipulators) for ratio indices. State Bank of India successfully achieved a consolidated M-score below the Beneish benchmark value of -2.22, but fell short of the Roxas M-score threshold value by a nominal margin. The Montier C-score composite values displayed low to average possibilities of financial statement falsifications by the selected banks for the FY 2023-24. Further, all the fraud detection models used confirmed ICICI Bank as being potentially sound with no major indications of fraudulent accounting practices or wrong accounting policies.

## 6. Limitations & Future Scope

The study is restricted to the current financial year 2023-24, while to predict the tendency of Financial Shenanigans there requires a longer period of time to acquire more consistent results. The study did not have any emphasis on primary data as the financial data were collected from the publicly available financial statements of the three listed banking companies. Moreover, the samples were only restricted to commercial banks in India listed as D-SIBs by the country's

banking regulator. The study is limited to the applications of the most widely used Beneish (8-variable), Roxas (5-variable) M-score and Montier C-score (6-variable) models, with no emphasis on other models of fraud detection having lower exposure. Moreover, the Beneish and Roxas models were developed keeping in mind the fraudulent practices of listed manufacturing companies, hence these fraud detection models may not be appropriate for financial institutions, such as banks and insurance companies. The Montier C-score model is another useful model that provides red flags or signals of fraud with the use of information from the company's financial statements.

The application of all the three models in tandem in the present study provides a comprehensive view in the detection of financial statement frauds of the selected Indian banks. With these, probable manipulations can be detected and stricken measure can be applied to such fraudulent banking companies. The present study can be further extended to include more number of business enterprises across different sectors for an extended time-period. Even the research scope can be broadened using the application of fraud triangle components of pressure, opportunity and rationalization. More studies can be conducted to investigate the impact of earnings management on the stock prices of companies.

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