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# Indian Journal of Accounting (IJA) Editorial Board

**Prof. Gabriel Simon Thattil**
President
Indian Accounting Association
Academic Director
Loyola College of Social Sciences, Trivandrum
Former Dean Faculty of Commerce
University of Kerala

# MESSAGE

Higher education in India is undergoing a shift in terms of reforms and Adoption of the National Curriculum frame- work. NEP 2020 seeks to make education holistic, trans- disciplinary and flexible. A host of innovative academic programmes and courses are being planned in terms of skill-embedded learning and tech-driven learning methodologies. What then emerges is how to stay relevant in terms of Academics and Research. A deeper and insightful understanding of the current learning eco-system and up-skilling and upgrading to meet the emerging needs are crucial considering disruptive technology that has come to stay.

Accounting today has taken a drastic shift from recording, classifying and preparation of financial statements to interpreting and judging results, analysis in a futuristic perspective and enabling full disclosure for stakeholder decision making. Research in finance and Accounting is turning to be all the more relevant in terms of making it inferential and analytical such that it addresses disruptiveness in terms of the emerging technology. This calls for a drastic shift in Accounting Education and research to bridge the gap between professional demand and academic discourse. Indian Accounting Association has been playing a significant role in this transformative approach through developing model curriculum, and promoting collaborative research in Accounting and Finance where the focus is on the merging domains of AI in Accounting, Fin Tech for Finance as well as Forensic accounting. Encouraging young learners through the National Accounting Talents Search Examination NATS and Young Researchers Award are part of these initiatives.

I would appeal to all researchers learners, professionals as well as practitioners to be part of our endeavours in promoting and professionalizing Accounting Education and research in India as we march ahead with the vision of attaining the status of Vikisit Bharath 2047.

With an intention to showcase research outcomes in the domains of Accounting, Finance and Financial services, as well as trans-disciplinary research, Indian Accounting Association is bringing out the next issue of IJA. The journal continues to serves as a publication of repute for dissemination of high quality research in Accounting and allied disciplines. I take this opportunity to thank all the contributors of research papers to this issue and sincerely request all my friends to come up with more research work and research publications, which we would gladly welcome. I also thank all our editorial team with special appreciation for the Chief Editor in bring out the current issue. This issue will certainly stimulate interest in further learning and research.

Wishing you all a wonderful research journey, with warm regards.

**Prof Gabriel Simon Thattil**
President
Indian Journal of Accounting

# MESSAGE FROM THE CHIEF EDITOR OF THE INDIAN ACCOUNTING ASSOCIATION

Accounting education is at the verge of sea changes due to technological changes. The use of Artificial intelligence and automation in accounting education has impacted accounting as a whole. Better decisions in business is capable now with the help of data analytics. Many changes can be seen in the accounting curriculum, including forensic accounting, fintech and cyber security. Real life case studies are being extensively used in classrooms to equip students to experience the real life problems. Focus on international accounting standards have given accounting a globalised view. Accounting has partnered with finance, management and other areas to give an interdisciplinary perspective. The need of the hour is to adapt to the changes in accounting and to embrace the changes. The role of academicians, research scholars and students are gaining significance in making the relevant updates. Research scholars can contribute scholarly articles on artificial intelligence in accounting, ESG, fin tech etc. Indian Journal of Accounting provides a platform for research scholars, students, academicians, and policymakers to contribute valuable papers relating to the recent changes in accounting.

Indian Accounting Association has 61 branches across India and around 9000 members. The Indian Accounting Association conducts National Accounting Talent Search Examination every year since 2009 to measure the nationwide accounting knowledge at the junior and senior levels. The best performer in the National Accounting Talent Search Examination is awarded a cash prize of Rs.21000 with a trophy and certificate at the junior level. The cash prize is Rs.25000, trophy and certificate for the senior level. This is usually conducted during February every year. The Indian Accounting Association has recently introduced a model curriculum for the accounting aspirants to provide them with the new insights on the advancements in the accounting field.

I congratulate all the contributors for their commendable articles and look forward to path breaking articles in the field of accounting and finance. I extend my deep sense of gratitude to Prof. Gabriel Simon Thattil for the timely guidance and coordination. My gratitude is due to the Associate Editors, Dr Priya S and Dr Arun Lawrence for their exemplary work. I am indebted to all the panel of reviewers who have done a remarkable job while reviewing the articles and ensured the articles met quality standards.

**Dr. Nimi Dev R**
Chief Editor
Indian Journal of Accounting (IJA)
Professor, Research & PG Department of Commerce,
Government College for women,
University of Kerala, Thiruvananthapuram- 695571, Kerala.

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# Impact of ESG Scores On Stock Price Returns and Corporate Financial Risk: Insights from a Bibliometric Study

Himalaya Singh[1] | Dr. Shilpa Vardia[2]

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**ABSTRACT**

This research presents a comprehensive bibliometric analysis of studies related to ESG (Environmental, Social, and Governance) scores, stock price returns, and corporate financial risk, aiming to outline the evolution, impact, and thematic trends in this rapidly evolving field. Over 1,000 publications from 2015 to 2024 were examined utilizing data sourced from the SCOPUS database. The analysis, conducted with the VOSviewer tool, revealed key trends, including a growing number of publications over time, prominent authors and institutions, and prevailing research themes. A significant increase in research activity was noted for 2024-2025, highlighting the rising importance of ESG-related topics. Various bibliometric techniques were utilized, such as citation analysis to identify influential works and authors, and keyword co-occurrence analysis to uncover central themes like "ESG," "stock price returns," and "corporate financial risk." The findings emphasize the leading contributions of institutions such as Sapienza University di Roma and the University of Portsmouth, with notable input from countries like China, Italy, and the United States. These insights provide a valuable understanding of the structure and development of ESG research, offering a foundation for future studies and pinpointing emerging trends and gaps in the literature. The study's methodological rigor and significant findings enhance comprehension of the effects of ESG scores on stock price returns, and corporate financial risk, establishing a strong foundation for advance academic exploration and practical application in the field.

**Keywords**

Environmental, Social, Governance Score, ESG disclosure, Firm Performance, Stock Price Returns, Corporate Financial Risk.

## Introduction

In recent years, non-financial considerations have gained prominence in investment decision-making among investors. ESG ratings serve as metrics assessing a company's performance concerning its environmental and social impacts, along with its corporate governance practices. The impact of ESG ratings on stock price returns in India is multifaceted and contingent upon various factors.

One significant factor is adopting socially responsible investing (SRI) strategies, as discussed by Shah et al. (2022). Their study explores the impact of investing in sustainable firms through SRI approaches. Meanwhile, previous research, such as that by Rashida (2021), has underscored the rising investor awareness regarding the impact of ESG factors on organizational financial results..

ESG ratings offer a comprehensive evaluation of a company's ESG practices, aiding investors in assessing its long-term sustainability and potential risks. Despite the growing interest in ESG factors among investors, studies analyzing the financial results of socially responsible funds versus predictable mutual funds have not consistently found significant performance differences (Shah et al., 2022). These findings highlight the nuanced interplay between ESG considerations and financial outcomes in investment decision-making contexts.

ESG practices-oriented portfolio selection strategies have gained immense appeal among investors. One of the Enterprise Acts, (Section 135) Act now mandates eligible companies to spend 2% of their

[1] Research Scholar, Department of Accountancy and Business Statistics, University College of Commerce and Management Studies Mohanlal Sukhadia University, Udaipur, Rajasthan. himalayasingh2377@gmail.com
[2] Assistant Professor, Department of Accountancy and Business Statistics, Mohanlal Sukhadia University Udaipur, Rajasthan, shilpa.vardia@gmail.com

net annual income on CSR initiatives (Companies Act, 2013).

The main idea of ESG-based investing is to discover and quantify the intangible value offered by socially responsible, environmentally conscious companies with strong governance mechanisms. This is working mostly due to the participation of institutions like UNEPFI. It is seen that these corporations have strong risk management strategies on ESG factors, delivering value for investors through long-term sustainable business models. These ESG indicators, which reflect the non-financial performance of an organization, are numerous and always changing. They are as follows:

**ESG pillars**

As stated earlier, ESG is built on three pillars what would be considered "parameters" in an ESG study: Environment, Social, and Governance? Each of these columns contains several elements

- **Environment:** The "Environment" pillar focuses on creating a sustainable environment, examining and monitoring characteristics such as the company's impact on climate, environmental responsibility, manufacturing of eco-friendly goods, etc.

  Examples: Greenhouse gas emissions, resource depletion (including water, waste, and pollution), Climate change and deforestation.

- **Social:** The "Social" part focuses on adding value to society by emphasizing human rights concerns, workplace health and safety, labor training and management, community involvement, and customer relationships, among other things.

  Examples: Slavery and child labor, health and safety, conflict, employee relations, Indigenous and local communities, and diversity.

- **Government:** The "governance" aspect deals with the corporate governance of a company and includes two major components: corporate structures and corporate behavior.

  This includes executive compensation, political lobbying and donations, board diversity, bribery and corruption, and tax strategy.

This study meaningfully enhances our accepting of ESG Scores and its connection to stock price returns and business financial risk through a comprehensive bibliometric analysis. It explores citation trends, co-citation relationships, keyword co-occurrence, co-authorship networks, and bibliographic coupling to thoroughly observe the impact of ESG Scores on stock price returns and company financial risk. The analysis highlights key authors, institutions, and research themes, while also uncovering emerging trends, thematic clusters, and gaps in the existing literature. These insights not only clarify the current landscape of research but also lay a strong foundation for future studies, thereby enriching academic discourse and informing practical applications in accounting and finance.

Technological innovations, for instance big data analytics, (AI) artificial intelligence, and blockchain, have significantly improved the processes for collecting, analyzing, and verifying ESG data, resulting in greater accuracy and reliability of disclosures (Friede, Busch, & Bassen, 2015). Nevertheless, challenges remain, particularly the necessity for standardized metrics and reporting frameworks, which hinder the ability to compare ESG performance across different companies and sectors (Eccles & Serafeim, 2013). Furthermore, issues like greenwashing and varying reporting practices pose risks to the credibility of ESG information.

The future of ESG scores is expected to see a closer connection with regular financial reporting and attempts to create unified global standards. This is being pushed forward by partnerships like the one between the IFRS Foundation and GRI. As ESG scores develops, it shows a larger movement towards sustainability and responsible business practices. Additionally, improvements in technology and efforts to standardize, effective and trustworthy.

The bibliometric approach employed in this study allows for the identification of significant milestones in the evolution of ESG scores, offering insights into how the field has developed in response to various external pressures and technological advancements. By mapping the scholarly landscape, the study not only uncovers gaps in the existing literature but also provides a robust foundation for future research, thereby enhancing academic discourse and informing practical applications in accounting and finance.

This paper purposes to discover important research

questions in order to give a broad overview of the current state of ESG scores research.

a) What patterns have emerged in research concerning ESG scores, stock price returns, and corporate financial risk over the last ten years?

b) Which countries and institutions are at the forefront of research on ESG scores and their relationship with firm performance, particularly in terms of stock price returns and corporate financial risk, and what role does their research play in the broader global conversation?

c) Who are the leading scholars in the domain of ESG scores and firm performance, particularly regarding stock price returns and corporate financial risk, and what influence has their research exerted on the academic community?

d) What are the principal themes and ideas present in contemporary research on ESG scores and firm performance, particularly in relation to stock price returns and corporate financial risk, and how do these elements interconnect?

e) How do citation trends differ across various years, and what insights do these trends provide regarding the progression of significant research in the area of ESG scores?

This study is particularly relevant in light of the increasing focus on sustainability and ethical conduct within the business sector. By examining the relationships among ESG scores, stock price performance, and corporate financial risk—an essential aspect of firm performance—this research enhances our comprehension of how transparency and accountability influence the generation of long-term value for both stakeholders and investors. Derived from this analysis are anticipated to inform subsequent research endeavors, aid in the formulation of more impactful ESG strategies, and ultimately contribute to the worldwide initiative aimed at fostering sustainable business practices.

ESG scores have gained importance as indicators of a company's sustainability and ethical performance, influencing financial markets significantly. A bibliometric analysis on this topic provides insights into current research trends and relationships between ESG factors and financial outcomes like stock price returns and corporate financial risks.

1. **Impact on Stock Price Returns**: Studies reveal a growing focus on the connection between ESG ratings and stock price performance. Firms with advanced ESG scores tend to attract responsible investors, which can boost stock returns. However, the relationship is complex—while positive ESG performance can enhance shareholder wealth, some research highlights cases where the financial benefits may not be immediate.
2. **Corporate Financial Risk Mitigation:** ESG factors serve as a tool for managing corporate risks. Companies that highlight sustainability are more resilient to regulatory, environmental, and reputational risks, which contributes to their long-term financial stability. This positive alignment between ESG compliance and risk management can create value for investors.
3. **Future Research Directions**: The literature suggests a need for further studies to explore the relationship across industries and countries, focusing on market-specific factors and integrating real-time ESG data into financial performance models.

The ESG rating landscape is diverse, with various providers offering unique methodologies and assessments that cater to different aspects of sustainability, governance, and social responsibility. Each provider, such as Sustainalytics, MSCI, CDP, and Bloomberg, brings its own framework, addressing a wide range of ESG dimensions. Investors and stakeholders must carefully evaluate these ratings based on their objectives, ensuring alignment between the ESG criteria applied by the rating agency and their own sustainability goals.

The following sections of the paper are organized as follows: Section 2 offers a review of existing literature on ESG scores, stock price returns, and corporate financial risk. Section 3 details the research methodology employed in this study. Section 4 presents and examines the results of the bibliometric analysis, highlighting key patterns, trends, and contributions. Finally, Section 5 concludes with a summary of the results and examines their consequence for upcoming research and practical applications.

## Review of Literature

ESG considerations into corporate strategy and investment decisions, promoting sustainable

business practices. Originating from CSR, ESG now offers a more inclusive framework for assessing corporate behavior and impact. Its application aligns businesses with evolving stakeholder expectations and regulatory requirements, driving accountability and transparency. This shift demonstrates the growing importance of ethical management and sustainable development in fostering long-term financial results and stakeholder trust.

Reviewing the past literature in the area of exploration is a preliminary step before attempting to plan the study. An intensive review of the literature gives a depth understanding regarding the present research work and it also enlightens the dimensions on which the previous researcher has done their work. Here are some of the reviews of the studies that have been previously done in the field of ESG scores. It provided an overview of the findings of past researchers and also highlighted the methodologies used by them to achieve these findings. A summary of available literature on the subject is presented in this section. The reviews have been arranged in ascending order for particular sections. The review is presented here under the following sections:

****Conclusion of the Review on ESG Scores Index of Selected Indian Companies****

The review reveals a wide spectrum of research on the correlation between ESG scores and financial performance, representing that the impact varies across countries, industries, and firm characteristics.

Devi et al. (2024) found a significant negative correlation between ESG scores and return on assets (ROA) in Indian companies, suggesting that higher ESG investments may reduce short-term profitability due to increased compliance costs and long-term investments. Similarly, Dwibedi et al. (2024) reported a non-linear U-shaped relationship between ESG and performance, with governance contributing positively to market performance but negatively to financial results.

On the other hand, Joshi et al. (2024) emphasized the positive role of financial strength including company size, cash holdings, and analyst coverage—on improving ESG scores. This reflects the importance of financial slack in fostering ESG initiatives in firms.

International studies, such as Hovde et al. (2023) in the U.S., also demonstrated a negative relationship between higher ESG scores and financial performance, underscoring similar trends across developed markets. However, contrasting outcomes were observed by Secinaro et al. (2020) in Europe, where environmental performance positively influenced firm profitability, suggesting regional variations in the benefits of ESG compliance.

The studies further highlight the importance of sector-specific dynamics. Pratya et al. (2022) demonstrated that the impact of ESG scores on financial performance varies by industry, with some industries outperforming while others underperform. This finding suggests the necessity for tailored ESG strategies. Similarly, Sharma et al. (2020) noted that voluntary ESG reporting is still evolving in India, driven largely by stakeholder pressure and regulatory initiatives from SEBI.

Moreover, Rashidah et al. (2021) in Asia emphasized the role of firm characteristics—like profitability and leverage—in influencing ESG scores. These findings point to the need for policy frameworks and regulatory guidelines to standardize and enhance ESG reporting in emerging markets.

In conclusion, while several studies indicate short-term financial drawbacks associated with ESG investments, long-term benefits in sustainability, resilience, and risk management are increasingly recognized. The mixed results across geographies and industries call for context-specific strategies for both investors and firms to effectively integrate ESG principles. This review emphasizes the significance of not only focusing on overall ESG scores but also evaluating individual pillars (Environmental, Social, Governance) and industry-specific factors to optimize performance and sustainability outcomes.

**** Conclusion of the review on evaluate the impact of ESG scores on the stock price returns of selected Indian companies****

To fulfill this objective numerous national and international studies has been done as follows:

The review of research on the impact of ESG scores on stock price returns across various regions and industries provides valuable insights into the complex relationship between ESG factors and financial performance. Dayanandan et al. (2024) highlighted that IFRS adoption in India positively impacted ESG scores, though high leverage and low returns on assets hindered transparency. Singh et al. (2024) found inconclusive short-term links between ESG and profitability, while governance played a key role in long-term performance. Spirova

et al. (2023) observed that social scores negatively affected share prices in the Netherlands, whereas environmental and governance scores had positive effects. Karamoy et al. (2020) noted that corporate governance factors did not significantly impact financial outcomes in Indonesian firms. Albitar et al. (2019) identified a positive relationship between ESG scores and financial results among FTSE 350 companies, with integrated reporting strengthening this link. Similarly, Aybars Asli et al. (2019) found that ESG practices enhanced operational efficiency in S&P 500 firms, though high Tobin's Q reduced their sensitivity to ESG factors. Valente et al. (2019) revealed that inconsistent ESG practices increased stock volatility, while stable efforts drove growth for multinational corporations. Yawika et al. (2019) reported that environmental factors negatively impacted market performance in high-profile Indonesian industries, with governance showing no significant effect. Finally, Buallay et al. (2018) demonstrated that ESG scores positively influenced financial metrics such as ROA and ROE in the banking sector, though governance produced mixed results.

In summary, the findings emphasize that governance factors are critical for long-term financial success, while environmental and social elements have mixed effects on performance. Regulatory frameworks and integrated reporting also shape ESG scores practices, especially in emerging markets like India. The research collectively suggests that sustainable business policies can improve operational efficiency, but consistent governance and institutional reforms are essential for leveraging the full potential of ESG-driven growth. These insights are valuable for policymakers, investors, and companies seeking to align ESG initiatives with long-term financial goals in dynamic markets.

****Conclusion on the Relationship Between ESG Performance and Corporate Financial Risk****

The reviewed studies provide diverse insights into the correlation between ESG performance and 1. business finance outcomes across regions and industries.

Singhal N. et al. (2024) focused on Indian firms listed on NSE Nifty-100, showing that CSR applicability and investments did not significantly affect return on equity (ROE). The study emphasized bridging the gap between ESG promises and actual performance through improved communication. Shah S. (2022) highlighted the importance of ESG in corporate India, especially among executive leaders (C-suite). It noted that the COVID-19 pandemic accelerated ESG adoption, with sustainability becoming a key concern among stakeholders. Yingzhi Xu (2022) found a positive relationship between ESG ratings and financial performance for Chinese firms, further strengthened by higher R&D expenditures. However, state-owned enterprises benefited more from ESG initiatives than non-state-owned firms. Griffin et al. (2020) analyzed environmental performance and its impact on firm costs. They found that companies with higher environmental ratings experienced increased information processing costs and short-term earnings volatility, although investors continued to favor these firms in socially responsible portfolios. Gangi et al. (2020) demonstrated that Corporate Environmental Policy (CEP) and green innovation improve a firm's reputation and risk-adjusted profitability. However, sustainable practices did not yield direct financial performance benefits, suggesting that firms should focus on environmental performance to maintain competitiveness. Altawalbeh M. et al. (2020) explored corporate governance mechanisms in Jordan and found that government ownership and frequent meetings positively impacted firm performance, while board independence had a negative effect. Omware I. M. et al. (2020) showed that diverse corporate governance factors, such as board education and gender diversity, positively influenced financial performance in Kenyan banks. Gerged A. M. et al. (2020) examined Saudi firms and found that corporate governance mechanisms influenced market value but had mixed effects on financial value. Awaysheh A. H. et al. (2020) found that CSR activities positively impacted operational performance and market valuation (Tobin's Q), with industry benchmarks playing a key role. Singh P. K. et al. (2020) revealed a negative correlation between CSR activities and bank profitability in India, indicating no significant impact on earnings per share.

Szegedi K. et al. (2020) discovered that CSR initiatives enhanced accounting-based performance in Pakistani banks. Al-Ahdal W. M. et al. (2020) reported that audit committees and board accountability influenced financial outcomes in firms across India and the Gulf. Transparency, however, negatively affected financial performance.

Fiandrino, S. et al. (2019) emphasized that CSR initiatives significantly influence corporate governance and financial performance across European firms, particularly in social and environmental practices. Al-Homedi E. A. et al. (2019) found that corporate governance structures, such as audit committees and institutional ownership, positively affected financial results in Indian hotel companies. Danoshana S. et al. (2019) demonstrated that audit committees and board size positively impacted financial results in Sri Lankan financial institutions. Akinleye G. T. et al. (2019) revealed that corporate governance practices had a negative impact on the financial results of Nigerian multinational companies, with minimal influence on firm growth.

The collective findings show that ESG initiatives, corporate governance, and CSR activities have mixed effects on financial performance, with the outcomes varying based on regional, sectoral, and firm-specific contexts. While some studies indicate positive impacts—especially when ESG efforts are combined with governance improvements—others highlight neutral or even negative effects, emphasizing the complexity of ESG integration. Corporate reputation and stakeholder engagement emerge as important factors in bridging performance gaps, suggesting that firms must align their ESG strategies with business operations to achieve sustainable long-term success.

**** Conclusion on the identification of stakeholders' perspectives on the use of ESG scores in investment decision-making****

The review on the identification of stakeholders' perspectives on the use of ESG scores in investment decision-making synthesizes several national and international studies exploring the correlation between ESG factors and financial performance across various regions and contexts:

Ifra Fathima et al. (2024) analyzed the association between ESG ratings and financial performance in Indian companies listed on the NSE. Using SPSS for data analysis, the study found a positive relationship between ESG scores and company profitability, indicating that sustainable investments align with financial success. Bui H. T. et al. (2023) investigated ESG and financial performance across EU countries using data from the Refinitiv database and investor surveys. The results were mixed, with some negative correlations between ESG and ROA and P/E ratios in sectors like Health Care and Financials, while other sectors showed no significant correlation. Dingding Liu et al. (2023) examined the impact of ESG ratings on German-listed companies. Year-by-year regressions revealed no significant effect of ESG on financial performance, measured by Tobin's Q, consistent with earlier findings by Velte (2017) for German firms. Duong Mai et al. (2023) focused on Finland and Vietnam to assess ESG variability. The research found no notable correlation between ESG factors and corporate financial performance (CFP) in Vietnam., while Finland showed a slightly negative correlation, suggesting that national contexts heavily influence ESG impacts. Trinks A. et al. (2020) evaluated the effect of carbon efficiency on multinational corporations' performance. Results showed that carbon-efficient companies achieved superior profitability and lower systemic risk, emphasizing the financial benefits of environmentally efficient practices. Mendonca A. et al. (2020) explored corporate governance factors in **Islamic banks** from GCC and non-GCC countries. The study found that board size negatively impacted profitability but was positively associated with risk-taking, asset quality, and capital adequacy, indicating nuanced governance dynamics in these banks. Velte P. et al. (2019) analyzed the impact of ESG on financial performance considering CEO power in German companies. The study found that ESG positively influences ROA when aligned with CEO incentives, suggesting that leadership dynamics play a crucial role in promoting ESG practices. Giovanni C. L. et al. (2019) examined the impact of corporate ethics on the FTSE MIB index in Italy. The study found a negative correlation between ESG and market premium, highlighting how socially responsible investing may affect returns on the Italian Stock Exchange. Aida M. I. et al. (2019) investigated board diversity and sustainability practices in Malaysian companies. Results indicated a positive correlation between board capabilities and firm ESG scores, emphasizing the importance of governance in fostering sustainability. Garcia A. S. et al. (2017) focused on companies from BRICS nations. The study concluded that firms in environmentally sensitive industries exhibited superior environmental performance, showcasing sectoral influences on ESG outcomes.

The reviewed studies collectively demonstrate that the relationship between ESG factors and financial performance is context-dependent, varying by region, sector, and governance structures. Some

research shows that there are positive relationships, such as in India and carbon-efficient firms globally, others report mixed or negative findings based on national or sectoral characteristics. These findings suggest that stakeholders' perspectives on ESG integration differ widely, highlighting the need for localized strategies to enhance ESG adoption in investment decision-making.

The literature on ESG scores and their influence on stock price returns and corporate financial risk suggests a generally positive relationship. However, the impact varies depending on governance mechanisms, industry-specific factors, and regional contexts. Businesses with higher ESG scores tend to experience reduced financial risks, improved market performance, and enhanced investor confidence.

This study can act as a guide for navigating the increasing significance of sustainability in financial markets and for integrating ESG principles into future business models.

**Research Methodology**

This study centers around examining how ESG scores relate to stock price returns and corporate financial risk by using bibliometric analysis, which is a strong quantitative method for evaluating academic literature and spotting trends, patterns, and key contributions in a specific field of study. The approach includes systematically gathering and examining information from scholarly databases, paying special attention to publication years, subject areas, and author affiliations. The SCOPUS database, known for its wide-ranging and high-quality journal selection, is used to ensure that relevant and significant research articles are included (Bergman, 2012). The bibliometric methods applied aim to outline the academic landscape of IFRS and earnings management, and across different fields (Archambault et al., 2009). This method allows for a detailed review of research outputs and helps identify gaps in existing literature, laying the groundwork for future investigations.

The study implements plan for gathering data to ensure comprehensive coverage. The search was conducted in the SCOPUS database, concentrating on publications from 2015 to 2024. It specifically targeted the article title field using the keywords "ESG Scores," "Stock Price Returns," and "Corporate Financial Risk," while restricting the results to English-language documents in the areas of Business, Management & Accounting; Economics, Corporate Accounting, Econometrics and Finance; and Social Sciences. The inclusion criteria encompassed articles, conference papers, and book chapters. The search string utilized was:

Data was collected from the Scopus database on October 9, 2024, focusing on four key groups of keywords: (i) "ESG" OR "Environmental, social, governance" OR "Environmental-social-governance" OR "Environmental, social and governance"; (ii) "rating*" OR "score*" OR "measure*" OR "indicator*"; (iii) "firm*" OR "company*" OR "business*" OR "industries*"; and share price return (iv) "Corporate performance" OR "Corporate profitability" OR "Corporate financial liquidity" OR "efficiency" OR "solvency/Risk." These terms were looked for in the titles, abstracts, and keywords of documents in Scopus (TITLE-ABS-KEY).

This search started with more than a thousand documents in the dataset. To make sure the data was relevant and of good quality, we went through a thorough cleaning and harmonization process.

Initially, duplicate records were found and eliminated to avoid any possible bias in the analysis. After that, the titles, abstracts, and keywords of the remaining documents were carefully examined to filter out unrelated papers, non-peer-reviewed articles, and those that didn't specifically focus on the topics of ESG scores, stock price returns (Spirova T. 2023), and corporate financial risk (Afagachie, C. 2013). Furthermore, bibliographic information like author names, affiliations, and keywords were standardized to address differences in spelling, abbreviations, and formatting. This step was crucial for accurately mapping the academic landscape and ensuring that the analysis truly represented the research area.

To provide a thorough and unbiased evaluation of research on how ESG scores affect stock price returns and corporate financial risk. We included studies that focused on the main topics of ESG scores and their effects on stock price returns and corporate financial risk, published between 2015 and 2024, and found in peer-reviewed journals. we conducted a preliminary review to fine-tune our criteria. We kept detailed records of all decisions to maintain transparency and allow for reproducibility. While we recognized the possible drawbacks of personal judgment, having several reviewers and thorough documentation aimed to enhance the precision and dependability of our selection process.

Future studies might find it helpful to include more databases or different review techniques to tackle this issue further.

After carefully cleaning and organizing the data, the final dataset includes 990 articles and reviews published from 2015 to 2024. This polished dataset serves as the foundation for the upcoming bibliometric analysis, which will enable a thorough investigation of research outputs, the discovery of new trends, and the identification of gaps in existing literature. By following this, A comprehensive approach for gathering data and processing, the study meets the recognized standards of bibliometric research, addressing any concerns about the analysis's validity. As a result, it lays a strong groundwork for examining how ESG scores influence stock price returns and corporate financial risk, offering important insights to the field. Initially, the search produced over a thousand documents, but to maintain relevance, titles and abstracts were carefully reviewed to filter out unrelated studies. The final dataset, refined through this careful process, consists of 990 articles and reviews covering a decade from 2015 to 2024.

**Results and Discussion**

This part looks into the outcomes of a bibliometric study focused on ESG scores, and how it relates to Stock price returns and corporate financial risk. It uncovers important patterns and trends within the research field. The analysis includes citation counts, co-citations, keyword co-occurrence, co-authorship networks, and bibliographic coupling, giving a detailed perspective on the connection between ESG scores, stock price returns, and corporate financial risk. The study points out a notable rise in research activity, highlights key authors and institutions, and discusses major research themes. It also identifies significant contributions, thematic clusters, and gaps in existing literature, offering valuable perspectives for upcoming research and laying the groundwork for more exploration in accounting and finance.

**Documents by Year**

In bibliometric analysis, "Documents by Year" indicates the number of academic publications, like articles or papers, released each year in a certain research field. This measure is useful for monitoring how research activity changes over time, showing trends, changes in scholarly attention, and times when interest in a subject rises or falls. By examining this information, we can gain a better understanding of how a field has developed, spot new trends, identify areas that require further investigation, and see the overall growth of academic interest.

(Figure 1.) The analysis of documents by year on ESG scores, stock price returns and corporate financial risk reveals a notable increase in

(Table 1 ) Evolution of number of articles per year, year-over-year growth rates with cumulative growth, 2015-2024

| Year | Documents | YoY Growth Rate (%) | Cumulative Growth (%) |
|---|---|---|---|
| 2024 | 340 | 38.78 | 5566.67 |
| 2023 | 245 | 45.84 | 3983.33 |
| 2022 | 168 | 110 | 2700 |
| 2021 | 80 | 14.28 | 1233.33 |
| 2020 | 70 | 75 | 1066.67 |
| 2019 | 40 | 122.23 | 56.67 |
| 2018 | 18 | 28.58 | 200 |
| 2017 | 14 | 55.56 | 133.33 |
| 2016 | 9 | 50 | 50 |
| 2015 | 6 | - | 0 |

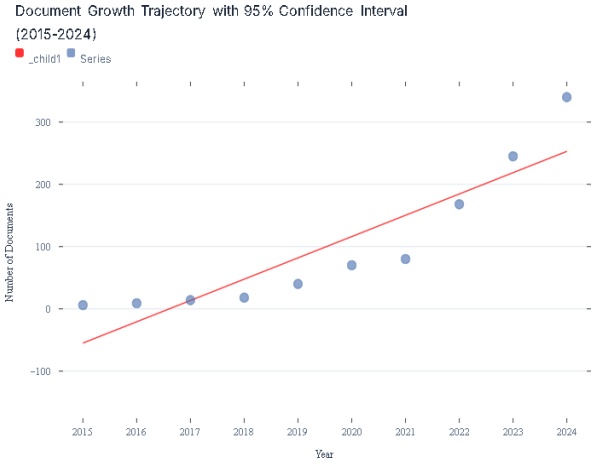


Figure 1. Evolution of number of articles per year, 2015-2024

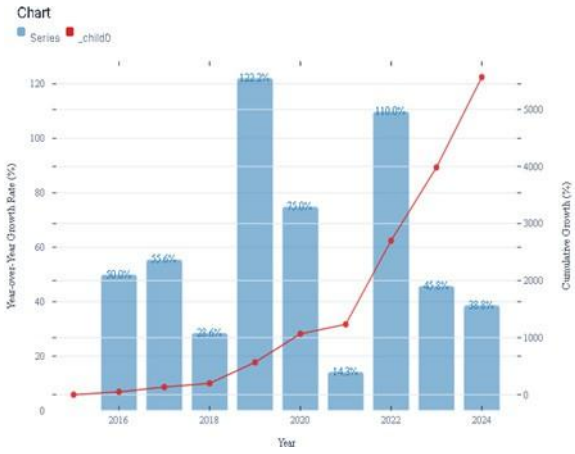


Figure 2: year-over-year growth rates with cumulative growth

(Source: Authors' work using Scopus data)

research activity over time. In 2024, there were 340 documents, indicating a peak in interest and scholarly output on the topic. This surge follows a significant rise from 2023, which had 245 documents, reflecting a growing focus on ESG scores in recent years. The trend shows a steady increase from 2022, with 168 documents, and 2021, with 80 documents, highlighting a period of accelerated research. Prior to this uptick, the number of documents was comparatively modest, with 2020 recording 70, 2019 with 40, and 2018 with 18 documents, suggesting a gradual but steady rise in the field. Earlier years had even fewer publications, with 2017 contributing 14 documents, 2016 with 9, and 2015 with 6. Indicating that the field was relatively nascent before the notable growth observed in the past few years.

(Figure 2) **Year-over-Year Growth Rate (%)**: This column shows the percentage rise in the number of documents from one year to the next. For example, from 2023 to 2024, there was a 38.78% increase in documents. The highest year-over-year (YoY) growth occurred in 2022, with **110%**. Another sharp increase was observed in **2019**, with **122.22%** growth, reflecting an active phase in document generation or research activity.

1. **To analyse the year-over-year growth rates follow these steps:** The formula for the year-over-year growth rate is:

$$\text{Growth Rate} = \frac{(\text{Documents in Current Year}) - \text{Documents in Previous Year})}{\text{Documents in Previous Year}} \times 100$$

**Cumulative Growth (%)**: This column shows the total growth from the starting year (2015) to each subsequent year. For instance, by 2024, there has been a cumulative growth of 5566.67% in the number of documents since 2015.Cumulative growth soared from **50% in 2016** to **5,566.67% in 2024**, indicating exponential document accumulation over time. The trend shows that after slower increases in earlier years (e.g., **2016–2018**), there was a steady surge starting from **2019**.

2. **To analyse** the cumulative **growth rates follow these steps:** The formula for the cumulative growth is:

$$\text{Cumulative Growth} = \frac{(\text{Documents in Current Year}) - \text{Documents in Starting Year})}{\text{Documents in Starting Year}} \times 100$$

This examination offers a deeper understanding of how the number of documents has increased over the years, both annually and cumulatively.

**Documents by Affiliation**

"Documents by affiliation" refers to how academic papers are organized centered around the universities or organizations connected with the authors. This approach highlights which institutions are leading in research within a certain field, showing their contributions and impact. By looking at documents by affiliation, we can pinpoint key research hubs, assess how productive different institutions are, and understand how collaboration works in that area. This offers significant perspectives on how academic and institutional factors influence research topics.

The analysis of document distribution

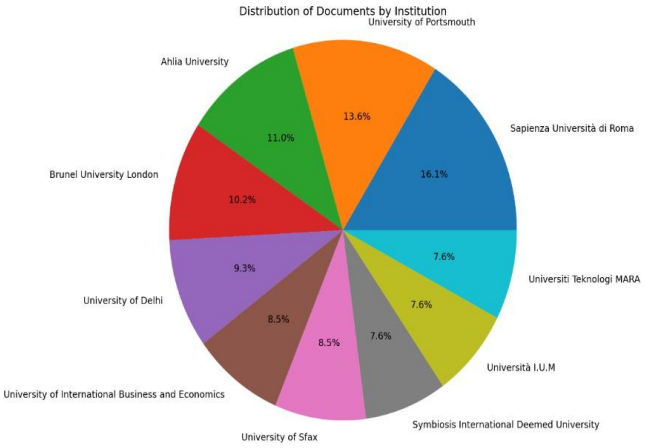


Figure 3: Documents by Affiliation
(Source: Authors' work using Scopus data)

concerning ESG scores, stock performance, and corporate financial performance by affiliation reveals a wide array of contributing institutions. At the forefront is Sapienza University di Roma, which has produced 19 documents, demonstrating its prominent research contributions in this area. The University of Portsmouth closely follows with 16 documents, indicating a robust emphasis on ESG-related subjects. Ahlia University and Brunel University London is also a major player in this, with 13 and 12 documents respectively, reflecting their considerable research endeavors. The University of Delhi, with 11 documents, enhances the expanding corpus of research from institutions across various geographical locations. Both the University of International Business and Economics and the University of Sfax have each contributed 10 documents, showcasing their active participation in ESG research. Additionally, Symbiosis International Deemed University and University LUM, each with 9 documents, further illustrate the global interest in ESG scores. Lastly, the University Teknologi MARA, with 8 documents, highlights its engagement in this field, representing a noteworthy yet comparatively smaller contribution relative to the leading institutions. This distribution illustrates a widespread and international scholarly commitment to ESG scores, stock performance, and corporate financial performance among diverse academic and research entities.

### Documents by Countries

Documents by Country is about how scholarly publications are spread out according to the countries where the research took place or where the authors are located. This measure is useful for spotting which countries are at the forefront of research in a certain area, highlighting their contributions and involvement. By looking at documents by country, researchers have the opportunity to acquire insights into worldwide research trends, evaluate international partnerships, and determine how different countries rank in contributing to knowledge on specific subjects.

The examination of documents categorized by country concerning ESG scores and corporate performance indicates a considerable worldwide emphasis. Researchers from around the globe have been crucial in advancing this field of study. From 2015 to 2024, 36 nations each published more

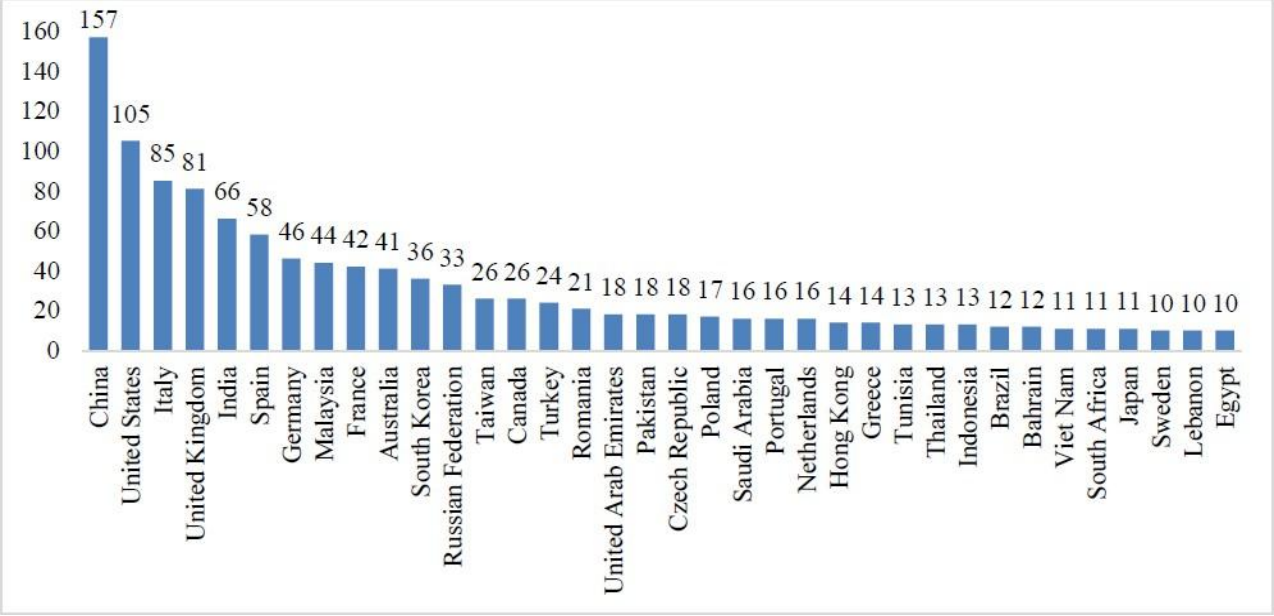


Figure 4: Documents by Affiliation (Source: Authors' work using Scopus data)

than 10 academic papers, indicating substantial international participation. China is at the leading edge with 157 publications, followed by the US with 105, Italy with 85, the United Kingdom with 81, and India with 66. In total, scholars from 86 countries have investigated the connection between ESG ratings and business performance. This extensive involvement underscores the global significance of sustainable practices and the growing focus on incorporating environmental, social, and governance (ESG) issues into business strategies. This distribution demonstrates a robust worldwide dedication to comprehending ESG Scores and their

her crucial role in advancing this field. Shunsuke Managi also shows considerable impact, with four publications totaling 715 citations, reflecting a strong academic presence. Nicola Cucari, despite having only three publications, has achieved an impressive 665 citations, indicating significant influence relative to his output. Valentina Lagasio and Mohamad Jizi, each with four publications, have accumulated 450 and 380 citations respectively, demonstrating their valuable contributions to the literature. Mahmoud Arayssi, with three publications and 365 citations, along with Khaled Hussainey, who has seven publications and 415 citations, also exhibit

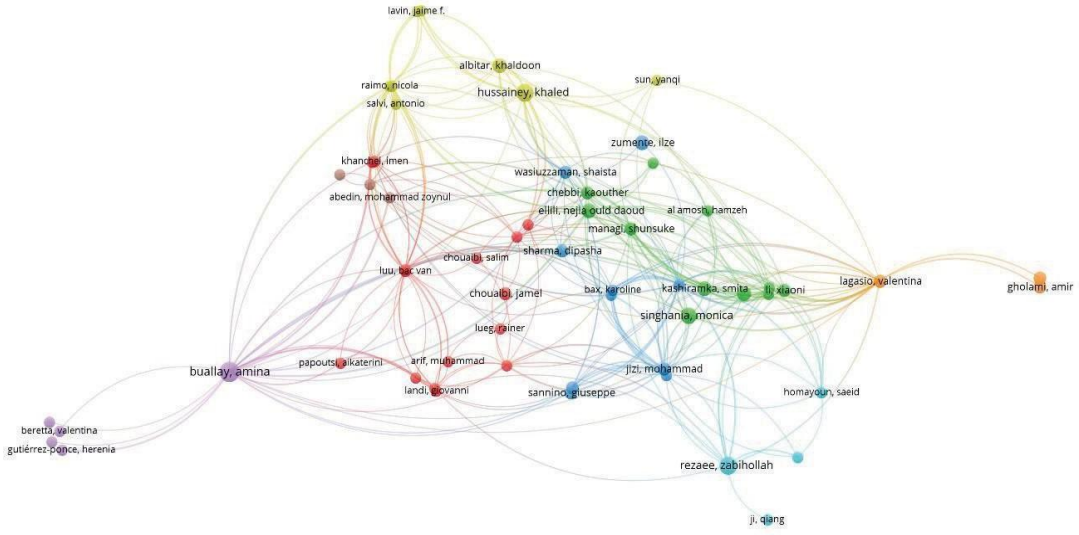


Figure 5: Citation by Authors (Source: Authors' work using Scopus data)

influence on corporate financial performance, with notable contributions from multiple nations.

## Citation by authors

Citations by authors indicate how often other researchers reference an author's work. This metric underscores the author's importance and impact within their field, with a higher number of citations reflecting greater recognition and contribution. It helps identify leading scholars, track research trends, and understand the dynamics within the academic community.

The citation patterns among authors studying ESG scores and corporate financial performance—covering areas such as stock price returns, corporate financial risk, and overall financial performance—highlight a diverse range of scholarly influence and contributions. Amina Bually emerges as the most influential author, having published nine works that together received 741 citations, underscoring notable scholarly impact. In contrast, Kaouther Chebbi, with four publications, has a relatively low citation count of 40, suggesting limited influence. Nejla Ould Daoud Ellili, with five publications and 170 citations, and Shaista Wasiuzzaman, with four publications and 270 citations, show moderate levels of academic recognition. This citation distribution highlights the prominence of leading researchers while also revealing the varying degrees of scholarly acknowledgment among different contributors in the field of ESG scores.

## Keyword occurrences

In bibliometric analysis, co-occurrence refers to the simultaneous appearance of specific keywords or terms in research papers. This phenomenon aids in identifying patterns within the subjects being investigated and highlights significant areas of interest by revealing the frequency with which certain terms are associated. By examining co-occurrence, researchers can identify trends

within their field, categorize related themes, and comprehend the interconnections between various concepts, thereby providing a more comprehensive comprehension of the evolution of academic discourse over time.

This analysis provides a keyword mapping based on an evaluation of 957 research articles pertaining to ESG ratings and corporate performance, using data sourced from Scopus site. The mapping process involved adjusting the software settings to identify keywords that appeared at least six times, rather than the default threshold of five, to better reflect the extensive literature available. This modification resulted in a total of 103 unique keywords. The term "ESG" was the most commonly used keyword, appearing 292 times, followed by "corporate social responsibility" with 129 occurrences, "sustainability" at 118, "financial performance" with 80, and "environmental" at 74. These keywords demonstrated the strongest interconnections, highlighting their frequent co-occurrence in the existing research on this topic.

Table 2 displays the ten most frequently utilized keywords by researchers, along with their respective occurrences and overall link strength.

Table 2. Keyword occurrences and link strengths
(Source: Authors' work in VOSviewer using Scopus data)

| Keyword | Occurrences | Total linkstrength |
|---|---|---|
| ESG | 292 | 492 |
| Corporate social responsibility | 129 | 246 |
| Sustainability | 118 | 221 |
| ESG performance | 97 | 156 |
| Governance | 35 | 115 |
| Environmental | 74 | 190 |
| Financial performance | 80 | 166 |
| Corporate governance | 69 | 158 |
| Social | 47 | 156 |
| Sustainable development | 58 | 107 |

We found 10 different clusters of topics, which are shown in various colors in Figure 6. Each cluster's keywords suggest that they were often used together in academic papers, indicating specific research sub-topics. The largest cluster, marked in red, has 17 keywords and revolves around ESG ratings and scores, linking them to digital transformation, green finance, innovation, stock returns, financial constraints, and volatility. The second cluster, shown in green, contains 15 keywords and focuses on banks, credit ratings, firm value, and financial performance measures like Return on Assets and Tobin's q, along with board gender diversity. The other clusters have between 3 and 13 keywords each. The way these keywords are spread out shows that ESG research is complex and covers many different areas. It focuses heavily on important ideas like ESG and sustainability, while also paying a lot of attention to how companies disclose information and their governance practices.

## journals on ESG ratings and corporate financial performance

Research examining the relationship between business sustainability, as indicated by ESG ratings,

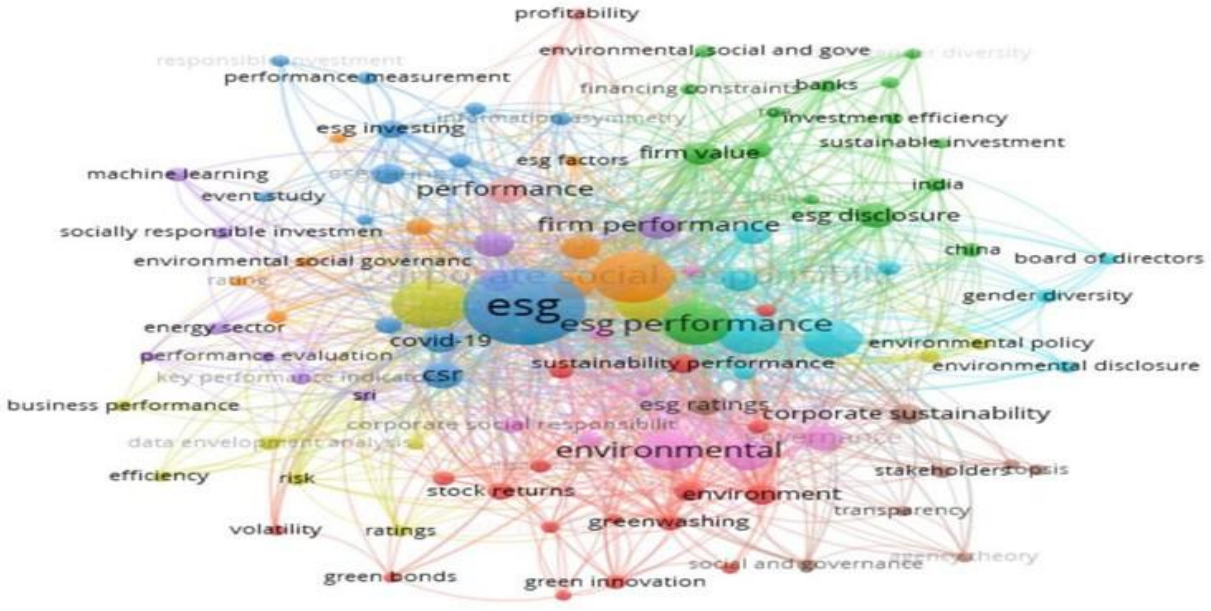


Figure 6. Mapping of keywords used in research (Source: Authors' work in VOSviewer using Scopus data)

and organizational performance has been published across 352 academic journals. Figure 7 illustrates the 20 journals that have contributed the most papers to this field. The extensive range of publication venues underscores the significant multidisciplinary interest in this subject, as evidenced by the diverse countries and affiliations of the authors involved. Notably, the journal Sustainability leads with the greatest amount of contributions, totaling 114 papers, which constitutes 11.9% of the overall publications, reflecting its focus on sustainability research. Following it, the (JSREM) journals Social

Table 3. Most important journals on ESG ratings and corporate performance

| Rank | Journal Name | Citations |
|---|---|---|
| 1 | Sustainability (Switzerland) | 114 |
| 2 | Corporate Social Responsibility and... | 37 |
| 3 | Business Strategy and the Environment | 31 |
| 4 | Journal of Cleaner Production | 26 |
| 5 | Journal of Research Letters | 20 |
| 6 | Journal of Sustainable Finance and... | 20 |
| 7 | Sustainability Accounting, Management... | 15 |
| 8 | International Review of Financial... | 14 |
| 9 | Environmental Science and Analysis | 13 |
| 10 | Journal of Social Responsibility... | 12 |
| 11 | Research and Financial Management | 11 |
| 12 | Journal of International Business and... | 10 |
| 13 | Environmental Development | 9 |
| 14 | Corporate Governance | 8 |
| 15 | Journal of Management Development | 8 |
| 16 | International Corporate Governance | 8 |
| 17 | Journal of Finance Research | 8 |
| 18 | International Journal of Psychology | 8 |
| 19 | Frontiers in Psychology | 8 |

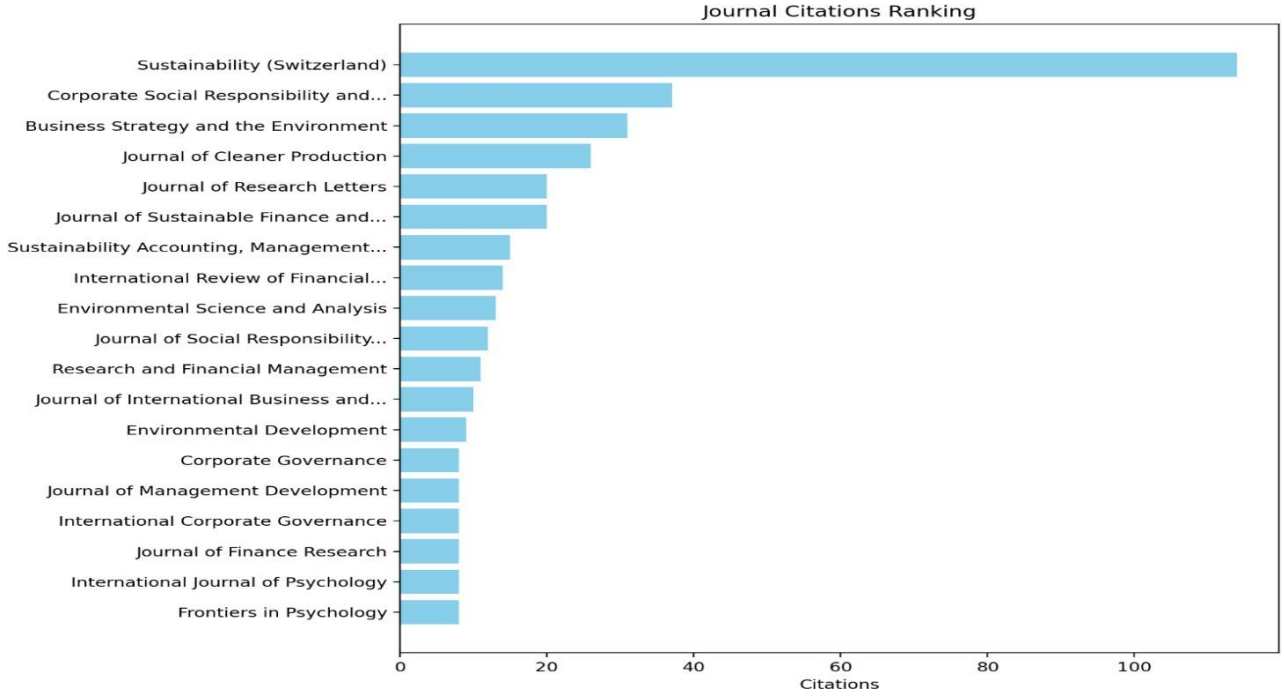


Figure 7. Most important journals on ESG ratings and corporate performance

Responsibility and Environmental Management and Business Strategy and the Environment rank second and third, respectively, with 37 and 31 papers, though they are considerably behind Sustainability in terms of publication volume. Additionally, at least 20 papers have been published in each of the following journals: Journal of Cleaner Production (26), Journal Research Letters (20), and Journal of Sustainable Finance and Investment (20).

## Conclusion

The bibliometric examination of ESG scores and corporate financial performance provides valuable insights into the development and influence of research within this domain. There has been a notable rise in the number of published documents in recent years.

The increasing number of years signifies an expanding academic engagement and concentration on ESG issues, culminating in a significant peak in 2024. This rise illustrates an enhanced awareness and research efforts related to ESG practices and their effects on the financial performance of corporate entities.

Significant institutions, including Sapienza University di Roma and the University of Portsmouth, have taken a leading role in promoting research initiatives, while a variety of global contributions emphasize the international relevance of the subject matter. The involvement of nations such as China, Italy, and the United States illustrates a widespread and geographically varied interest in ESG research. Citation trends indicate that foundational studies, particularly those by Fatemi (2021) and Eliwa (2024), have profoundly influenced the discipline, shaping contemporary discussions and guiding future investigations. This influence is further evidenced by the substantial citation metrics of prominent scholars, reflecting their important contributions and the broad acknowledgment of their research. An analysis of keywords reveals that concepts such as "ESG," "sustainability," and "corporate social responsibility" are pivotal to the discourse, underscoring essential thematic areas and emerging trends. Additionally, co-occurrence analysis of these terms uncovers thematic clusters and interconnections among concepts, enhancing the understanding of the field's organization and the development of new research themes.

This study underscores the significance of incorporating Environmental, Social, and Governance (ESG) practices into the strategic frameworks and reporting mechanisms of businesses, particularly for practitioners, policymakers, and industry stakeholders. Organizations are encouraged to remain updated on the changing landscape of ESG standards and frameworks, utilizing knowledge from prominent institutions and impactful research to refine their ESG approaches. Policymakers may leverage the knowledge gained from this research to formulate regulations and guidelines that promote enhanced transparency and accountability in ESG assessments. Additionally, industry stakeholders can gain valuable perspectives by examining the emerging trends and thematic clusters highlighted in the research.

This bibliometric examination of ESG scores and corporate financial performance, although thorough, presents several limitations that warrant consideration. Firstly, the research is grounded in a particular selection of databases and sources. This constraint could result in the exclusion of significant studies, thereby distorting the overall analysis. Moreover, the study depends on citation metrics and keyword frequencies, which, while informative, may not adequately reflect the quality or influence of specific research outputs. The evolving landscape of the ESG sector implies that new trends and recent publications might not be entirely represented in the dataset, potentially compromising the analysis's comprehensiveness. Additionally, the emphasis on publications in the English language may overlook vital contributions from research available in other languages, thus narrowing the study's breadth. Lastly, the analysis fails to consider qualitative dimensions of the research, such as the rigor of methodologies or the unique contributions of individual Research initiatives.

Future studies may overcome these limitations by expanding the selection of databases and sources, thereby enhancing the comprehensiveness of literature reviews in the field. Including non-English publications would also provide a more global perspective on the associations between ESG (Environmental, Social, and Governance) scores, stock price performance, and corporate financial risk. Furthermore, subsequent research could gain from incorporating qualitative assessments of research quality and impact, complementing the quantitative metrics utilized in this study.

Emphasis on recent publications and emerging trends would help capture the latest developments and innovations in ESG research. Researchers should also consider the influence of methodological diversity in ESG studies, as this can reveal how different analytical approaches shape findings and contribute to the discipline's evolution. Finally, comparative analyses of ESG scoring practices across various industries or geographic regions could shed light on unique sector-specific or region-specific challenges and opportunities. Such efforts are likely to advance a deeper understanding of ESG scores in relation to corporate financial performance, leading to more robust and comprehensive insights in this growing area of study.

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# Financial Literacy as a Pathway to Rural Financial Empowerment: Insights from Coffee Farmers

Sreereshma S R[1] | Dr. Dileep A S[2] | Dr. Santhosh V S [3]

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**Abstract**

The study addresses a critical yet underexplored dimension of rural financial empowerment by evaluating the financial literacy of smallholder coffee farmers in Kerala. Grounded in the OECD/INFE framework, the research studies how the three core dimensions of financial literacy, namely knowledge, behavior, and attitude, influence the adoption of structured bookkeeping practices. Utilizing a cross-sectional survey of 150 farmers, the study employed Friedman tests and multiple linear regression analysis to assess within-group variation and predictive relationships. Results reveal a significant disparity across literacy components: while farmers demonstrated strong financial attitudes, their behavior was moderately developed, and knowledge scores were critically low. Regression analysis confirmed that all three dimensions significantly influence bookkeeping, with financial behavior emerging as the most dominant predictor. Additionally, education level and mobile phone usage significantly enhanced financial record-keeping behavior. The study uncovers a vital gap between financial intentions and actual capability, emphasizing the need for context-specific, applied financial education and digital literacy support. By integrating behavioral, cognitive, and enabling factors, this research provides actionable insights for policymakers, cooperatives, and financial institutions aiming to strengthen financial inclusion and sustainability in plantation-based agriculture. The findings contribute meaningfully to the discourse on rural financial capability and agrarian resilience in developing economies.

**Keywords**

Financial Literacy, rural development, coffee, OECD/INFE.

## Introduction

Financial literacy refers to an individual's ability to understand, evaluate, and apply essential financial concepts such as interest rates, inflation, budgeting, saving, borrowing, and risk management (Ankrah Twumasi et al., 2022; Klapper & Lusardi, 2020). In addition to requisite factual knowledge, financial literacy requires behavioural attributes and motivations that affect people's decisions relating to financial issues in everyday life (Chang et al., 2022). Financial literacy is regarded as a critical life skill in today's multifaceted economic reality for distinguishing and making appropriate decisions, simplified by managing financial risks, planning for future needs, or improving financial quality of life in the long term. Over the years, it has become a critical component of policy agendas worldwide, particularly in the context of inclusive growth, rural development, and financial inclusion (Sayinzoga et al., 2016).

Among farmers, financial literacy plays an even more crucial role (Gottlieb & Hansson, 2024a). Agriculture is inherently uncertain and requires critical decision-making regarding input purchases, input costs, investments in production, financing, and markets. A financially literate farmer can budget income, capitalize on loan offers, manage costs, navigate price fluctuations, and prepare for lean seasons. However, despite the significant growth of agribusiness and rural finance, crop production remains complicated for many smallholder farmers in India (Gaurav & Singh, 2012; Ph scholar et al., 2013). Many smallholder farmers do not have enough financial awareness or financial capability.

[1] Research Scholar, PG Department and Research Center of Commerce, Mahatma Gandhi College, University of Kerala, Contact number:8078180586, email: srsreereshma@gmail.com

[2] Corresponding Author, Associate professor , PG Department and Research Center of Commerce, Mahatma Gandhi College, University of Kerala, Contact number: 9447500734, email: dr.dileepvjd@gmail.com.

[3] Associate Professor & Head, Department of Management Studies, IMDR College of Advanced Studies, Thiruvananthapuram, Contact number: 9447699865 Mailid: dr.santhoshvs@gmail.com

This awareness and capacity gap often leads to inefficient borrowing, underutilization of subsidies, poor record-keeping, challenges tapping into formal finance, lower productivity and sustainability of farm operations (Widhiyanto et al., 2018).

This concern is particularly relevant to smallholder coffee farmers in Kerala. Even though coffee farming can be lucrative, it involves seasonal income, long reproductive timelines, variable input costs, and reliance on both domestic and export markets. These intricacies require agricultural knowledge, financial planning, and business management skills. In Kerala, many of its coffee farmers cultivate coffee as a member of a cooperative or other types of unorganized smallholdings. Mobile banking, microfinance, and training initiatives have progressed into parts of the sector, but a farmer's ability to access financial services is dependent on their individual literacy in relation to money — this being both conceptual and practical. This means financial literacy is not only an individual property but also a needed capacity for maintaining agrarian livelihoods and potential resilience in the long-term plantation sector (Raza et al., 2023; Widhiyanto et al., 2018)

This study aims to address this gap by assessing the financial literacy of smallholder coffee farmers in Kerala using the internationally validated Organisation for Economic Co-operation and Development / International Network on Financial Education (OECD/INFE) framework, which capturesfinancialknowledge, behavior, and attitude. The study has two specific objectives, to analyze the level of financial literacy among smallholder coffee farmers, to understand whether financial literacy contributes to the use of structured bookkeeping practices. The first objective gauges financial literacy to determine to what extent farmers have the conceptual and behavioral instruments for financial self-management. The second objective stems from the recognition that record-keeping on the farm level is necessary for budgeting, cost-benefit analysis, and access to credit, yet retains minimal use in informal farming contexts. By connecting bookkeeping with literacy dimensions, the study provides pragmatic knowledge for relevant government agencies, cooperatives, and NGOs designing rural financial education, programs for access to credit, and digital financial services. In addition to being aware of matters of attitude, it suggests that achieving real financial capability for rural producers needs context-specific, knowledge-based interventions rather than being reliant on generalized advertising campaigns.

## Review of Literature

The OECD/INFE framework emphasizes that financial literacy is a multidimensional construct comprising financial knowledge, behavior, and attitude — each influencing financial decision-making in unique ways (OECD, 2023). Financial knowledge involves understanding concepts such as interest, inflation, and risk, enabling farmers to assess credit terms at the same time as evaluating input costs (Nolan et al., 2024). Financial behavior is reflected in daily actions such as budget preparation and saving, which are essential to keeping records and making informed decisions (Li et al., 2024; Ntakyo et al., 2021). Financial attitude relates to how individuals approach planning and thriftiness, essentially motivating farm operators performance to manage finances thoughtfully (Wever et al., 2025). The three components will have a collective influence on the ability of farm operators to engage in tasks like proper bookkeeping, which entails both knowledge and practice-based activities. Consequently, financial literacy should be a notable influence on the adoption of financial bookkeeping practices.

Education and mobile phone use are fundamental enablers of financial capability and technological readiness in rural settings. According to Human Capital Theory (Blaug, 1976), education enhances cognitive skills and decision-making capacity, enabling farmers to better manage income, evaluate financial services, and maintain records (Dogeje et al., 2024; Medard et al., 2012). Empirical studies have established a positive relationship between education levels and structured financial decision-making, including record keeping (Gottlieb & Hansson, 2024b). In the same way, the Technology Acceptance Model (Davis Fred, 1987) explains how ease of use and perceived usefulness either encourage or discourage mobile-based tool adoption. Mobile phone use provides farmers with access to financial services, information networks, and even digital bookkeeping apps (Kamal & Bablu, 2023; Krell et al., 2021). Further, research has shown how mobile phone use has improved budgeting, tracking costs, and farm level financial management (Kamal & Bablu, 2023). Because of these reasons, it is reasonable to expect that education levels and mobile phone use will positively affect bookkeeping

behavior among coffee farmers.

### Research Gap

While financial literacy has gained increasing attention in recent years, most existing studies focus on urban populations, salaried workers, or generalized adult samples, leaving a significant gap in understanding its role among smallholder farmers, particularly in plantation-based agriculture. There is scant empirical work that demonstrates the translation of financial literacy into distinct financial practices, such as bookkeeping in agricultural situations. Further, although frameworks such as OECD/INFE capabilities have been universally applied, they have received limited attention in the Indian agricultural landscape, particularly for coffee farmers in Kerala. Certainly, the features of education and mobile phone possession have been highlighted for their role as enablers in financial behaviour; they have rarely been studied in any formal literacy framework or combined with their record-keeping behaviours. This study fills such gaps by applying a validated framework to study financial literacy and subsequent structured financial behaviour in a rural, crop-specific context, thereby providing both contextual and theoretical contributions.

### Theoretical foundation

This study is based on the OECD and its International Network on Financial Education (INFE) financial literacy framework, which is an internationally known model developed by the Organisation for Economic Co-operation and Development (OECD), which defines financial literacy as financial knowledge, financial behavior, and financial attitude (OECD, 2023). Financial knowledge refers to the ability to understand the basics around interest, inflation, and risk diversification. Financial behavior applies this knowledge through actions such as budgeting, saving, and managing debt. Financial attitude reflects a longer-term orientation toward financial planning and thriftiness. This model is called the KBA model and has been tested and validated across more than 40 counties, allowing for global comparisons and methodological consistency.

The model's applicability for rural and agrarian populations makes it highly relevant for this study of smallholder coffee farmers in Kerala, who are informal economy players with seasonal cash flows, limited access to credit, and a highly variable income. The framework is also consistent with India's National Strategy for Financial Education 2020–2025 from the Reserve Bank of India, which employs a similar broader three-pronged approach for the goals of rural financial literacy (Bomanwar, 2020; RBI, 2007). Also, the KBA model affords the identification of specific gaps between its components, and therefore, practitioners can take measured actions - such as to improve behavior using nudges, if both attitude and knowledge are high.

The study also integrates education level and mobile phone usage into the model, grounded within Human Capital Theory (Blaug, 1976) and the Technology Acceptance Model (Davis Fred, 1987), which explain how cognitive ability and technological readiness support fixed financial practices (i.e., bookkeeping). The interconnected theoretical base of these frameworks justifies the selection of these variables and supports the inquiry of how financial capability is converted into measurable financial outcomes at the farm level.

## Methodology

### Research Design

This study adopted a quantitative, cross-sectional design to assess the financial literacy of smallholder coffee farmers in Kerala and examine how financial literacy components influence the adoption of bookkeeping practices. The research is exploratory and explanatory in nature, guided by the OECD/INFE framework, integrating additional enabling variables grounded in Human Capital Theory and the Technology Acceptance Model.

### Sampling and Data Collection

Primary data were collected through a structured questionnaire administered to a sample of 150 smallholder coffee farmers across major coffee-producing regions in Kerala. A purposive sampling method was used, targeting farmers involved in coffee cultivation who had at least one year of production experience and engaged in individual or cooperative-based farming.

The questionnaire was designed in alignment with the OECD/INFE financial literacy toolkit and pre-tested for clarity and relevance. Data were collected through in-person interviews conducted with the support of local agricultural officers and cooperative

Table 1: Financial Literacy Component Scores among Farmers

| Component | Mean Score (out of 5) | Median | Standard Deviation | Rank (Friedman Test) |
|---|---|---|---|---|
| Financial Knowledge | 2.6 | 2.5 | 1.1 | 3 (Lowest) |
| Financial Behavior | 3.7 | 3.8 | 0.9 | 2 |
| Financial Attitude | 4.1 | 4.2 | 0.8 | 1 (Highest) |

*Source: Primary Data*

representatives to ensure accurate comprehension and response among participants.

The reliability of the Likert-scale items for behavior and attitude was confirmed using Cronbach's alpha, which exceeded the acceptable threshold of 0.70.

**Data Analysis Techniques**

***Objective 1: Comparing Financial Literacy Dimensions***

Descriptive statistics (mean, median, SD) were calculated to determine levels and relative strengths of financial knowledge, behavior, and attitude of farmers. Friedman test was conducted to compare ranks of the three components. Post hoc Wilcoxon signed rank tests with Bonferroni adjustment ($\alpha = 0.0167$) were performed to determine pairwise differences for statistical significance.

***Objective 2: Predicting Bookkeeping Practices***

To examine the influence of the financial literacy components and control variables on bookkeeping behaviors, a multiple linear regression model was analyzed. All assumptions required for model estimation were evaluated prior to estimating the model. The regression model was tested with financial knowledge, behavior, and attitude as explanatory variables with education and mobile phone usage as control variables. The fit of the model was evaluated using the $R^2$, Adjusted $R^2$, and F-statistic, while the significance of individual predictors was evaluated using standardized beta coefficients, and p-values.

**Results**

***Objective 1: To assess the level of financial literacy among smallholder farmers in India***.

$H_{1:}$ There is a significant difference between the average ranks of knowledge, behavior, and attitude.

The findings show that farmers had positive financial attitudes (Mean = 4.1) suggesting they would prefer to plan for positives, save, and learn about financial issues simultaneously. Their financial behaviors (Mean = 3.7 value) were moderate, showing reasonable practices like budgeting, making timely loan repayments, and habits of savings. However, their financial knowledge was significantly poorer (Mean = 2.6 value) with many farmers not being able to answer fundamental financial questions involving other work-related factors such as interest calculations, inflation, and the advantages of savings accounts. This gap seems to indicate a conceptual weakness in their core financial understanding, even with positive financial disposition.

Table 2: Friedman Test Output:

| Test Statistic | Value |
|---|---|
| $\chi^2$ (Chi-square) | 110.85 |
| df | 2 |
| p-value | < 0.001 |

*Source: Primary Data*

Given that $p < 0.05$, we reject $H^2$, and therefore, there is a significant difference between at least two of the components. Since the Friedman test is significant, we will conduct pairwise comparisons between Knowledge vs Behavior, Knowledge vs Attitude, and Behavior vs Attitude with the Bonferroni correction (alpha = 0.05/3 = 0.0167) to control for Type I error.

Table 3: Wilcoxon Results

| Comparison | Z Score | p-value | Significant? |
|---|---|---|---|
| Knowledge vs. Behavior | -9.12 | < 0.001 | Yes |
| Knowledge vs. Attitude | -10.02 | < 0.001 | Yes |
| Behavior vs. Attitude | -2.65 | 0.008 | Yes |

*Source: Primary Data*

An analysis using the Friedman test revealed a statistically significant difference in the financial literacy dimensions between farmers ($\chi^2(2) = 110.85$, $p < 0.001$). Wilcoxon signed-rank tests

were used for post hoc comparison with Bonferroni correction, and indicated that attitudes (Mdn = 4.2) were significantly higher than both behaviour (Mdn = 3.8, $p < 0.001$) and knowledge (Mdn = 2.5, $p < 0.001$). Overall, the results show that while farmers had positive attitudes towards managing their money, their financial behaviour and financial knowledge were both considerably below their attitudes.

**OBJECTIVE 2:** ***To examine how financial literacy dimensions (knowledge, behavior, and attitude) influence the adoption of bookkeeping practices among smallholder coffee farmers.***

***$H_{2a}$: Financial knowledge has a significant positive influence on bookkeeping practices.***

***$H_{2b}$: Financial behavior has a significant positive influence on bookkeeping practices.***

***$H_{2c}$: Financial attitude has a significant positive influence on bookkeeping practices.***

**Assumptions tested**

Prior to conducting a multiple linear regression analysis to determine the influence of each component of financial literacy on the smallholder coffee farmers' adoption of bookkeeping practices the necessary statistical assumptions were checked and satisfied. The assumption of linearity was confirmed with the residual plots showing a random and symmetrical distribution of residuals with respect to the predicted values. The Durbin-Watson statistic was 1.89 suggesting independence of the residuals. The assumption of homogeneity WAL (homoscedasticity) was verified visually, since no funnel-shaped spread was observed in the scatterplot of standardized residuals and predicted values. The assumption of normality of residuals was upheld, indicated by a close-to-normal histogram, Q-Q plot, and non-significant Shapiro-Wilk test ($p = 0.064$). The study was also confident to confirm that there was no multicollinearity because all Variance Inflation Factor (VIF) values remained less than 2.0 and the Tolerance values were greater than 0.5. With the above assumptions confirmed, the regression analyses determined the following when looking at predicting factors of bookkeeping adoption, financial behavior ($\beta = 0.35$, $p < 0.001$) was positively significant., follow by financial knowledge ($\beta = 0.30$, $p = 0.002$), and finally attitude ($\beta = 0.15$, $p = 0.048$). Education ($\beta = 0.10$, $p = 0.017$) and mobile phone usage ($\beta = 0.20$, $p = 0.014$) were also statistically significant positive controls measured along with the dimensions of financial literacy. The overall model (designed for significance testing) was found to be significant, ($R^2 = 0.46$, $F(5,144) = 18.2$, $p < 0.001$), evidencing a total net effect above the chance of the dimensions of financial literacy and underlying key demographic enablers could explain farmers' adoption of bookkeeping practices.

$R^2 = 0.46$
Adjusted $R^2 = 0.43$
$F(5,144) = 18.2$
$p < 0.001$

keepingi = β0 + β1 (Knowledgei) + β2(Behaviori) + β3(Attitudei) + β4 (Educationi) + β5(MobileUsei + ϵi

The results of the regression indicated that all aspects of financial literacy significantly predicted smallholder farmers' use of bookkeeping practices. Financial behavior had the strongest positive influence (Beta = 0.35, $p < 0.001$), indicating that the farmers who did manage their finances better were more likely to keep accurate records in their books. Both financial knowledge (Beta = 0.30) and financial attitude (Beta = 0.15) were significant, albeit lesser predictors of bookkeeping practices, indicating that while it may be valuable to have conceptual understanding and financial values,

Table 4: Linear Regression Results

| Predictor | Unstandardized B | Std. Error | Beta | t-value | p-value |
|---|---|---|---|---|---|
| **(Constant)** | 1.20 | 0.35 | — | 3.43 | 0.001 |
| **Financial Knowledge** | 0.25 | 0.08 | 0.30 | 3.12 | 0.002 |
| **Financial Behavior** | 0.40 | 0.10 | 0.35 | 4.00 | 0.000 |
| **Financial Attitude** | 0.18 | 0.09 | 0.15 | 2.00 | 0.048 |
| **Education Level** | 0.12 | 0.05 | 0.10 | 2.40 | 0.017 |
| **Mobile Phone Usage** | 0.30 | 0.12 | 0.20 | 2.50 | 0.014 |

*Source: Primary Data*

actual financial behavior is most influential in predicting practical applications of record keeping. The control variables of education and use of mobile were also positively related to bookkeeping, lending evidence to contributing or enabling factors.

**Discussion and Practical Implications**

The analysis revealed a statistically significant difference among the three components of financial literacy: knowledge, behaviour, and attitude. Coffee farmers have positive financial attitudes that amount to overall positive attitudes toward savings and planning. Their financial behaviours were only moderately developed while their financial knowledge had the least scores (Mean = 2.6). Many farmers were unable to respond correctly to simple questions pertaining to interest rates, inflation, and risk diversification. The difference suggests to us that coffee farmers valued planning and might even use behaviours like savings and budgeting, but their limited or poor conceptual understanding can impede their ability to make sensible economic decisions when using formal credit, managing investment risk, and recording costs in their agribusiness activity. The study uncovers a critical discrepancy between the financial intentions and capabilities of smallholder coffee farmers. Although they possess a highly positive financial outlook, their limited conceptual knowledge may restrict the effective use of financial services and accurate farm decision-making. This finding implies that rural financial education must go beyond motivational or attitude-based campaigns and instead focus on delivering applied financial knowledge through contextualized, farmer-friendly training models.

The strong positive attitude toward saving and financial planning is a promising signal for policymakers and extension workers. It shows that farmers value good financial habits, are open to learning, and believe in the importance of planning. This offers a fertile base for interventions. However, the low knowledge scores are concerning. Many farmers are not knowledgeable of the basic financial principles necessary to make informed decisions. If farmers do not have basic conceptual clarity, they may not be able to evaluate loan offers, properly calculate repayment obligations, assess profitability, or understand their long-term exposure to risk. In the coffee farmer context - where they experience seasonal income, inputs are often investments, and access to formal credit may be a necessity - financial understanding can lead to misinformed behaviours even if intentions are good. Moderate behaviours scores show that there are some good financial habits currently being practiced. This could be due to social learning, prior training by cooperatives, or exposure to mobile banking tools. However, without the right conceptual understanding, these behaviors may not be optimal or sustainable in the long run. Smallholder coffee farmers exhibit responsible financial attitudes and modest behavioral engagement. However, their limited financial knowledge remains a key challenge to comprehensive financial inclusion. It is critical to bridge the knowledge gap through practical, accessible, and agriculturally relevant financial education, based on the conversation with the smallholder coffee farmers, in order to build sustainable farming livelihoods and access to credit.

Due to the large variation identified in the dimensions of financial literacy, the second objective explored whether there are elements of financial literacy that may predict farmers adopting structured bookkeeping. The regression analyses revealed that all three components of financial literacy were significant predictors of bookkeeping practices. Specifically, financial behavior was the strongest predictor, meaning behaviors which were actionable such as budgeting and tracking income and expenses were relatively most aligned with structured recordkeeping, while financial knowledge and financial attitude were both significant but less powerful predictors, demonstrating that not only are both cognitive and motivational dimensions important, but cognitive and motivational dimensions can serve as antecedents of purposeful action. In addition to the financial literacy components, the present study included education level and mobile phone usage as predictors of bookkeeping practices. According to Human Capital Theory, education increases individuals' ability to process information, make rational decisions, and adopt new practices. Financial capability models highlight that foundational skills like literacy and numeracy — both products of formal education — influence an individual's ability to manage finances effectively. Education level is therefore included as a predictor of bookkeeping practices because it reflects the farmer's cognitive ability to understand and apply financial literacy concepts in daily farm management. It also influences exposure to formal financial systems and the ability to follow structured practices like documentation and accounting.

The use of mobile phones can reflect, at a minimum, the farmer's ability to access digital tools and financial resources. According to the Technology Acceptance Model (Davis, 1989), the use of technology can facilitate behavioural intention to perform tasks such as expense tracking and savings. Diffusion of Innovation Theory (Rogers, 2003) asserts that mobile phone adoption is a key enabler of innovation diffusion in rural finance and agricultural decision-making. Mobile phone usage is included as a predictor because it denotes the farmers technological readiness, which could include access to financial tools, record-keeping apps and digital training content. Further, mobile phone usage is a proxy for interconnectivity and the ability to access support networks which can prompt the structured behaviour associated with bookkeeping. We confirmed that the education variable and mobile phone usage were significantly influential to the bookkeeping behaviour.

The results indicate that while farmers might already have these two potential motivators to manage their finances effectively in regards to coffee, they are limited likely due in part to a lack of formal knowledge and facilitating educational and technological resources. The results support a multi-dimensional intervention which incorporates both motivational messaging, and a financially educational, digitally literate approach with enabling infrastructure. Ultimately, building financial literacy amongst smallholder coffee farmers is not just focused on the worked knowledge, but on empowering the farmers to manage their finances based on their now informed knowledge with access to proper payment and financial decision-making tools, provided software platforms, and competent knowledge to feel confident to do so. Utilisation of specific training sessions, a community based financial facilitation coaching process, and supporting services, especially now with mobile devices, could begin to finally bridge a gap between attitude and action, and increase the sustainability and financial resilience of the coffee farming community in Kerala.

## Conclusion

Using the OECD/INFE framework, this study evaluated smallholder coffee farmers' financial literacy in Kerala. Findings show the farmers had strong financial attitudes, poor financial knowledge, and moderately developed financial behaviour. All three factors were found as significant effects on bookkeeping, with behaviour being the greatest predictor. Education and mobile phone usage significantly enabled farmer performance as well. Overall, the findings show that there is a significant gap between farmers' financial intentions and their practical ability to execute them. Addressing this gap through contextually based financial education and digital support is essential for enhancing performance in financial management and sustainability in rural coffee farming.

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# Association between Demographic and Socio-Economic Characteristics of the Household and Lapsation of Life Insurance Policies: A Cross Sectional Study in Kerala

Jino Joseph[1]

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**Abstract**

Lapsation is a major issue faced by the life insurance sector in India. This study tries to establish an association between household characteristics and lapsation of life policies. Household characteristics can be divided into three, demographic characteristics, social characteristics and economic characteristics. The study used household survey data for achieving the objective. Chi-square test was used for analysing and testing the survey data. The study found that demographic characteristics such as age of the household head and caste, social characteristics such as education of the household head and spouse, occupation of the household head and economic characteristics such as economic status and income of the household have a low to moderate association with lapsation. The study suggests the introduction of flexible products tailored to the needs of the poor in the society.

**Keywords**

Words: Demographic Characteristics, Economic Characteristics, Household, Lapsation, Social Characteristics

## Introduction

Life insurance in India has a history of two decades. It had a pre-nationalisation phase, nationalisation phase and a liberalisation phase. Tremendous growth happened in the life insurance sector during the different phases, especially during liberalisation phase (P S Palande et al., 2003) (H Sadhak, 2009). However, lapsation of life insurance policies is a major problem faced by the Indian life insurance sector (R Nirmal, 2019). There may be different variables associated with lapsation of life policies. They include policy features, economic factors, marketing factors and household features. Economic factors include financial emergency, policy replacement and return from policy. (Martin Eling & Dieter Kiesenbauer, 2011) (Weiyu Kuo et al., 2003) (DT Russel et al., 2013) and (Shi-jie Jiang, 2010). Policy features include type of policy, mode of payment, time elapsed since purchase and type of intermediary. (R Kannan et al., 2008) (Robert Keng Heong Lian et al., 2004) Marketing factors include product specific factors and middlemen considerations. (A Verma, 2008) (D Chandrasekharan, 2008) (V Rajagopalan, 2008) Household features include demographic and socio-economic profile of the households. Though different studies established the relation between policy features, economic features and lapsation, only few studies include certain household features to establish relationship with lapsation. So, the present study examines the association between different socio-economic and demographic profile of the household and lapsation of life insurance policies.

This paper is organised as follows: Section 2 deals with review of recent literature, section 3 deals with data and methods, section 4 deals with results and discussion and section 5 deals with conclusion of the paper.

## Review of Literature

Literature related to lapsation can be divided into four. One group is related to financial or economic aspects of lapsation of life policies, second one

[1]Assistant Professor, Department of Commercial Practice, Government Polytechnic College Kottayam, Kerala. Pin-686013 Email: jino28arackal@gmail.com

is related to the policy features connected with lapsation, third one is marketing aspects related to lapsation and finally household characteristics. (Weiyu Kuo et al., 2003) found that unemployment and interest rate are the two variables associated with lapsation of life insurance policies. (Shi-jie Jiang, 2010) proposed two hypotheses for explaining surrender of life insurance policies i.e., interest rate hypothesis and emergency fund hypothesis. Interest rate hypothesis says that in times of higher interest rate, people surrender their insurance policies and invest that amount in higher earning securities. Emergency fund hypothesis says that in case of unemployment or in financial crisis people surrender their policies to meet the financial emergency. In addition to emergency fund and interest rate hypotheses, (DT Russel et al., 2013) also studied policy replacement hypothesis and found that it is also significant. (V Rajagopalan, 2008) identified the factors such as changes in tax laws, availability of alternative investment options leads to lapsation. (R Mallela et al., 2008) identified low return as one of the causes of lapsation.

Policy features establishes the relationship between different policy features such as age at entry, type of policy, mode of payment etc. with lapsation. (R Kannan et al., 2008) observed that age at entry, mode of premium payment, duration elapsed since policy inception, policy type, and type of under writing are found to be the most significant factors affecting lapse rate. (Robert Keng Heong Lian et al., 2004) found that mode of payment (Monthly or non-monthly), participating or not and size of the policy are significant in explaining lapsation.

Marketing aspects include product features and middlemen considerations. (D Chandrasekharan, 2008) identified agency termination and mis-selling lead to lapsation. (R Mallela et al., 2008) identified the causes of lapsation are product considerations, failure to pay premium, quality of service, promotion and servicing aspect. According to (V Rajagopalan, 2008) the problem of lapsation arises due to external and internal causes. The external factors are macro-economic factors, availability and emergence of alternative investment options and customer specific factors. Internal factors are product design and choice, distribution strategies, incentive framework, supervision and control. Verma (2008) suggested options available for industry to tackle lapsation. These include more robust sales process; focus on financial underwriting vs product size, flexible product, product switch, premium holidays, reduced coverage, broad based product strategy, increasing premium payment channels and increasing customer contractibility.

However, only limited studies connected the household features with lapsation of life insurance policies. For example (Manohar Giri & Devina Chatterjee, 2021) found that there is positive correlation between poverty and discontinuation of policy. Poor has double chance to discontinue their policies than other. (Manohar Giri & Devina Chatterjee, 2021) also found that family size and income had a negative association with discontinuation of life policies. The present study examines the association between household characteristics and lapsation of life insurance policies.

**Data and Methods**

The present study is based on primary data which was collected through household survey. Sample size for the study was calculated by using Cucharan formula (J E Bartlett et al., 2001). The result of the Chucaran formula gave a sample size of 384. Primary data were collected through multistage stratified sampling and interview schedule was used for data collection. At the first stage 4 districts, Kollam,Alappuzha,Thrissur and Kannur were randomly selected from Kerala. From each district, one urban area and one rural area were selected at random. From each urban area and rural area, one ward was selected at random. Then each ward was roughly divided into four quarters and thirteen households were selected from each quarter. Thus 52(13*4) households surveyed from one ward of each Panchayath (Rural) and Muncipality (Urban). Consequently 104 (52*4)) households were surveyed from each district. From four districts a total of (104*4) 419 households were surveyed. However, 15 interview schedules were cast off because of inadequate or poor response. Out of the remaining 401 households, 94 households never subscribed a policy and hence were excluded and thus final sample constitute only 307 households.

These households were visited by the researcher and data were collected through interview schedule. During the survey households were asked two questions, i.e,1. Whether they are covered by life insurance or not. 2. Whether they faced lapsation of life policies. From the response of the two questions, two categories were formed – those households who faced lapsation and those who are not faced lapsation. Their socio-economic and demographic

characteristics were also collected during the survey. Collected data were analysed through SPSS software and the tool used for analysis was Chi-square test.

## Results and Discussion

### Sample Characteristics

Age, number of dependents, religion and caste are the demographic characteristics of the households selected for the study. From the table 6.1, it can be seen that, the highest percentage of the head of the households belong to the age group 41-50 (35%) and lowest percentage in the age group above 60 (8%). Considering the age of spouse, highest percentage (37 %) of spouses are of in the age group of 36-45 and lowest percentage in the age group of above 55(6%), Regarding religious background of the people, majority of the households are Hindu (67%) followed by Christian households (23%) and Muslim households(10%). Another observation is that majority of the households belong to OBC category which is 56% . Regarding the number of dependents of the households, majority (50%) have two dependents.

Education of household head, education of spouse, occupation of household head, place of residence are the social characteristics selected for the study. Education wise analysis shows that the highest percentage of head of the households belong to Class X (35 %) and lowest category is those with

Diploma (8%) and PG degree(7%). While, considering the education of the spouse, highest percentage of spouses are degree holders, (29 %) and Diploma and PG holders are only 8% and 7% respectively. As far as occupation is concerned, (20%) are day labourers, followed by government and private employees, which constitute around 15% of the sample. Lowest percentage of head of the households are Agriculturist ( 4%). Regarding place of residence of the households, majority (52 %) o are residing in urban areas and (48%) of people are residing in rural area.

Economic status of household, income and occupational status of spouse are the economic characteristics selected for the study. Majority households are APL (Above Poverty Line) households (76%) and BPL(Below Poverty Line) households are 24%. Regarding income, highest percentage of households (38%) belongs to upper middle class. Lower middle class and upper class are 21% and 22% of the sample respectively. Regarding occupational

Table 4.1 Sample Characteristics of the Households

| Characteristics | n | % | Characteristics | n | % |
|---|---|---|---|---|---|
| **Age of the household Head** | | | **Education of Household Head** | | |
| Up to 40 | 81 | 26 | Below SSLC | 41 | 13 |
| 41-50 | 108 | 35 | SSLC | 106 | 35 |
| 51-60 | 96 | 31 | Plus Two | 60 | 20 |
| Above 60 | 22 | 8 | Diploma | 25 | 8 |
| **Total** | **307** | **100** | Degree | 53 | 17 |
| **Age of the Spouse** | | | P G | 22 | 7 |
| Up to 35 | 86 | 29 | **Total** | **307** | **100** |
| 36-45 | 108 | 37 | **Education of Spouse** | | |
| 46-55 | 82 | 28 | Below SSLC | 27 | 9 |
| Above 55 | 17 | 6 | SSLC | 83 | 28 |
| **Total** | **293** | **100** | Plus Two | 57 | 19 |
| **Religion** | | | Diploma | 11 | 4 |
| Christian | 70 | 23 | Degree | 92 | 31 |
| Hindu | 206 | 67 | P G | 23 | 8 |
| Muslim | 31 | 10 | **Total** | **293** | **100** |
| **Total** | **307** | **100** | **Occupation of the household head** | | |
| **Caste** | | | Govt. Employee | 45 | 15 |
| Forward Cast | 111 | 36 | Pvt Employee | 46 | 15 |

| | | | | | |
|---|---|---|---|---|---|
| OBC | 173 | 56 | Business | 38 | 12 |
| SC/ST | 23 | 7 | Agriculture | 13 | 4 |
| **Total** | **307** | **100** | Self employed | 42 | 14 |
| **No of Dependents** | | | Day Laborers | 60 | 20 |
| Nil | 8 | 3 | NRI | 37 | 12 |
| 1 | 36 | 12 | Others | 26 | 8 |
| 2 | 155 | 50 | **Total** | **307** | **100** |
| 3 | 75 | 24 | **Place of Residence** | | |
| Above 3 | 46 | 11 | Urban | 145 | 52 |
| **Total** | **307** | **100** | Rural | 162 | 48 |
| **Education of Household Head** | | | **Total** | **307** | **100** |
| Below SSLC | 41 | 13 | **Economic Status** | | |
| SSLC | 106 | 35 | APL | 236 | 76 |
| Plus Two | 60 | 20 | BPL | 71 | 24 |
| Diploma | 25 | 8 | **Total** | **307** | **100** |
| Degree | 53 | 17 | Below Rs.10,000 | 54 | 18 |
| P G | 22 | 7 | Rs.10,000-Rs. 25,000 | 114 | 38 |
| **Total** | **307** | **100** | Rs.25,000-Rs.50,000 | 69 | 21 |
| **Education of Spouse** | | | Above Rs. 50,000 | 70 | 22 |
| Below SSLC | 27 | 9 | **Total** | **307** | **100** |
| SSLC | 83 | 28 | **Employment Status of Spouse** | | |
| Plus Two | 57 | 19 | Employed | 78 | 27 |
| Diploma | 11 | 4 | Housewife | 215 | 73 |
| Degree | 92 | 31 | **Total** | **293** | **100** |
| P G | 23 | 8 | | | |
| **Total** | **293** | **100** | | | |

*Source: Primary Data*

status of spouse three fourth of the total spouses are housewives. (73%)

## Results

### Demographic Characteristics of the Household and Lapsation of Life Insurance Policies

Chi-square test confirmed that there is a significant association between age of the household head and status of lapsation. The value of Chi-square is 9.725, which is significant at the 5% level with 3 degrees of freedom. Thus, there is a difference in status of lapsation based on the age of the household head. Compared to households with age is less than 40, households with age more than 40, are less likely to face lapsaion. Analysis also revealed that households with age of the head of the household above 60 are more likely to face lapsation than households with age of the household head between 51-60. Households with head of the household as above 50 age are less likely to face lapsation than household with age category of 41-50. The effect size indicator Cramer's V showed a value of 0.178 with 3 degree of freedom indicates that there is a low association between age of the household head and status of lapsation.

With regard to the age of the spouse, majority of households in the age category of 36-45 and 46-55 were faced lapsation. However, only a smaller number of households in the age categories of up to 35 and above 55 are faced lapsation. Chi-square analysis revealed that this percentage is not significant. $\chi 2$, (2 d.f, N=314)=13.52,P>0.05.

Analysis also revealed that on the basis of number of dependents, lapsation happened in equal percentage on all categories. Chi-square analysis also indicated that there is no significant association between status of lapsation and number of dependents. $\chi 2$ , (2 d.f

Table.4.2 Demographic Characteristics of the Household and Faced Lapsation or not.

| Characteristics n | | Faced Lapsation | | Not Faced Lapsed | | Total | | Chi-square | DF | P value | Cramer's V |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | % | n | % | n | % | | | | | |
| Age of household head | Up to 40 | 29 | 35.8 | 52 | 64.2 | 81 | 100 | 9.725 | 3 | 0.021* | 0.178 |
| | 41-50 | 63 | 58.3 | 45 | 41.7 | 108 | 100 | | | | |
| | 51-60 | 46 | 47.9 | 50 | 52.1 | 96 | 100 | | | | |
| | Above 60 | 12 | 54.5 | 10 | 45.5 | 22 | 100 | | | | |
| Age of spouse | Up to 35 | 34 | 39.5 | 52 | 60.5 | 86 | 100 | 4.480 | 3 | 0.214 | 0.124 |
| | 36-45 | 59 | 54.6 | 49 | 45.4 | 108 | 100 | | | | |
| | 46-55 | 41 | 50.0 | 41 | 50.0 | 82 | 100 | | | | |
| | Above 55 | 8 | 47.1 | 9 | 52.9 | 17 | 100 | | | | |
| Number of dependents | Nil | 5 | 62.5 | 3 | 37.5 | 8 | 100 | 2.986 | 4 | 0.560 | 0.099 |
| | 1 | 19 | 52.8 | 17 | 47.2 | 36 | 100 | | | | |
| | 2 | 77 | 49.7 | 78 | 50.3 | 155 | 100 | | | | |
| | 3 | 31 | 41.3 | 44 | 58.7 | 75 | 100 | | | | |
| | Above 3 | 18 | 54.5 | 15 | 45.5 | 33 | 100 | | | | |
| Religion | Christian | 29 | 41.4 | 41 | 58.6 | 70 | 100 | 3.191 | 2 | 0.203 | 0.102 |
| | Hindu | 108 | 52.4 | 98 | 47.6 | 206 | 100 | | | | |
| | Muslim | 13 | 41.9 | 18 | 58.1 | 31 | 100 | | | | |
| Caste | Forward Caste | 40 | 36.0 | 71 | 64.0 | 111 | 100 | 13.437 | 2 | 0.001* | 0.208 |
| | OBC | 94 | 54.3 | 79 | 45.7 | 173 | 100 | | | | |
| | SC/ST | 16 | 69.6 | 7 | 30.4 | 23 | 100 | | | | |

*Source: Primary Data*
** Significant at 0.05 level*

,N=307)=4.480,P>0.05.

Analysis also showed that a smaller number of Christian and Muslim households faced lapsation but majority of Hindu households faced lapsation. However,Chi-square test revealed that there is no significant association between religion and status of lapsation. The value of chi-square is 3.191 which is not significant at 5% level with 2 degrees of freedom. Thus, there is no religion wise difference in status lapsation.

Chi-square analysis also revealed that there is significant association between caste and status of lapsation. Compared with forward caste households, OBC households are more likely face lapsation and less likely to persist. Compared with SC/ST households, OBC households are less likely to lapse and more likely to persist. $\chi 2$ , (2 d.f ,N=307)=13.437,P<0.05. The effect size indicator Cramer's V showed a value of 0.208 with 2 degrees of freedom, means that there is a low association between lapsation and caste of the household.

**Social Characteristics of the Household and Lapsation of Life Insurance Policies**

Table 4.3 shows that there is steady decrease in the number of households faced lapsation as the educational level increases. Chi-square analysis revealed that there is significant association between education of household head and status of lapsation. The value of chi-square is 14.940 which is significant at the 5% level with 5 degrees of freedom. Thus, there is a difference in the status of lapsation based on education of the household head. Majority and near majority of the households with education of the household head up to class XII education are likely to face lapsation than households with head of the household who has higher level of education. Crammers V showed a value of 0.221 indicates a low association between education of the household head and lapsation.

In the case of the education of spouse, it can be seen

**Table 4.3 Social Characteristics of the Household and Faced Lapsation or not.**

| Characteristics | n | Lapsed | | Not Lapsed | | Total | | Chi-square | D.f | P Value | Cramer's V |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | % | n | % | N | % | | | | | |
| Education of household head | Below SSLC | 26 | 63.4 | 15 | 36.6 | 41 | 100 | 14.94 | 5 | 0.011* | 0.221 |
| | SSLC | 57 | 53.8 | 49 | 46.2 | 106 | 100 | | | | |
| | Plus Two | 32 | 53.3 | 28 | 46.7 | 60 | 100 | | | | |
| | Diploma | 12 | 48 | 13 | 52 | 25 | 100 | | | | |
| | Degree | 16 | 30.2 | 37 | 69.8 | 53 | 100 | | | | |
| | P G | 7 | 31.8 | 15 | 68.2 | 22 | 100 | | | | |
| Education of Spouse | Below SSLC | 18 | 66.7 | 9 | 33.3 | 27 | 100 | 15.251 | 5 | 0.009* | 0.228 |
| | SSLC | 50 | 60.2 | 33 | 39.8 | 83 | 100 | | | | |
| | Plus Two | 27 | 47.4 | 30 | 52.6 | 57 | 100 | | | | |
| | Diploma | 5 | 45.5 | 6 | 54.5 | 11 | 100 | | | | |
| | Degree | 35 | 38 | 57 | 62 | 92 | 100 | | | | |
| | P G | 7 | 30.4 | 16 | 69.6 | 23 | 100 | | | | |
| Occupation of household head | Govt. Employee | 12 | 26.7 | 33 | 73.3 | 45 | 100 | 41.24 | 7 | 0.000* | 0.367 |
| | Private Employee | 13 | 28.3 | 13 | 71.7 | 46 | 100 | | | | |
| | Business | 11 | 28.9 | 11 | 71.1 | 38 | 100 | | | | |
| | Agriculture | 8 | 61.5 | 8 | 38.5 | 13 | 100 | | | | |
| | Self employed | 29 | 69 | 29 | 31 | 42 | 100 | | | | |
| | Day Labourers | 41 | 68.3 | 41 | 31.7 | 60 | 100 | | | | |
| | NRI | 21 | 56.8 | 21 | 43.2 | 37 | 100 | | | | |
| | Others | 15 | 57.1 | 15 | 42.3 | 26 | 100 | | | | |
| Place of residence | Urban | 62 | 42.8 | 83 | 57.2 | 145 | 100 | 4.094 | 1 | 0.043* | 0.115 |
| | Rural | 88 | 54.3 | 74 | 45.7 | 162 | 100 | | | | |

*Source : Primary Data*
** Significant at 0.05 level*

that there is a steady decrease in the percentage of households faced lapsation as the education level increases. Chi-square analysis revealed that there is significant association between education of spouse and status of lapsation. The value of chi-square is 15.251 which is significant at the 5% level with 5 degrees of freedom. Thus, there is a difference in status lapsation based on education of the spouse of the household head. Majority and near majority of the households with education of the household head up to class XII education are likely to face lapsation than households with head of the household has higher level of education. Crammers V shows a value of 0.228 indicates a low association between education of spouse and lapsation.

Table 4.3 clearly indicates that there is an association between occupation of household head and status of lapsation. Majority of agriculturist, self-employed and day labourers faced lapsation. However, only a smaller number of government employees, private employees and businessmen faced lapsation. The Chi-square test indicates that there is significant association between status of lapsation and occupation of the household head. The value of Chi-square is 41.240 which is significant at the 5% level with 7 degrees of freedom. Thus, there is a difference in facing lapsation based

on the occupation of the household head. Crammers V showed a value of 0.367 which indicates a moderate relationship between occupation of the household head and lapsation.

Table 4.3 also indicates that majority of the rural households faced lapsation; however, only a smaller number of households in urban area faced lapsation. Chi-square test revealed that there is significant association between place of residence and status of lapsation. The value of Chi-square is 4.094 which is significant at the 5% level with 1 degree of freedom. Thus, there is a difference in status of lapsation based on place of residence. Compared with households in urban areas, households in rural areas are more likely to face lapsation. The effect size indicator Crammer's V showed a figure of 0 .115 with 1 degree of freedom, indicates a low association between place of residence and status of lapsation.

**Economic Characteristics of the Household and Lapsation of Life Insurance Policies**

Table 4.4 shows that majority of the BPL households faced lapsation however, only lesser number of APL households faced lapsation. Chi-square test revealed that there is significant association between economic status of household and status of lapsation. The value of Chi-square is 6.677 which is significant at the 5% level with 1 degrees of freedom. Thus, there is a difference in status of lapsation based on economic status. Compared with APL households, BPL households are more likely to face Lapsation. Crammers V showed a value of 0.114 indicates a low association between economic status and lapsation.

Table 4.4 also shows that there is steady decrease in lapsation as the income level increases. Percentage of lapsation is highest at lower class households and lowest among upper class households. The Chi-square test indicated that lapsation of life policies with respect to income of the household is significant.

Hence, it can be inferred that there is steady decrease in occurrence of lapsation as the income level increases. Majority of the lower class and lower middle class are affected by lapsation.

However, the upper middle class and upper class are less likely to face lapsation than lower class and lower middle class. Effect size indicator Crammers V showed a value of 0.272 indicates a moderate association

Table 4.4. Economic Characteristics of the Household and Faced Lapsation or Not.

| Characteristics | N | Lapsed | | Not Lapsed | | Total | | Chi-square | Df | Cramer's V | P Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | % | n | % | n | % | | | | | |
| Economic status of household | APL | 105 | 44.5 | 131 | 55.5 | 236 | 100 | 6.677 | 1 | 0.144 | 0.01* |
| | BPL | 44 | 62 | 27 | 38 | 71 | 100 | | | | |
| Income | Below Rs.10000 | 35 | 64.8 | 19 | 35.2 | 54 | 100 | 21.352 | 3 | 0.272 | 0.00* |
| | Rs10000-Rs.25000 | 65 | 57 | 49 | 43 | 114 | 100 | | | | |
| | Rs.25000-Rs.50000 | 29 | 42 | 40 | 58 | 69 | 100 | | | | |
| | Above Rs. 50000 | 20 | 28.6 | 50 | 71.4 | 70 | 100 | | | | |
| Occupational status of spouse | Employed | 40 | 51.3 | 38 | 48.7 | 78 | 100 | 0.425 | 1 | 0.038 | 0.514 |
| | Housewife | 101 | 47 | 114 | 53 | 215 | 100 | | | | |

*Source: Primary data*
** Significant at 0.05 level*

between income level and lapsation.

Finally, Table.4.4 shows that majority of the working wife households faced lapsation. However only a smaller number of housewife households faced lapsation. Chi-square test revealed that there is no significant association between occupational status of spouse and lapsation.

**Discussion**

The present study found that there is an association between household characteristics and lapsation of life policies. The household characteristics are divided into three; demographic, social and economic characteristics. Study found that demographic characteristics such as age of the household head, and caste are significantly associated with lapsation. Study also found that all the social variables such as education of the household head and spouse, occupation of household head and place of residence are significantly associated with lapsation. Lapsation is higher among rural households, agriculturist, self-employed and day labourers. Economic characteristics such as economic status of household head (APL/ BPL) and income are significantly associated with lapsation.

The age of the head of the household shows a significant association between the lapsation of life policies. It can be seen that a lower percentage of lapsation is among younger households (age < 40) and as the age increases, there is an increase in the status of lapsation. The financial commitments and expenditure of a younger household is lower. As children grow, the family faces financial emergencies which lead to lapsation. But this finding is contradiction to the results of (Irina Gemmo & Martin Richard Goetz, 2019) . However, t age of spouse is a not a significant variable connected with lapsation. Results also revealed that there is no significant association between number of dependants and the status of lapsation. This is contradictory with the findings of (Manohar Giri & Devina Chatterjee, 2021). (Manohar Giri & Devina Chatterjee, 2021) found a negative and significant association between family size and lapsation. The study also found that there is significant association between caste of the household and lapsation. (Manohar Giri & Devina Chatterjee, 2021) found that households in higher socio-economic class have lower probability to discontinue the policies. This leads to the inference that policies acquired by OBC and SC/ST households have more chance to lapse than forward caste households. This may be due to lack of knowledge, lack of regular income, financial distress etc.

Among the social characteristics education, occupation and place of residence (Rural/ Urban) are the important variables associated with the lapsation of life insurance policies. Education of the household head and the spouse have a significant effect on lapsation. Households with the head of the household and the spouse with less educational qualification have higher chance of lapsation than households with the head of the household with higher level of education. In the same way the occupation of the household head is also significant in affecting lapsation. Households heads employed in organised sectors face lower chance to lapse compared to households where the head is employed in unorganised sectors like agriculture, self-employed, day labourer etc. This is due to their employment which is irregular or may be affected by seasonal change which leads to income shock. This income shock and irregular income leads to lapsation (Priya Basu,2005). Hence, occupation in unorganised sectors is more prone to lapsation than organised sectors. The locality of people is another important social factor determining lapsation. The study also found that a greater number of rural households faced lapsation than urban household. This is because of irregular and volatile income streams (Priya Basu, 2005), lack of time and lack of knowledge to monitor their policies. This results is also consistent with the findings of (Manohar Giri & Devina Chatterjee, 2021)

Regarding economic status of household, BPL households are more likely to face lapsation than APL households. This is also consistent with the findings of (Manohar Giri & Devina Chatterjee, 2021). (Manohar Giri & Devina Chatterjee, 2021) found that there is a positive association with poverty status and discontinuation of life insurance policies of the poor. Similarly, income is also significant variable associated with lapsation. As the income level increases it can be seen that there is a steady decrease in the percentage of lapsation. (Manohar Giri & Devina Chatterjee, 2021) also found that "log of income was negatively correlated with the probability of discontinuation". The occupational status of spouse is associated with lapsation as the liquidity shock faced by working wife family is less than housewife family. However, study results shows that occupational status of spouse is not significantly associated with lapsation.

## Conclusion

The study found that social, economic and demographic variables are associated with lapsation of life insurance policies. Hence, it is suggested that

efforts may be made to keep the policy alive among the households in the weaker sections of the society. There are social sector obligations regarding insurers for increasing penetration. However, there is no provision to conserve the policies which are already sold to these sections of the society. So, there is an urgent need to develop and introduce flexible products to cater the needs of the poor in the society. The economically and socially backward people have irregular and volatile income streams. Life insurers shall introduce products that are suitable to their customer's income stream so that they are able to pay their premiums in small amounts out of their meagre income.

This study is an attempt to establish a relationship between household demographic, social and economic characteristics and lapsation. This study can be replicated by introducing other household characteristics such as household assets, having bank account or not etc.

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# Corporate Social Responsibility in Public Sector Banks in Karnataka: A Mixed Method Study on Rural Socio-Economic Development

Purushothama G[1] | Dr. K. Karthikeyan[2]

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**Abstract**

This study critically examines the contribution of Corporate Social Responsibility (CSR) initiatives undertaken by Public Sector Banks (PSBs) in Karnataka towards rural socio-economic development. With Karnataka's rural population accounting for nearly 66.1% of its total population (Census 2011), CSR efforts by state-owned banks hold significant potential for addressing issues of educational backwardness, healthcare inequality, and economic vulnerability in rural areas. Between 2018 and 2023, CSR spending by major PSBs in Karnataka amounted to approximately `482.6 crore, with education (`148 crore), healthcare (`122 crore), and livelihood enhancement (`108 crore) receiving the lion's share of this investment (Department of Financial Services, 2023). While the allocation reflects a commitment to priority sectors, the study finds noticeable disparities in district-wise distribution. For instance, Tumkur and Belagavi districts received more than 20% of total CSR funds, whereas backward regions such as Chamarajanagar and Raichur were relatively underfunded. A mixed-method approach combining field-level beneficiary interviews and statistical analysis of CSR data reveals that while many projects led to tangible outcomes—such as improved school enrolment and primary health centre functionality—some lacked continuity and community involvement. The research further indicates that over 64% of rural respondents were unaware that the development activities they benefited from were bank-sponsored CSR projects, pointing to a communication and transparency gap. This study argues that while CSR by PSBs has certainly contributed to rural development in Karnataka, the approach needs to be more decentralised, participatory, and region-specific. With targeted planning, improved monitoring, and inclusive stakeholder engagement, the developmental impact of CSR in rural Karnataka can be amplified to ensure that no region is left behind..

**Keywords**

Corporate Social Responsibility, Public Sector Banks, Karnataka, Rural Development, Mixed Method, Socio-Economic Impact

## Introduction

Corporate Social Responsibility (CSR) in India has evolved from voluntary philanthropy to a structured, legally mandated framework under Section 135 of the Companies Act, 2013. This legislation positioned India as a global pioneer in making CSR spending compulsory for eligible firms. For Public Sector Banks (PSBs), CSR assumes a deeper significance—beyond statutory compliance—owing to their dual role as financial institutions and developmental agents. Historically, PSBs have advanced national objectives through financial inclusion, rural credit, and social banking, aligning them naturally with the ethos of equitable and inclusive growth.

In Karnataka, where over two-thirds (66%) of the population resides in rural areas (Census 2011), disparities between urban prosperity and rural deprivation remain acute. Northern and central districts such as Belagavi, Ballari, Tumkur, and Chamarajanagar continue to face persistent challenges in education, healthcare, sanitation, and livelihoods. In this context, CSR initiatives by PSBs possess transformative potential to address developmental bottlenecks, complement

[1]Research Scholar, Vivekananda College, Tiruvedakam West,Madurai, Tamil Nadu
(Assistant professor of Commerce, Government First Grade College Alur, Karnataka Contact No-9900420449)
[2]Associate Professor & amp; Head, Department of Commerce and Research Supervisor
Vivekananda College, Tiruvedakam West, Madurai, Tamil Nadu.

government welfare schemes, and promote social equity.

Between 2018 and 2023, PSBs in Karnataka—led by major institutions like the State Bank of India, Canara Bank, and Bank of Baroda—collectively spent around ù482.6 crore on CSR projects. A major portion of this investment targeted rural sectors: education (ù148 crore), healthcare (ù122 crore), and livelihood promotion (ù108 crore). These allocations suggest a strong policy alignment with grassroots development priorities. However, the impact, inclusivity, and sustainability of these interventions remain insufficiently examined in both academic and policy discourses.

This study, therefore, seeks to assess the scope and sectoral focus of CSR initiatives by PSBs in Karnataka, evaluate their socio-economic outcomes in rural communities, and identify regional disparities in deployment patterns. By integrating quantitative data analysis with qualitative field insights from the four representative districts, the study aims to generate a holistic understanding of how CSR interventions by PSBs contribute to rural transformation. The findings are further intended to inform policy-level recommendations for enhancing the effectiveness, equity, and accountability of CSR implementation in the public banking sector.

**Government Data and Statistical Context**

According to the Ministry of Corporate Affairs (MCA), India's total CSR expenditure reached `26,210 crore in FY 2022–23, positioning CSR as a significant driver of developmental financing. Karnataka ranked among the top five recipient states, attracting `1,794 crore in CSR funding during that year—reflecting both its industrial strength and the scale of its regional developmental needs.

Within this broader landscape, Public Sector Banks (PSBs) have emerged as pivotal contributors. As per data from the Department of Financial Services (DFS, 2023), PSBs in Karnataka spent approximately ù482.6 crore on CSR activities between 2018 and 2023, with nearly 58% of the total funds dedicated to rural development. This targeted approach illustrates the strategic orientation of PSB-led CSR towards addressing rural deprivation and strengthening local capacities.

1) A sectoral analysis of CSR expenditure by Public Sector Banks in Karnataka reveals a focused alignment with key developmental priorities. Education received ù148 crore, directed towards enhancing school infrastructure, promoting digital learning, and providing scholarships for underprivileged students.

2) Healthcare accounted for ù122 crore, supporting rural medical camps, mobile health services, maternal and child health programs, and upgrades to primary health centres.

3) Livelihood promotion attracted ù108 crore, focusing on vocational training, entrepreneurship development, and partnerships with NGOs to create sustainable income opportunities.

4) Women's empowerment received ù54 crore, aimed at strengthening Self-Help Groups (SHGs), conducting financial literacy training, and advancing gender equity initiatives.

While these allocations demonstrate PSBs' commitment to education, health, and livelihood enhancement, disparities persist across districts—both in fund utilization and impact. The uneven geographical distribution of CSR spending, coupled with variations in community participation and project sustainability, calls for a deeper evaluation of effectiveness.

Table.No.1
CSR Expenditure by PSBs in Karnataka (2018–2023)

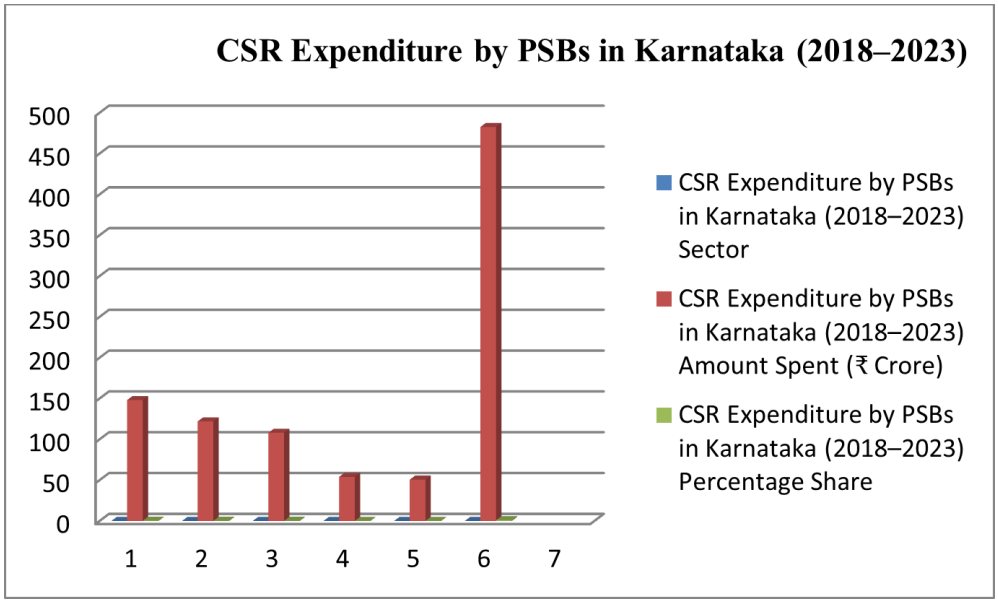
| Sector | Amount Spent (` Crore) | Percentage Share |
|---|---|---|
| Education | 148.0 | 30.6% |
| Healthcare | 122.0 | 25.3% |
| Livelihood | 108.0 | 22.4% |
| Women Empowerment | 54.0 | 11.2% |
| Financial Literacy | 50.6 | 10.5% |
| **Total** | **482.6** | **100%** |

***Source: Department of Financial Services, 2023***

**Literature Review:**

- **Davis, K. (1973). The Case For and Against Business Assumption of Social Responsibilities.** Keith Davis presents a balanced examination of whether businesses should take on social responsibilities beyond profit-making. He introduces the "iron law of responsibility," suggesting that unethical behaviour can lead to loss of legitimacy and influence. Davis argues that corporations must use their resources wisely to address gaps left by government and civil society. His reasoning

Chart.No.1




highlights CSR as both a moral and strategic necessity. For public sector banks in India, this dual responsibility—financial and social—is especially relevant. Davis's insights help position CSR as enlightened self-interest rather than mere philanthropy.

- **Carroll, A. B. (1999). Corporate Social Responsibility: Evolution of a Definitional Construct.** Carroll traces the historical development of CSR and introduces the influential four-part model encompassing economic, legal, ethical, and philanthropic responsibilities. He shows how corporate responsibility has expanded from profit-centred motives to stakeholder-oriented practices. The model serves as a foundation for analysing how companies integrate social obligations into governance. For Indian PSBs, it provides a framework to understand how legal mandates like Section 135 align with ethical and voluntary dimensions. Carroll's work remains a global benchmark for evaluating corporate social behaviour and accountability.
- **Blowfield, M., & Murray, A. (2008). Corporate Responsibility: A Critical Introduction.** Blowfield and Murray critically examine CSR within the broader global economic context, contrasting practices in developed and developing nations. They argue that in countries like India, CSR often addresses core developmental challenges such as poverty and inequality. Their analysis stresses the role of NGOs and community participation in ensuring effective implementation. They also caution against superficial, image-driven CSR efforts that lack long-term impact. For PSBs operating in Karnataka, their insights highlight the importance of locally grounded and participatory approaches. The work provides a strong theoretical lens for assessing CSR depth and authenticity.
- **Visser, W. (2011). The Age of Responsibility: CSR 2.0 and the New DNA of Business.** Wayne Visser proposes "CSR 2.0," a progressive model where social responsibility becomes central to business strategy rather than a peripheral activity. He calls for CSR that is innovative, transparent, and integrated into organisational culture. This approach encourages institutions to measure real impact instead of focusing on compliance or charity. For public sector banks, it offers a roadmap to connect CSR with sustainability and stakeholder trust. In Karnataka's rural context, Visser's ideas support shifting from token gestures to systemic development. His model redefines CSR as a driver of long-term transformation.
- **Baxi, C. V., & Ray, R. (2012). Corporate Social Responsibility: A Study of CSR Practices in Indian Industry.** Baxi and Ray provide an empirical overview of CSR adoption across Indian industries, including public enterprises. They note a shift from informal philanthropy to structured, thematic

interventions following the 2013 Companies Act. Their analysis emphasises how companies plan, manage, and evaluate CSR projects. For public sector banks, the study underscores the need for stronger local engagement and decentralised decision-making. The authors also identify challenges such as over-centralisation and inconsistent implementation across regions. Their work offers practical insights for improving CSR governance and accountability in Karnataka's PSBs.

- **Kumar, R. (2014). Strategies for Sustainable Banking: CSR in Indian PSBs.** Ravindra Kumar focuses on CSR in public sector banks through state-level case studies, including Karnataka. He identifies barriers such as bureaucratic delays, limited coordination, and weak monitoring that hinder effective CSR delivery. The book also showcases best practices linking CSR with financial inclusion and community partnerships. Kumar argues that banks should align CSR priorities with local development indicators rather than generic national goals. His findings support using banking infrastructure as a platform for social transformation. The study offers practical direction for strengthening CSR in rural banking operations.
- **Sharma, A. (2015). Corporate Social Responsibility and Development in India.** Anjali Sharma explores how CSR contributes to inclusive development, drawing from rural case studies across India. She emphasises that projects succeed when communities, NGOs, and panchayats actively participate in planning and execution. Her research criticises top-down approaches that prioritise visibility over genuine impact. For Karnataka, her arguments underline the importance of cultural sensitivity and participatory planning in CSR. Sharma advocates that PSBs evolve from donors to facilitators of local empowerment. Her conclusions inform this study's focus on community-based assessment and sustainability.
- **Chatterjee, B., & Mitra, N. (2017). CSR in India: A Study of Select Companies.** Chatterjee and Mitra analyse how Indian firms, including PSBs, adapted to the CSR mandate after 2013. They highlight uneven CSR distribution, with urban and industrial regions receiving more support than rural or backward districts. Their findings are particularly relevant to Karnataka, where disparities persist between developed and underdeveloped areas. The authors discuss governance structures, CSR foundations, and the use of third-party partners. They argue for more decentralised, locally informed CSR planning. This work underscores the need to align CSR investment with grassroots developmental priorities.
- **Sen, S. (2019). Corporate Social Responsibility and Rural Development: Case Studies from India.** S. Sen presents detailed case studies of CSR projects focused on rural sectors such as agriculture, health, and education. He highlights CSR as a complementary force to government programs and stresses localisation for sustainable outcomes. The book critiques the overemphasis on financial reporting rather than outcome-based evaluation. Sen advocates for community ownership and capacity-building as keys to long-term success. His approach is highly relevant for analysing PSB-led initiatives in Karnataka's rural districts. The work offers both conceptual depth and methodological inspiration for this study.
- **Khosla, R. (2021). Public Sector Banks and Rural India: The Development Nexus.** R. Khosla examines the historical and current contribution of public sector banks to rural development in India. He argues that PSBs, due to their reach and mandate, are uniquely positioned to drive inclusive growth through CSR. The book documents initiatives in Karnataka, including education, sanitation, and skill-building projects. Khosla critiques uniform policy models and calls for context-specific CSR designs. His emphasis on accountability and decentralised decision-making aligns with this research's objectives. The study provides a strong empirical base for assessing PSB-driven rural transformation.

**Objectives of the Study:**

- To assess the scope and sectoral focus of CSR initiatives by PSBs in Karnataka.
- To evaluate the socio-economic impact of these initiatives on rural communities.
- To identify regional disparities in CSR deployment and their causes.
- To propose policy-level interventions to improve CSR effectiveness in rural Karnataka.

**Methodology:**

This study adopts a mixed-method research design, combining both quantitative and qualitative approaches to comprehensively assess the role of Public Sector Banks' (PSBs) Corporate Social Responsibility (CSR) in rural socio-economic development across selected districts of Karnataka. The rationale behind employing a mixed-method strategy lies in its ability to balance the breadth of statistical analysis with the depth of contextual insights. While quantitative data allows for a macro-level evaluation of CSR expenditure patterns and regional allocations, qualitative fieldwork provides an in-depth understanding of how these initiatives are perceived and experienced by the beneficiaries on the ground.

**Quantitative Component**

The quantitative part of this study is based on reliable secondary data drawn from official and institutional sources. These include the Ministry of Corporate Affairs (MCA) for CSR expenditure disclosures under Section 135 of the Companies Act, 2013; the Department of Financial Services (DFS) for annual reports on CSR contributions made by public sector banks; the Reserve Bank of India (RBI) for publications on financial inclusion and rural outreach; and the National Bank for Agriculture and Rural Development (NABARD) for reports on rural development indices and cooperative linkages.

The analysis focuses on the period from 2018 to 2023 and examines the CSR spending patterns of major public sector banks operating in Karnataka, such as the State Bank of India, Canara Bank, Syndicate Bank (prior to its merger with Canara Bank), and Vijaya Bank (now merged with Bank of Baroda). From these sources, data were compiled on total CSR expenditure, sector-wise allocations (such as education, healthcare, women's empowerment, and livelihood promotion), and district-level distribution of funds.

This quantitative data helps identify key trends, disparities, and priorities in CSR deployment across Karnataka's districts. It allows an assessment of not only where the funds are being directed but also how evenly and strategically they are distributed to address the developmental needs of rural communities.

**Qualitative Component**

While statistical data offers a broad overview, understanding the actual impact of CSR initiatives requires insights from the people and institutions directly involved. To complement the numerical analysis, the study integrates a qualitative component through field-based interviews designed to capture local experiences, perceptions, and challenges.

A total of 40 rural beneficiaries were interviewed across four districts—Tumkur, Belagavi, Ballari, and Chamarajanagar—each representing a distinct social and economic context. The participants were selected for their direct involvement in CSR-supported activities such as school renovation projects, health camps, vocational training centres, and women's Self-Help Group (SHG) programmes. Their accounts provide a human perspective on how CSR projects influence education, healthcare access, livelihoods, and community well-being.

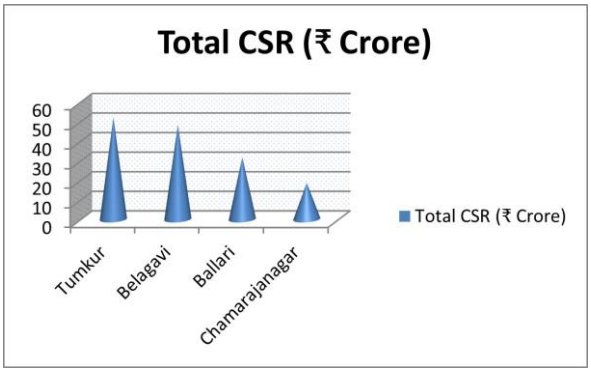
In addition to beneficiary interviews, 10 key informant discussions were held with CSR officers and regional managers from leading public sector banks, as well as with representatives from local NGOs and implementation partners. These interactions offered valuable insights into how CSR initiatives are planned, implemented, and monitored in practice. The discussions also helped identify common challenges, such as administrative delays, gaps in coordination between banks and partner agencies, and limited participation from local communities.

All interviews were recorded, transcribed, and analysed thematically using content analysis techniques. The qualitative findings helped highlight recurring patterns, success stories,

Table.No.2
Regional Disparity in CSR Allocation by PSBs in Karnataka (2018–2023)

| District | Total CSR (` Crore) | Primary Focus Areas |
|---|---|---|
| Tumkur | 52.1 | Education, SHG promotion |
| Belagavi | 48.3 | Health, Women Empowerment |
| Ballari | 31.7 | Livelihood, Healthcare |
| Chamarajanagar | 18.6 | Financial Literacy |

Chart.No.2

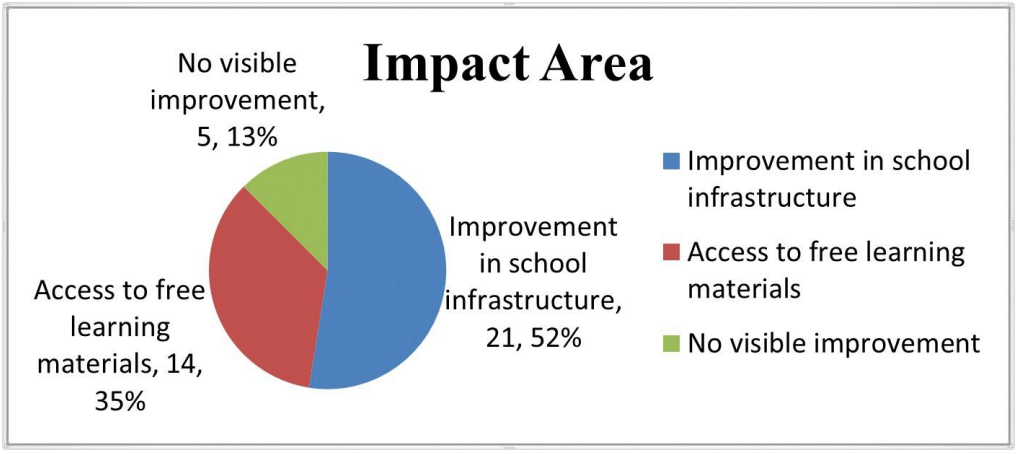



Tumkur and Belagavi received the highest CSR investments due to better infrastructure and existing partner NGOs. However, backward districts like Chamarajanagar lagged due to logistical and administrative challenges.

Table.No.3
Perceived Impact of CSR Programs on Education (n = 40)

| Impact Area | Number of Respondents (n) | Percentage (%) | Interpretation |
|---|---|---|---|
| Improvement in school infrastructure | 21 | 52.5% | Majority acknowledged enhanced learning environment due to renovated classrooms, toilets, and libraries funded by PSBs. |
| Access to free learning materials | 14 | 35.0% | Many reported receiving books, uniforms, and stationery, reducing family expenses on schooling. |
| No visible improvement | 5 | 12.5% | Some respondents, mostly in Chamarajanagar, claimed they saw no meaningful change due to poor project follow-up. |

Chart.No.3




Over half the respondents confirmed visible improvements in educational infrastructure due to CSR. However, a small but significant portion remained skeptical, highlighting regional inconsistencies in delivery and maintenance of CSR interventions.

Table.No. 4
Impact of CSR on Health and Nutrition Outcomes (n = 40)

| Type of Health Support Received | Number of Respondents (n) | Percentage (%) | Interpretation |
|---|---|---|---|
| Participation in free medical camps | 18 | 45.0% | Health camps organized under CSR schemes offered basic diagnosis and medication in rural areas. |
| Received nutrition kits/supplements | 12 | 30.0% | Particularly among women and children, nutrition interventions helped reduce anemia and malnutrition locally. |
| No access to health-related CSR | 10 | 25.0% | Some remote areas did not benefit from such initiatives due to logistical or administrative neglect. |

Nearly three-fourths of the respondents experienced some form of health-related support. Still, accessibility issues persist in backward districts, indicating the need for more inclusive targeting mechanisms by CSR planners in PSBs.

Table 5
Beneficiary Satisfaction with CSR Program Delivery (n = 40)

| Satisfaction Level | Number of Respondents (n) | Percentage (%) | Interpretation |
|---|---|---|---|
| Highly satisfied | 11 | 27.5% | Respondents cited timely delivery, follow-up, and helpful staff involvement. |
| Moderately satisfied | 18 | 45.0% | Most beneficiaries felt the projects were useful but lacked scale or long-term sustainability. |
| Dissatisfied | 11 | 27.5% | Complaints included irregular implementation, lack of transparency, and one-off support without continuity. |

While the majority of respondents expressed moderate satisfaction, concerns about project duration, lack of continued funding, and absence of beneficiary feedback mechanisms emerged as major constraints in realizing the full potential of CSR programs.

and areas that need improvement. Together, the quantitative and qualitative components provide a balanced understanding of how CSR initiatives by public sector banks operate and influence rural development outcomes in Karnataka.

**Recommendations:**

- **Decentralised CSR Planning: Integrating Branch-Level Perspectives:** One of the most critical measures to improve the impact and reach of CSR in rural Karnataka is the decentralisation of planning processes. Presently, many CSR projects are conceptualised and designed at the head office or zonal level, often without nuanced understanding of local socio-economic realities. It is therefore recommended that public sector banks formally incorporate inputs from branch-level staff, who are more familiar with ground-level challenges and community-specific needs. Local branch managers and staff, through their daily engagement with the community, can offer practical insights into priority areas such as school infrastructure, women's self-help groups, or drinking water scarcity. Involving them in project conceptualisation and selection will help ensure that CSR initiatives are more relevant, demand-driven, and aligned with the aspirations of the target population. Such participatory planning also enhances implementation efficiency, reduces duplication of existing schemes, and fosters a sense of ownership among beneficiaries.
- **State–Corporate Partnerships: Aligning CSR with Government Development**

**Goals:** To maximise developmental outcomes, stronger partnerships between public sector banks and state government agencies should be institutionalised. While banks independently undertake CSR in education, health, sanitation, and livelihood sectors, these often operate in silos and overlap with existing state-run welfare programmes. Collaborative efforts with departments like Rural Development, Women and Child Welfare, and Panchayat Raj institutions can help synchronise objectives, leverage government infrastructure, and avoid resource redundancy. Such alignment would also facilitate knowledge sharing, streamlined beneficiary targeting, and joint monitoring mechanisms. Public banks could co-finance certain rural schemes or offer supplementary services where state resources fall short. For instance, a CSR initiative could support digitisation of rural schools that are already covered under the government's midday meal scheme. These partnerships would not only enhance developmental impact but also build institutional trust and accountability.

- **Awareness Campaigns: Enhancing CSR Visibility and Community Participation:** The field findings revealed a widespread lack of awareness among rural beneficiaries regarding CSR and its role in community development. Many recipients of bank-sponsored programmes were unaware of the institutional backing behind the benefits they received. To address this gap, public sector banks must invest in sustained awareness campaigns in local languages through accessible mediums such as community radio, local panchayat meetings, wall posters, and street plays. These campaigns should focus on explaining what CSR is, how banks contribute to it, and how communities can engage with the process. They should also highlight successful local case studies to build trust and encourage participation. By demystifying CSR and making its benefits visible, these campaigns will help cultivate a more informed, involved, and appreciative beneficiary base. Community engagement in planning and feedback processes is also likely to improve once awareness increases.
- **Third-Party Evaluation: Ensuring Transparency and Measurable Impact:** The study found that many CSR projects lack robust monitoring, making it difficult to assess their effectiveness and sustainability. To address this, banks should introduce independent third-party evaluation mechanisms to audit CSR activities periodically. Such evaluations should go beyond financial compliance and assess outcomes in terms of social return on investment (SROI), community feedback, sustainability of interventions, and replicability of successful models. Engaging academic institutions, development consultancies, or reputed NGOs for this purpose would provide objective assessments and help identify gaps that internal reviews might overlook. Evaluation reports should be made publicly accessible to strengthen stakeholder trust and ensure transparency. Further, banks can use these evaluations to refine their CSR strategies annually, scale successful models, and disengage from projects that fail to deliver measurable impact.

Together, these recommendations aim to bridge the gap between policy and practice in CSR execution by public sector banks. Decentralised planning, collaborative governance, beneficiary sensitisation, and independent oversight together offer a roadmap for transforming CSR from a checklist activity into a catalyst for inclusive and sustainable rural development in Karnataka.

**Conclusion:**

This study set out to investigate the role of Public Sector Banks (PSBs) in Karnataka in fostering socio-economic development through Corporate Social Responsibility (CSR), with a particular focus on education and malnutrition alleviation in rural areas. The findings, derived from a combination of statistical data analysis and in-depth fieldwork across diverse districts, reveal a complex picture of promise, disparity, and potential for reform. CSR initiatives led by banks such as State Bank of India, Canara Bank, and Syndicate Bank have had measurable effects, particularly in sectors like primary education, digital literacy, and basic healthcare. In districts where CSR funds were well allocated, the results included improved school infrastructure, better nutrition outcomes among children, and enhanced access to health services. However, these benefits were not uniformly distributed across the state. Geographical imbalances, with southern districts receiving a disproportionate share of CSR investment, highlight the need for a more equitable approach to resource distribution.

Moreover, the research identified critical gaps in awareness, community involvement, and monitoring of CSR activities. Many beneficiaries were unaware of the origin or nature of the services they received, underscoring the absence of a participatory approach in CSR planning and implementation. Equally concerning was the lack of long-term oversight, which in some cases resulted in incomplete or poorly maintained facilities, reducing the overall effectiveness of the interventions. The qualitative interviews brought forth voices from the ground—villagers, students, health workers, and local bank officials—who collectively pointed toward a need for more contextual, locally driven CSR programming. These perspectives reinforce the importance of decentralised planning, meaningful partnerships with government agencies, and consistent community engagement.

In conclusion, while public sector banks in Karnataka have made noteworthy contributions to rural development through CSR, the impact remains uneven and sometimes short-lived due to systemic gaps in design, execution, and follow-up. Addressing these issues requires not just increased financial commitment, but also a strategic shift in how CSR is envisioned—as a collaborative, transparent, and accountable process grounded in local realities. By adopting a more integrated and responsive model, PSBs can play a transformative role in reducing rural inequalities and advancing the broader goals of social justice and inclusive growth in Karnataka.

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# Financial Wellbeing in the Digital Workplace: An Indian Knowledge Systems Perspective

K M Vineeth [1] | CR Shiju[2] | Mary Sruthy Melbin[2]

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**Abstract**

The increasing digitalization of the workplace has significantly influenced employees' financial behaviour, wellbeing, and overall performance. This study examines how Corporate Digital Wellbeing (DW) and Indian Knowledge Systems (IKS) interact to enhance Financial Wellbeing (FWB) among corporate employees. Drawing upon indigenous philosophical principles such as mindfulness, self-regulation, and ethical conduct, the paper positions IKS as a moderating cultural framework that nurtures balance between digital engagement and financial prudence. The study employs a quantitative descriptive design, collecting responses from 360 employees across key sectors including information technology, finance, consulting, manufacturing, and healthcare. Using Partial Least Squares Structural Equation Modelling (PLS-SEM), the research investigates the influence of IKS on digital wellbeing and the subsequent impact on financial wellbeing, job satisfaction, self-efficacy, and burnout. Findings reveal that IKS significantly enhances digital wellbeing, which in turn fosters financial wellbeing and positive psychological outcomes while mitigating burnout. The mediating role of digital wellbeing underscores its strategic importance in shaping financially and mentally resilient employees in the digital age. By integrating ancient wisdom with modern financial perspectives, this research contributes to the growing discourse on sustainable human capital and workplace finance. The study also offers managerial insights for developing organizational policies that promote both digital and financial balance, reinforcing the holistic spirit of accounting and wellbeing.

**Keywords**

Indian Knowledge Systems, Corporate Digital Wellbeing, Financial Wellbeing, Job Satisfaction, Burnout.

## Introduction

The digital workplace has become a double-edged sword. On the one hand, it enables unprecedented connectivity, efficiency, and flexibility; on the other, it fuels stress, distraction, and digital fatigue. The phenomenon of "always-on" culture has blurred the boundaries between professional and personal life, resulting in burnout, declining job satisfaction, and fragile employee engagement. While organizations worldwide are experimenting with digital detox programs and mindfulness apps, these approaches often emerge from Western-centric frameworks that emphasize technology management rather than holistic wellbeing.

In contrast, Indian Knowledge Systems (IKS) that is rooted in timeless philosophies of balance, discipline, and self-regulation could offer an indigenous, value-based perspective. Principles drawn from Yoga, Ayurveda, and classical Indian philosophy emphasize harmony between body, mind, and environment, making them highly relevant for addressing the psychosocial challenges of the digital era. Yet, despite their resonance with modern wellbeing needs, these frameworks remain largely absent in corporate digital wellbeing discourse.

## Problem Statement

The core challenge lies in the mismatch between the universal adoption of digital technologies and the lack of culturally contextualized strategies

[1]Associate Professor and Head, Post Graduate Department of Commerce, Government College Tripunithura, Kerala
https://orcid.org/0000-0001-5329-5963. vineeth@gcte.ac.in
[2]Assistant Professor, Post Graduate and Research Department of Commerce, St. Paul's College Kalamassery, Kerala
https://orcid.org/0009-0007-0771-3221. shiju@stpauls.ac.in
[3] Associate Professor, Post Graduate Department of Commerce, St. Teresa's College (Autonomous) Ernakulam, Kerala
https://orcid.org/0009-0002-9091-2988. sruthymelbin@gmail.com

to ensure employee wellbeing in digitally driven workplaces. Existing corporate initiatives often treat digital wellbeing as a technical or behavioral problem—focusing narrowly on screen time reduction, device-free hours, or app-based nudges—without embedding deeper cultural or value-oriented approaches. This gap has left organizations struggling to design interventions that are sustainable, authentic, and engaging for employees.

In this backdrop, the research problem/question addressed in this study is:

How can Indian Knowledge Systems (IKS) contribute to Corporate Digital Wellbeing, and through it, influence key workplace outcomes such as burnout, job satisfaction, financial wellbeing, and sustainable engagement?

**Review of Literature**

The rapid integration of digital technologies has transformed organizations into hyper-connected ecosystems. While technology enhancesproductivity, wellbeing and collaboration, it also contributes to digital overload, technostress, and information fatigue (Tarafdar et al., 2019). Studies highlight that the "always-on" culture creates an imbalance between work and personal life, leading to mental fatigue, stress, and reduced job satisfaction (Day et al., 2012; Mazmanian et al., 2013)few studies have examined the impact of ICT on their well-being, and there is a lack of validated measures designed to assess the ICT factors that may impact employee well-being. Therefore, we developed and validated a measure of ICT demands and supports. Using Exploratory Structural Equation Modeling, we found support for 8 ICT demands (i.e., availability, communication, ICT control, ICT hassles, employee monitoring, learning, response expectations, and workload Western research predominantly conceptualizes digital wellbeing in terms of Screen-time management (Przybylski & Weinstein, 2017) these potential deleterious influences have not been rigorously studied. Using a preregistered plan for analyzing data collected from a representative sample of English adolescents (n = 120,115, Mindfulness and digital detox strategies (Syvertsen & Enli, 2020), Organizational interventions like right-to-disconnect policies (Derks et al., 2014). While these approaches acknowledge the psychosocial consequences of digitalization, they are often reactive and fragmented, focusing on external behaviour modification rather than internal value alignment.

Digital wellbeing has strong implications for workplace outcomes. Excessive digital engagement is associated with burnout (Salanova et al., 2013), lower job satisfaction (Richardson et al., 2018), and declining employee engagement (Bakker & Demerouti, 2017). Conversely, balanced digital practices improve productivity, financial wellbeing and foster sustainable engagement (Sonnentag, 2018). Key outcome linkages include Burnout, where, Digital fatigue accelerates emotional exhaustion and depersonalization; Job Satisfaction, where, Healthy digital boundaries enhance job satisfaction by restoring work-life balance; Productivity and wellbeing, where, effective digital use fosters concentration and reduces distraction; and Sustainable Engagement, where, Digital wellbeing ensures long-term motivation and reduces attrition. These findings affirm the critical role of digital wellbeing in shaping organizational performance but also highlight that existing models are largely behavioural and tool-based, leaving little scope for cultural or philosophical depth.

IKS embodies a holistic understanding of life, emphasizing balance, self-discipline, and integration of body, mind, and spirit. Core principles relevant to digital wellbeing include, Yoga and Mindfulness, which, Encourage awareness, self-regulation, and detachment from compulsive behaviour; Ayurveda, which, Advocates balance between activity and rest, dietary discipline, and alignment with natural rhythms; Philosophical Traditions (Vedanta, Buddhism, Jainism, and so forth), which, Stress non-attachment, moderation, and conscious living; and Work-related Dharmic Values, which, Promote responsibility, ethical engagement, and inner harmony in professional life (Bharadwaj et al., 2015; KTM, 2025; Malik & Malik, 2021; Vineeth, 2025; Vineeth & Nambiar, 2025)organizational knowledge has been managed more informally than in formal ways. This was done through a knowledge supporting culture, by trusting and managing the employees. This was possible due to the small size of the organizations and co-location of employees. However, increasing global competition and growth of marketplaces have created a competitive incentive among many companies to consolidate and reconcile their knowledge assets as a means of creating value that is sustainable over time. In such a scenario, a need was felt to formally manage knowledge by developing capabilities.The objective

of this research article is to explore the knowledge management (KM. Unlike Western models, IKS provides a value-oriented and preventive approach rather than a purely corrective one. It does not treat digital excess merely as a behavioural flaw but as a misalignment of self-discipline and awareness.

Despite the rising discourse on corporate wellbeing, IKS remains underutilized in organizational studies of digital wellbeing. While Western scholarship has developed extensive literature on digital fatigue and coping strategies, culturally rooted approaches that integrate values, balance, and holistic perspectives are missing. The synergy between IKS and digital wellbeing has not been empirically tested in relation to workplace outcomes such as burnout, job satisfaction, financial wellbeing, and sustainable engagement.

**Research Hypotheses**

IKS with its traditions such as Yoga, Ayurveda, and classical ethical-philosophical teachings emphasize balance, self-regulation, and mindful living. These principles provide values and practices like mindfulness, rhythm and restraint that can be institutionalized to promote healthier relationships with digital technology in the workplace. Prior studies demonstrate that yoga and mindfulness-based interventions improve stress regulation and enhance overall wellbeing (Mehta & Sharma, 2020; Sengupta, 2012). Thus, IKS orientation is expected to positively influence corporate digital wellbeing.

*H1: Indian Knowledge Systems (IKS) positively influence Corporate Digital Wellbeing (DW).*

Digital wellbeing initiatives such as right-to-disconnect policies, digital mindfulness, and boundary management reduce the constant demands of an "always-on" culture (Derks et al., 2014). Excessive digital demands have been linked to emotional exhaustion and burnout (Tarafdar et al., 2019), while healthier digital practices reduce strain and prevent resource depletion (Salanova et al., 2013). Therefore, higher DW should reduce burnout.

*H2a: Corporate Digital Wellbeing (DW) negatively influences Burnout (BO).*

Restoring digital boundaries improves work–life balance, which has been positively associated with job satisfaction (Richardson et al., 2018). Studies show that wellbeing initiatives that minimize digital overload improve employees' positive evaluation of their jobs (Day et al., 2012). Thus, DW is expected to positively influence job satisfaction.

*H2b: Corporate Digital Wellbeing (DW) positively influences Job Satisfaction (JS).*

Employees with better digital balance and wellbeing demonstrate greater clarity in financial planning and decision-making (Garman & Forgue, 2011). When employees manage their digital wellbeing (reduced burnout, better focus), they tend to manage their finances more effectively (Netemeyer et al., 2018). Organizations that foster digital wellbeing are therefore more likely to see wellbeing and gains at large.

*H2c: Corporate Digital Wellbeing (DW) positively influences Financial Wellbeing (FWB).*

Sustainable engagement reflects enduring energy, motivation, and commitment to work (Bakker & Demerouti, 2017). By reducing technostress and supporting psychological recovery, DW enhances long-term engagement (Schaufeli & Taris, 2014). Thus, DW is expected to positively influence sustainable engagement.

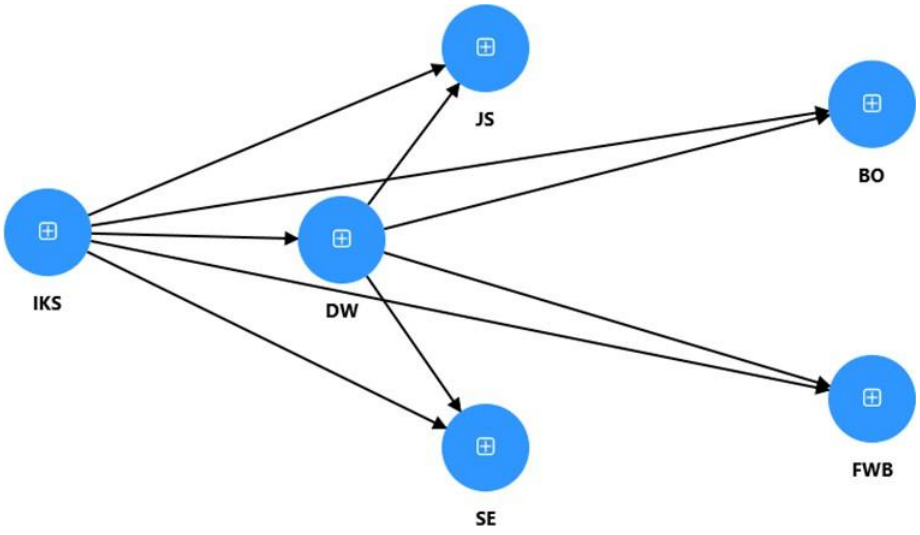
*H2d: Corporate Digital Wellbeing (DW) positively influences Sustainable Engagement (SE).*

IKS incorporates normative and behavioural prescriptions such as dharma (ethical duty), yoga (discipline), and samabhava (equanimity), which directly shape attitudes and workplace behaviours (Sode et al., 2024). Mindfulness and yoga-based workplace interventions have been shown to reduce stress and burnout (Kudesia, 2019), while improving satisfaction and performance. Hence, IKS orientation should directly lower burnout and increase job satisfaction, financial wellbeing, and sustainable engagement.

*H3a–H3d: IKS directly influences workplace outcomes*
*H3a: IKS negatively influences Burnout (BO).*
*H3b: IKS positively influences Job Satisfaction (JS).*
*H3c: IKS positively influences Financial Wellbeing (FWB).*
*H3d: IKS positively influences Sustainable Engagement (SE).*

IKS provides a value framework (balance, discipline, moderation) which is operationalized in organizations through digital wellbeing policies and practices. Literature on mediation in wellbeing research suggests that cultural/value antecedents influence outcomes through proximal mechanisms

Figure 1: Conceptual Model




like DW (Sonnentag, 2018; Tarafdar et al., 2019). Hence, DW is hypothesized to be the key mediating link between IKS and workplace outcomes.

*H4a–H4d: Corporate Digital Wellbeing (DW) mediates the influence of IKS on workplace outcomes.*
*H4a: DW mediates the influence of IKS on Burnout (negative effect).*
*H4b: DW mediates the influence of IKS on Job Satisfaction (positive effect).*
*H4c: DW mediates the influence of IKS on Financial Wellbeing (positive effect).*
*H4d: DW mediates the influence of IKS on Sustainable Engagement (positive effect).*

**Methodology**

This study adopts a descriptive and explanatory research design to examine the influence of Indian Knowledge Systems (IKS) on Corporate Digital Wellbeing (DW) and subsequent workplace outcomes such as Job satisfaction, Financial Wellbeing, and Burnout. A cross-sectional survey method was employed to collect primary data, enabling quantitative analysis of the hypothesized relationships. The study further utilizes Partial Least Squares Structural Equation Modelling (PLS-SEM) for hypothesis testing, as it is well-suited for complex models, theory development, and constructs measured through latent variables (Hair et al., 2019)yet concise, overview of the considerations and metrics required for partial least squares structural equation modeling (PLS-SEM.

The target population comprised corporate employees across diverse industries, representing IT, banking, education, healthcare, and manufacturing sectors. Respondents were chosen because of their active engagement with digital technologies in organizational settings and their exposure to workplace wellbeing challenges.

A purposive sampling technique was adopted to capture employees who regularly use digital platforms in their work. Data were collected through structured online questionnaires distributed via email, LinkedIn, and professional networks. A total of 360 valid responses were received, which exceeded the minimum sample size recommended by Hair et al. (2019) for PLS-SEM (10 times the maximum number of structural paths directed at any construct). This ensured adequate statistical power.

All constructs were measured using previously validated scales, with slight contextual adaptations for the Indian corporate setting. A five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) was used.

Indian Knowledge Systems (IKS): Adapted from (Kudesia, 2019; Malik & Malik, 2021)we lack clarity on three key questions: What is mindfulness? How does mindfulness training operate? And why might mindfulness matter for organizations? In this article I introduce a new conceptualization of mindfulness, which I call metacognitive practice. Metacognitive practice is so named because it blends insights from metacognition and practice theory to answer these three key questions. First, when seen as metacognitive practice, mindfulness is not a

single mode of information processing to be applied in all situations. Instead, it is a metacognitive process by which people adjust their mode of information processing to their current situation. Second, this metacognitive process is made possible by three specific beliefs that supersede lay beliefs about human information processing. A core function of mindfulness training, thus, is to provide a context that cultivates these beliefs. Third, when these beliefs are put into practice, people gain greater agency in how they respond to situations. This matters for organizations, because as people interrelate their individual actions into a collective response, metacognitive practice can get embedded in amplifying processes that transform the organization—or in fragmentation processes that threaten it. (PsycInfo Database Record (c, focusing on value orientation, holistic wellbeing, ethical conduct, and mindfulness practices in the workplace.

Corporate Digital Wellbeing (DW): Based on scales developed by (Almourad et al., 2021)compulsive, and hasty use of technology as an emerging form of problematic behavior affecting individuals' emotional, social, and occupational wellbeing. Smartphone overuse, in particular, has been linked to negative effects on users' quality of life, such as anxiety, depression, sleep disturbance and loss in productivity. One strategy to help regulate digital usage and, potentially, increase digital wellbeing is to devise smartphone applications to collect data about usage and increase users' awareness of it and enable them to set limits and alert users accordingly. However, such applications have not been extensively evaluated from the users' perspective and whether they help the basic requirements for digital wellbeing. In this paper, we examine the quality of the emerging family of digital wellbeing smartphone applications from the users' perspective and based on persuasive design and established behavioral change theories. We performed a thematic analysis on the users' reviews on two popular applications, SPACE Break Phone Addiction and Google Digital Wellbeing (GDW and extended to organizational contexts, including dimensions such as healthy digital habits, boundary management, reduced digital overload, and mindful technology use.

Job Satisfaction (JS): Measured using items adapted from (Spector, 1997) Thousand Oaks California 91320 United States", "ISBN" : "978-0-7619-8922-6","language":"en","note":"DOI: 10.4135/9781452231549","publisher":"SAGE Publications, Inc.","publisher-place":"2455 Teller Road, Thousand Oaks California 91320 United States","source":"DOI.org (Crossref.

Burnout (BO): Adapted from Maslach Burnout Inventory (Maslach & Jackson, 1981).

Financial Wellbeing (FWB): adapted from Kempson et al. (2017)this report offers a working definition and an a priori conceptual model of financial well-being and its possible determinants. Using survey data from Norway (2016 and Netemeyer et al. (2018).

**PLS SEM: Measurement Model**

Normality refers to whether the data approximate a multivariate normal distribution in terms of skewness and kurtosis (Kline, 2016)and he seamlessly integrates recent advances in structural equation modeling (SEM. When normality holds, maximum likelihood and other estimation techniques tend to produce unbiased and efficient results (Byrne, 2016)everyday language, the text is ideal for those with little to no exposure to either SEM or Amos. The author reviews SEM applications based on actual data taken from her own research. Each chapter \"walks\" readers through the steps involved (specification, estimation, evaluation, and post hoc modification. Although Partial Least Squares SEM (PLS-SEM), as used in this study, is considered a variance-based method that is robust to violations of normality (Hair et al., 2021), the assumption of normality is still desirable because it enhances the validity of inferential procedures and model testing. In the present study, descriptive statistics for skewness and kurtosis were examined and all values fell within acceptable ranges (±1.5), consistent with the guidelines of West et al. (1995) there has been growing interest in determining the robustness of structural equation modeling techniques to violations of scaling the normality assumptions and in developing alternative remedial strategies when these assumptions are seriously violated / these topics are the focus of the present chapter <br> overview of normal theory estimation / effects and detection of nonnormality / remedies for multivariate nonnormality (PsycINFO Database Record (c and Tabachnick & Fidell (2013). This indicates that the normality requirements are reasonably met, thereby supporting the suitability of the dataset for PLS-SEM analysis.

Cronbach Alpha of the study is above the threshold limit of 0.70. The factor loadings of the study is in the acceptable range. To report Convergent Validity, AVE scores were examined, the values are above 0.50. Fornell and Larcker and Henseler's method is employed to examine the Discriminant Validity. As per Fornell and Larcker, the square root of AVE scores is greater than the correlation coefficient between the constructs (Fornell & 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. To overcome these problems, a testing system was developed and applied based on measures of shared variance within the structural, measurement, and overall models. (36 ref. Following the Henseler method, the correlation coefficient is below the threshold limit of 0.85 (Henseler et al., 2015)such as partial least squares, the Fornell-Larcker criterion and the examination of cross-loadings are the dominant approaches for evaluating discriminant validity. By means of a simulation study, we show that these approaches do not reliably detect the lack of discriminant validity in common research situations. We therefore propose an alternative approach, based on the multitrait-multimethod matrix, to assess discriminant validity: the heterotrait-monotrait ratio of correlations. We demonstrate its superior performance by means of a Monte Carlo simulation study, in which we compare the new approach to the Fornell-Larcker criterion and the assessment of (partial. Based on the VIF (Variance Inflation Factor) statistics, it appears that multicollinearity is not a major concern for the model (Latan et al., 2023)which include partial least squares-path modeling (PLS-PM. Homoscedasticity examines the assumption of equality of variance. all the significant values obtained are above the threshold limit of 0.05, thus revealing the absence of homoscedasticity concerns in the construct (Loevinger, 1948).

Common Method Variance Bias is a prevailing methodological concern in organizational-behavioural research (Donaldson & Grant-Vallone, 2002)multitrait-multimethod dataset (n=408 ethnically diverse non-professional level employees. In most of the statistical modelling, it is assumed that, the data should be free from Common Method Variance Bias. It refers to the variance that arise due the method of measurement adopted in the study (Podsakoff et al., 2003), thus resulting to a biased, inflated or deflated inter-correlations between the constructs, subject to several factors (Williams & Brown, 1994). Here, Harman's Single Factor method was used to assess the Common Method Variance Bias. Under this method, all observed variables measuring the latent variables are loaded in to a single factor, and then performs un-rotated Exploratory Factor Analysis to identify the variance explained. If the percentage of total variance explained by the single factor is less than 50%, in can be inferred that, the data is free from Common Method Variance Bias (Podsakoff et al., 2003).

**Results**

The sample comprised 54.2% male (n = 195), 41.7% female (n = 150), and 4.2% identifying as other (n = 15). This indicates a fairly balanced representation of male and female employees, with a small but important inclusion of non-binary/other genders. Such diversity strengthens the inclusivity of the study and reflects the growing recognition of gender diversity in Indian corporate settings.

Respondents were drawn from five major sectors:

*Information Technology (IT)*: The largest group, representing 40% (n = 144) of the sample, which is consistent with the high digital adoption and relevance of digital wellbeing in IT workplaces.

*Finance*: The second-largest group, 20.3% (n = 73), highlighting the sector's digital intensity and exposure to technology-driven work environments.

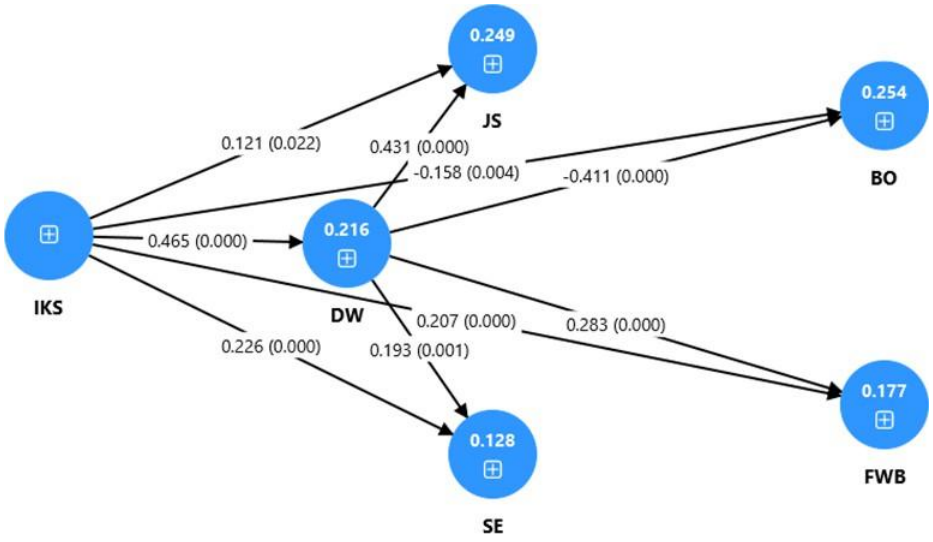
*Manufacturing*: 17.2% (n = 62), offering insights into a more traditional but increasingly digitized sector.

*Consulting*: 16.9% (n = 61), which often involves high digital communication and knowledge work, making it a relevant sector for the study.

*Healthcare*: 5.6% (n = 20), representing a smaller but crucial sector where digital wellbeing is emerging with the adoption of telemedicine and digital record systems.

Average age of the respondents was found to be 38. The sample profile shows a diverse representation across gender and sectors, with IT professionals forming the largest share due to their high digital

Figure 2: PLS SEM Structural Model




engagement. The inclusion of finance, consulting, manufacturing, and healthcare sectors ensures the generalizability of findings across different organizational contexts. The balanced gender distribution, coupled with sectoral diversity, enhances the robustness of the study and provides a comprehensive understanding of the influence of Indian Knowledge Systems on corporate digital wellbeing.

**PLS SEM: Structural Model**

The results of the structural model provide strong support for the proposed relationships among Indian Knowledge Systems (IKS), Corporate Digital Wellbeing (DW), and workplace outcomes such as burnout (BO), job satisfaction (JS), Financial Wellbeing (FWB), and sustainable engagement (SE).

Direct effects analysis revealed that Corporate Digital Wellbeing (DW) significantly reduced burnout ($\beta = -0.415$, $p < 0.001$) and enhanced job satisfaction ($\beta = 0.422$, $p < 0.001$), Financial Wellbeing ($\beta = 0.278$, $p < 0.001$), and sustainable engagement ($\beta = 0.195$, $p = 0.001$). These findings clearly indicate that when organizations provide a digitally supportive work environment that encourages balance, mindful technology use, and healthy digital practices, employees experience lower burnout and higher levels of satisfaction, financial wellbeing, and engagement.

Indian Knowledge Systems (IKS) orientation also showed significant direct effects on workplace outcomes. Specifically, IKS directly reduced burnout ($\beta = -0.155$, $p = 0.003$) and enhanced job satisfaction ($\beta = 0.145$, $p = 0.005$), financial wellbeing ($\beta = 0.223$, $p < 0.001$), and sustainable engagement ($\beta = 0.228$, $p < 0.001$). In addition, IKS strongly predicted the development of corporate digital wellbeing itself ($\beta = 0.450$, $p < 0.001$), highlighting that values rooted in IKS substantially contribute to building a healthier digital culture at work.

The indirect effect analysis demonstrated the mediating role of DW in the relationship between IKS and workplace outcomes. IKS significantly reduced burnout indirectly via DW ($\beta = -0.187$, $p < 0.001$) and improved job satisfaction ($\beta = 0.190$, $p < 0.001$), financial wellbeing ($\beta = 0.125$, $p < 0.001$), and sustainable engagement ($\beta = 0.088$, $p = 0.001$). Notably, the indirect effects of IKS on burnout and job satisfaction through DW were stronger than the respective direct effects, indicating that DW is a critical channel through which IKS values manifest in these outcomes. For financial wellbeing and engagement, both direct and indirect effects were significant, with direct effects remaining relatively stronger.

The total effects further reinforced the importance of IKS in shaping workplace outcomes. Overall, IKS reduced burnout ($\beta = -0.341$, $p < 0.001$) and improved job satisfaction ($\beta = 0.335$, $p < 0.001$), financial wellbeing ($\beta = 0.348$, $p < 0.001$), and sustainable engagement ($\beta = 0.315$, $p < 0.001$). These results suggest that IKS-driven values exert both direct and indirect influences, with digital wellbeing serving as an essential mediator that

amplifies these positive outcomes.

The findings highlight two important insights. First, corporate digital wellbeing is a central mechanism that translates IKS values into tangible employee outcomes, particularly in reducing burnout and enhancing job satisfaction. Second, IKS values play a dual role, exerting their influence both directly and indirectly, ensuring that employees experience a holistic improvement in satisfaction, financial wellbeing, and engagement. This provides strong empirical evidence that integrating IKS principles into corporate culture fosters sustainable digital wellbeing and better workplace outcomes.

## Discussion

This study demonstrates that Indian Knowledge Systems (IKS) offer valuable insights for addressing the contemporary challenge of digital wellbeing in organizations. The findings highlight Corporate Digital Wellbeing (DW) as a central mechanism through which IKS values exert their influence on workplace outcomes. By embedding principles of balance, mindfulness, moderation, and harmony drawn from IKS, organizations can effectively reduce burnout while enhancing job satisfaction, financial wellbeing, and sustainable engagement. Notably, the mediation analysis confirms that the impact of IKS on reducing burnout and improving job satisfaction operates more strongly through DW than through direct effects, underscoring the importance of cultivating a digitally mindful organizational culture.

These results extend the theoretical understanding of digital wellbeing by linking it to an indigenous value framework, thereby enriching global conversations that have largely been dominated by Western models of digital detox. For practitioners, the study provides actionable guidance: adopting IKS-driven interventions—such as mindful digital practices, structured work–tech routines, and policies emphasizing work–life harmony—can create resilient, engaged, and productive workplaces. In sum, integrating IKS with corporate digital wellbeing not only offers a culturally grounded approach but also contributes to sustainable employee wellbeing in the digital age.

## Implications of the Study

*Theoretical Implications*: This study advances theoretical understanding by establishing Corporate Digital Wellbeing (DW) as a mediating construct between Indian Knowledge Systems (IKS) and workplace outcomes. It demonstrates that ancient cultural values—such as balance, mindfulness, harmony, and moderation—can be empirically validated in the context of contemporary organizational challenges. The stronger indirect effects of IKS on burnout and job satisfaction highlight the importance of incorporating value-based frameworks into wellbeing theories. Furthermore, by extending digital wellbeing research beyond Western-centric models of digital detox, this study positions IKS as a globally relevant and culturally grounded framework for addressing digital-age workplace concerns.

*Methodological Implications*: From a methodological perspective, this study showcases the utility of PLS-SEM for simultaneously examining direct, indirect, and total effects. It demonstrates how mediation analysis provides richer insights into the mechanisms through which traditional values influence workplace outcomes. The research also highlights the feasibility of operationalizing IKS values as measurable constructs, opening avenues for future empirical studies. Researchers are encouraged to adopt cross-cultural comparisons to assess how indigenous knowledge systems from different traditions shape digital wellbeing. Longitudinal and experimental designs may further validate the causal relationships uncovered in this study.

*Practical and Managerial Implications*: The findings have strong managerial relevance. Organizations seeking to reduce burnout and enhance job satisfaction, financial wellbeing, and sustainable engagement should implement digital wellbeing initiatives inspired by IKS. HR practitioners can integrate practices such as yoga, meditation, mindful digital breaks, and balanced communication policies into workplace wellness programs. Leaders are encouraged to promote a culture that values digital harmony by discouraging after-hours digital overload and encouraging mindful use of technology. By embedding IKS values into corporate culture, firms can create resilient, satisfied, and sustainably engaged workforces, thereby enhancing long-term organizational performance.

*Policy and Societal Implications*: At the policy level, the study underscores the need to include digital wellbeing frameworks within national workplace health and safety guidelines. Policymakers can encourage organizations to report on digital wellbeing initiatives as part of ESG and

sustainability disclosures, strengthening corporate accountability. Societally, the results position IKS as a culturally resonant alternative to Western digital detox models, contributing to global debates on digital wellbeing. Educational institutions and training providers can integrate IKS-based digital mindfulness programs to prepare students and employees for healthier digital work practices. In this way, the study not only informs corporate policies but also strengthens India's role in shaping a globally relevant discourse on sustainable digital wellbeing.

## Limitations and Scope for Future Research

While the study provides valuable insights into the relationship between Indian Knowledge Systems (IKS), Corporate Digital Wellbeing (DW), and workplace outcomes including financial wellbeing, it is not free from limitations.

First, the study employed a cross-sectional design, which restricts the ability to draw definitive causal inferences. Although mediation analysis provided evidence of indirect effects, longitudinal or experimental studies would strengthen claims regarding causality.

Second, the data were collected through self-reported measures, which may be subject to biases such as social desirability or common method variance. Future research could incorporate multi-source data, such as supervisor assessments, performance records, or digital usage metrics, to validate the findings.

Third, the sample was context-specific and may not fully represent all sectors or cultural contexts. As IKS is deeply rooted in Indian cultural traditions, further research should explore the applicability and adaptability of the model in different cultural and organizational settings to enhance generalizability.

Fourth, while this study operationalized IKS values into measurable constructs, the richness of IKS as a philosophical and cultural framework cannot be fully captured quantitatively. Future research may adopt mixed-methods approaches—such as interviews, case studies, or ethnographic inquiry—to provide deeper insights into how IKS principles manifest in workplace practices.

Future studies should aim for longitudinal, cross-cultural, and multi-method research designs to advance understanding of how indigenous value systems can shape sustainable digital wellbeing and workplace outcomes in the digital era.

## Conflict of Interest

The author(s) declare that there is no conflict of interest regarding the publication of this paper.

## Ethical Considerations

Participation was voluntary, and informed consent was obtained from all respondents. Confidentiality and anonymity of responses were assured. The study adhered to ethical guidelines for research involving human participants, following the principles of APA (2017).

## Appendix

Table 1 Profile of the Sample

| Gender | Frequency | Percent |
|---|---|---|
| Female | 150 | 41.7 |
| Male | 195 | 54.2 |
| Other | 15 | 4.2 |
| Total | 360 | 100 |
| Sector | Frequency | Percent |
| Consulting | 61 | 16.9 |
| Finance | 73 | 20.3 |
| Healthcare | 20 | 5.6 |
| IT | 144 | 40 |
| Manufacturing | 62 | 17.2 |
| Total | 360 | 100 |

Source: Survey Data

Table 3 Discriminant Validity – HTMT Ratio

| Construct | BO | DW | IKS | JS | FWB | SE |
|---|---|---|---|---|---|---|
| BO | | | | | | |
| DW | 0.6343710 | | | | | |
| IKS | 0.4673680 | 0.5722976 | | | | |
| JS | 0.4574630 | 0.6023102 | 0.4315536 | | | |
| FWB | 0.3781106 | 0.4856232 | 0.4770348 | 0.2555594 | | |
| SE | 0.2525449 | 0.3575460 | 0.4041302 | 0.2549078 | 0.3232409 | |

Source: Computed from Survey Data (Ringle et al., 2025)

Table 4 Discriminant Validity – Fornell – Larcker Criterion

| Construct | BO | DW | IKS | JS | FWB | SE |
|---|---|---|---|---|---|---|
| BO | 0.791569 | | | | | |
| DW | -0.484296 | 0.713073 | | | | |
| IKS | -0.341291 | 0.450079 | 0.735340 | | | |
| JS | -0.337686 | 0.487447 | 0.334992 | 0.829726 | | |
| FWB | -0.269562 | 0.378480 | 0.348239 | 0.185571 | 0.803552 | |
| SE | -0.175832 | 0.297249 | 0.315416 | 0.202330 | 0.245101 | 0.794336 |

Source: Computed from Survey Data (Ringle et al., 2025)

Table 5 Collinearity Statistics

| Item | VIF | Item | VIF | Item | VIF |
|---|---|---|---|---|---|
| BO_1 | 1.47532 | DW_6 | 1.51209 | FWB_1 | 1.41573 |
| BO_2 | 1.24603 | IKS_1 | 1.45550 | FWB_2 | 1.49326 |
| BO_3 | 1.49794 | IKS_2 | 1.30109 | FWB_3 | 1.39563 |
| DW_1 | 1.52526 | IKS_3 | 1.35688 | SE_1 | 1.38747 |
| DW_2 | 1.54122 | IKS_4 | 1.35214 | SE_2 | 1.35666 |
| DW_3 | 1.50162 | JS_1 | 1.45058 | SE_3 | 1.53664 |
| DW_4 | 1.55755 | JS_2 | 1.72327 | | |
| DW_5 | 1.61617 | JS_3 | 1.73285 | | |

Source: Computed from Survey Data (Ringle et al., 2025)

Table 6 Path Coefficients

| Path Coefficients | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (\|O/STDEV\|) | P values |
|---|---|---|---|---|---|
| DW -> BO | -0.415 | -0.416 | 0.049 | 8.512 | 0.000 |
| DW -> JS | 0.422 | 0.424 | 0.048 | 8.845 | 0.000 |
| DW -> FWB | 0.278 | 0.279 | 0.055 | 5.073 | 0.000 |
| DW -> SE | 0.195 | 0.197 | 0.056 | 3.457 | 0.001 |
| IKS -> BO | -0.155 | -0.156 | 0.052 | 2.962 | 0.003 |
| IKS -> DW | 0.450 | 0.453 | 0.042 | 10.716 | 0.000 |
| IKS -> JS | 0.145 | 0.146 | 0.051 | 2.841 | 0.005 |
| IKS -> FWB | 0.223 | 0.225 | 0.053 | 4.179 | 0.000 |
| IKS -> SE | 0.228 | 0.231 | 0.060 | 3.790 | 0.000 |

Source: Computed from Survey Data (Ringle et al., 2025)

Table 7 Total Indirect Effects

| Total Indirect Effects | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (\|O/STDEV\|) | P values |
|---|---|---|---|---|---|
| IKS -> BO | -0.187 | -0.188 | 0.029 | 6.436 | 0.000 |
| IKS -> JS | 0.190 | 0.192 | 0.027 | 7.007 | 0.000 |
| IKS -> FWB | 0.125 | 0.126 | 0.027 | 4.569 | 0.000 |
| IKS -> SE | 0.088 | 0.089 | 0.025 | 3.474 | 0.001 |

Source: Computed from Survey Data (Ringle et al., 2025)

Table 8 Specific Indirect Effects

| Specific Indirect Effects | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (\|O/STDEV\|) | P values |
|---|---|---|---|---|---|
| IKS -> DW -> BO | -0.187 | -0.188 | 0.029 | 6.436 | 0.000 |
| IKS -> DW -> JS | 0.190 | 0.192 | 0.027 | 7.007 | 0.000 |
| IKS -> DW -> FWB | 0.125 | 0.126 | 0.027 | 4.569 | 0.000 |
| IKS -> DW -> SE | 0.088 | 0.089 | 0.025 | 3.474 | 0.001 |

Source: Computed from Survey Data (Ringle et al., 2025)

Table 9 Total Effects

| Total Effects | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (\|O/STDEV\|) | P values |
|---|---|---|---|---|---|
| DW -> BO | -0.415 | -0.416 | 0.049 | 8.512 | 0.000 |
| DW -> JS | 0.422 | 0.424 | 0.048 | 8.845 | 0.000 |
| DW -> FWB | 0.278 | 0.279 | 0.055 | 5.073 | 0.000 |
| DW -> SE | 0.195 | 0.197 | 0.056 | 3.457 | 0.001 |
| IKS -> BO | -0.341 | -0.345 | 0.045 | 7.525 | 0.000 |
| IKS -> DW | 0.450 | 0.453 | 0.042 | 10.716 | 0.000 |
| IKS -> JS | 0.335 | 0.338 | 0.047 | 7.119 | 0.000 |
| IKS -> FWB | 0.348 | 0.351 | 0.046 | 7.512 | 0.000 |
| IKS -> SE | 0.315 | 0.320 | 0.050 | 6.326 | 0.000 |

Source: Computed from Survey Data (Ringle et al., 2025)

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# The Role of Artificial Intelligence in Reshaping the Landscape of Digital Transformation with Special Reference to The Finance Sector

Dr. N. Sathiya [1]

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**Abstract**

The convergence of Artificial Intelligence (AI) and digital transformation marks a pivotal era in the evolution of businesses and organizations, particularly within the finance sector. This paper explores the intricate relationship between AI and digital transformation, spanning from foundational AI principles to real-world applications across industries, with a special emphasis on financial services. It examines the historical progression, key components, and the paradigm shift from rule-based systems to sophisticated machine learning models that are revolutionizing modern enterprises.

Building on this foundation, the study illuminates how AI acts as a catalyst for digital transformation, driving operational efficiency, innovation, and customer engagement. The finance sector exemplifies this transformation through AI-powered innovations such as algorithmic trading, credit scoring, fraud detection, and robo-advisory platforms. Real-world examples demonstrate how organizations can leverage AI to overcome challenges, manage risks, and unlock new growth opportunities.

A significant portion of the study focuses on AI's role in fostering a culture of innovation, enhancing customer experiences, enabling data-driven decision-making, and reshaping workforce dynamics. The paper also discusses ethical considerations, algorithmic biases, and evolving regulatory frameworks to ensure responsible AI adoption.

**Keywords**

Artificial Intelligence (AI), Digital Transformation, Finance, FinTech, Innovation, Customer Experience, Data Analytics, Ethical Considerations

## Introduction

The digital transformation era has redefined organizational strategies, operations, and customer engagement across all sectors. At its core lies **Artificial Intelligence (AI)**—a driving force enabling automation, predictive analytics, and intelligent decision-making. In finance, AI has catalyzed innovations in banking, investment, insurance, and regulatory compliance. From AI-driven fraud detection to algorithmic trading and customer personalization, the financial sector illustrates how digital transformation powered by AI can deliver greater efficiency, security, and inclusivity. AI's integration into digital ecosystems represents not merely a technological upgrade but a strategic evolution that transforms data into actionable intelligence. This paper explores how AI contributes to the broader landscape of digital transformation while focusing on its profound implications for financial institutions that must balance innovation with ethical and regulatory responsibilities.

As the digital landscape evolves, the workforce undergoes significant changes, driven by AI's automation capabilities. The section on streamlining operations explores how AI optimizes efficiency, reshapes job roles, and fosters collaborative intelligence in the workplace. The imperative for workforce up skilling and reskilling is underscored as organizations adapt to the AI-driven future of work. Challenges and considerations in AI-driven digital transformation are then dissected, ranging from ethical concerns to biases in algorithms and the evolving regulatory landscape. The article emphasizes the importance of navigating these

[1]Research Supervisor, Assistant Professor, Department of Commerce, Sona College of Arts and Science, Salem-5, sathiyasamrutha@gmail.com

challenges responsibly for a sustainable and equitable AI-driven digital transformation.

## Review of Literature

### Technological Foundations of AI

Researchers emphasize the technological underpinnings of AI—machine learning, natural language processing (NLP), computer vision, and deep learning—that form the foundation of digital transformation (Smith, 2019). In finance, these technologies underpin applications such as risk modeling, document automation, and intelligent fraud detection systems (Brown & White, 2019).

### AI and Business Innovation

AI acts as a catalyst for business innovation by enabling data-driven product and service development (Jones & Brown, 2020). Financial institutions leverage AI to streamline operations, predict market movements, and introduce novel services like robo-advisory and AI-assisted credit scoring (Johnson et al., 2021).

### AI-Driven Customer Experiences

AI has redefined customer interactions through chatbots, recommendation engines, and virtual assistants (Williams & Miller, 2022). In the finance sector, personalized banking, automated loan services, and predictive customer engagement strategies have improved service delivery and customer satisfaction (Baker, 2018).

### Data-Driven Decision-Making with AI

AI-driven analytics extract actionable insights from vast datasets (Brown & White, 2019). Financial organizations rely on predictive models for risk assessment, credit analysis, and fraud prevention (Davis, 2020). This enhances the accuracy and timeliness of financial decisions while ensuring regulatory compliance.

### AI and the Future of Work

AI reshapes the workforce by automating repetitive tasks and introducing new skill requirements (Miller, 2019). In finance, automation of reporting, auditing, and compliance processes enables professionals to focus on higher-value strategic activities, supported by AI-driven analytics (Smith et al., 2021).

### Challenges and Ethical Considerations

Researchers highlight concerns regarding algorithmic bias, transparency, data privacy, and socio-economic implications of AI (Brown, 2020). Ethical frameworks and regulatory measures are critical to ensure accountability in AI-driven decision-making (Taylor & Williams, 2019; Miller & Davis, 2016).

### Future Trends and Possibilities

The literature anticipates continued AI integration with emerging technologies like blockchain and IoT, driving innovation in sectors such as finance, healthcare, and manufacturing (White et al., 2021; Jones, 2022). In finance, the convergence of AI and blockchain promises enhanced security and transparency in transactions.

## Objectives of the study

1. To assess the impact of Artificial Intelligence on digital transformation across industries.
2. To understand AI adoption trends in the finance sector and analyze its effects on operations, innovation, and customer experience.
3. To identify challenges organizations face when integrating AI into financial transformation and propose practical, ethical, and sustainable solutions.

## Theoretical background of the study

### The Foundation of Change: Understanding the Basics of AI

AI encompasses a spectrum of technologies enabling machines to emulate human-like intelligence. Its evolution—from rule-based systems to neural networks and deep learning—has empowered industries to automate decision-making. In finance, AI technologies support credit scoring, fraud detection, and compliance automation, thereby improving operational resilience and accuracy.

### AI and the Digital Transformation Ecosystem

Digital transformation integrates digital technologies across business functions, altering organizational structures and customer interactions. AI strengthens this ecosystem by enabling automation, personalization, and data-driven insights. Financial institutions utilize AI for anti-money laundering (AML), market trend analysis, and automated investment management, demonstrating AI's symbiotic relationship with digital transformation.

### Catalyzing Innovation: AI's Impact on Business and Financial Strategies

Innovation lies at the heart of digital transformation.

AI propels innovation by optimizing existing processes and enabling the creation of new business models. In finance, AI enables predictive analytics for investment forecasting, AI-powered trading systems, and smart contract automation in blockchain-based finance.

**Reshaping Customer Experiences with AI**

AI revolutionizes customer experience through hyper-personalization. In digital banking, AI chatbots and virtual financial assistants provide real-time support, while recommendation algorithms tailor financial products to individual user profiles, fostering loyalty and engagement (Williams & Miller, 2022).

**Data as the Lifeblood: AI's Role in Data-Driven Decision-Making**

Data is central to digital transformation, and AI serves as the engine that turns raw data into actionable insights. In finance, AI models analyze large datasets to identify fraud, predict credit defaults, and optimize portfolio management. However, challenges such as data bias, privacy, and governance persist (Brown & White, 2019).

**Streamlining Operations: AI and the Future of Work**

AI enhances efficiency by automating tasks such as transaction processing, risk evaluation, and regulatory reporting. While automation replaces some routine roles, it creates opportunities for collaborative intelligence where humans and AI systems work together to achieve superior outcomes (Taylor, 2018). Continuous workforce reskilling is vital to align with this transformation.

**Challenges and Considerations in AI-Driven Digital and Financial Transformation**

The adoption of AI is accompanied by ethical, legal, and regulatory challenges. Financial institutions face issues related to algorithmic transparency, data security, and potential biases in credit assessment models. Establishing ethical guidelines and responsible AI frameworks ensures equitable digital transformation across industries.

## Conclusion

The intertwining narratives of Artificial Intelligence and digital transformation reveal a future defined by continuous innovation and adaptation. AI has evolved from a technological tool to a strategic enabler of organizational transformation, driving growth across sectors—most notably in finance. It enhances operational efficiency, fosters innovation, and transforms customer experiences while enabling smarter, data-driven decisions.

In finance, AI's transformative power manifests through predictive analytics, risk management, fraud detection, and personalized banking. Yet, as opportunities expand, so do challenges—ethical dilemmas, data biases, and regulatory complexities demand careful governance. The path forward lies in balancing innovation with accountability.

The fusion of AI with emerging technologies like blockchain, quantum computing, and IoT will further redefine digital transformation, particularly in financial systems. The future belongs to organizations that harness AI responsibly, combining human creativity and machine intelligence to shape a transparent, efficient, and equitable digital economy.

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# Strategic CSR and Funding: Insights from Indian Textile Companies

Dr. Navjot Kaur[1] | Prabhjot Kaur[2]

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**Abstract**

This study investigates the impact of Corporate Social Responsibility (CSR) expenditure on the export performance of Indian textile companies, listed on the Bombay Stock Exchange, during the period 2014 to 2024. The study is based on secondary data gathered from the annual reports of selected Indian textile companies which has further been analysed using correlation and regression analysis. The research reveals a significant positive relationship between CSR spending and export ratio. The correlation analysis showed an overall positive trend. Regression analysis indicated that CSR expenditure, along with total debt to equity, and company size, positively and significantly influenced export performance. The findings support the Stakeholder Theory, suggesting that CSR engagement enhances stakeholder relationships and global competitiveness, thereby facilitating internationalization. The study contributes to the literature by empirically linking CSR to export performance in the Indian manufacturing sector, offering managerial insights into strategically leveraging CSR initiatives to enhance global market positioning and achieve sustainable international growth.

**Keywords**

Corporate Social Responsibility, Internationalization, Export Performance, Indian Textile Industry, Foreign Sales Ratio, Firm Competitiveness.

## Introduction

In today's highly competitive global landscape, corporations strive to position themselves as socially responsible entities. Engaging in Corporate Social Responsibility (CSR) initiatives has become a strategic approach to gaining competitive advantages in both domestic and international markets. While CSR practices were traditionally voluntary, recent years have witnessed significant regulatory changes mandating corporate participation in social initiatives. These regulatory frameworks, particularly for multinational corporations, have necessitated an active role in social development. Historically, businesses often perceived CSR as a financial burden; however, the increasing need to expand and operate globally has reinforced the importance of social responsibility. Empirical evidence suggests that CSR investments contribute to strengthening relationships with stakeholders, locally and internationally, thereby enhancing a firm's competitive position (Diez et al., 2018).

With the implementation of mandatory CSR reporting requirements and the associated benefits for corporations, CSR disclosure has become an integral component of corporate annual reports. Research by KPMG (2003) revealed that 51 percent of companies included information on CSR and sustainability practices in their annual reports, highlighting the growing significance of transparent CSR communication in corporate governance.

In recent years, the on-going globalization of corporations has led to significant growth in international trade, financial transactions, and cross-border ownership of assets and labour (Tengblad & Ohlsson, 2010). Consequently, the role of corporate social responsibility (CSR) in a globalized economy has become increasingly relevant, as the CSR initiatives of multinational companies are both influenced by and exert influence on critical factors such as social and political structures, corporate culture, and stakeholder expectations. While extensive research has examined the relationship

[1]Assistant Professor, University College Chunni Kalan, dr.navjotkaur2004@gmail.com
[2] Research Scholar, Department of Commerce, Punjabi University, Patiala, prabh17904@gmail.com

between CSR practices and corporate financial performance, findings suggest a bidirectional relationship—where strong financial resources enable greater CSR engagement, and in turn, CSR initiatives contribute to improved financial performance (Kanwal et al., 2013). However, there remains a gap in the literature concerning the role of CSR in corporate internationalization. Limited studies have explored how CSR practices contribute to building a firm's global reputation and how expanding global opportunities encourage corporations to adopt a strategic approach to CSR, positioning themselves as socially responsible entities in the international market.

**Manufacturing Sector and CSR Activities**

In 2021, India's manufacturing sector contributed approximately USD 397.14 billion to the Gross Value Added (GVA). By 2023-24, the sector's GVA increased to USD 887.4 billion, accounting for 27.62 percent of India's total GVA. Projections indicate that by 2032, the manufacturing sector's contribution to GVA is expected to rise from the current 14 percent (USD 459 billion) to 21 percent (USD 1,557 billion). This growth underscores the sector's expanding significance in India's economy (Statistics Times, The Economic Times, Elets eGov, FICCI).

India's manufacturing sector encompasses several key industries, notably textiles, leather, and electronics. The textile and apparel industry, in particular, holds a significant position both domestically and internationally. In the fiscal year 2023-24, India's textile and apparel exports amounted to USD 34.4 billion, reflecting a 3 percent decline from the previous year. Despite this downturn, the sector's domestic market has shown resilience. Projections indicate that the Indian textile and apparel market is expected to grow at a compound annual growth rate (CAGR) of 11.98 percent from 2025 to 2033, reaching approximately USD 646.96 billion by 2033. This growth is driven by factors such as rising disposable incomes, evolving fashion trends, and the expansion of online retail platforms (textileexcellence.com, IMARC, gartexindia.com). India's share in the global textile and apparel trade stands at 3.9 percent, with major export destinations including the United States and the European Union, collectively accounting for approximately 47 percent of total exports. The sector also plays a crucial role in employment, providing jobs to over 45 million people (The Economic Times, Invest India)

Given these dynamics, it is essential to understand how corporate social responsibility (CSR) expenditures influence the export performance of Indian textile companies. This study aims to examine the impact of CSR initiatives on enhancing the global competitiveness of these firms, thereby contributing to their international business growth.

**Review of Literature**

***Corporate Social Responsibility (CSR)***

The concept of Corporate Social Responsibility (CSR) has been studied for a long time, yet experts still can't agree on its exact meaning, components, and guiding principles (Crane et al., 2008). Over the years, many researchers, professionals, and scholars have tried to define CSR in their own way. Carroll (1999) explained CSR as the responsibility of businesses to meet society's expectations in four areas: economic, legal, ethical, and voluntary actions, based on what society demands at a particular time.

Carroll believed that CSR has evolved from a simple idea into a much broader and more complicated concept. He noted that it's now harder to define because it involves both the company's decision-making process and what society expects from the business. To break it down, Carroll introduced a four-part CSR pyramid (as shown in Figure 1), which includes economic, legal, ethical, and charitable responsibilities (Carroll, 1991). Meanwhile, Sharma (2009) pointed out that in India, CSR has grown over time, shaped by ideas of charity and laws. The shift from a charity-focused approach to one that considers multiple stakeholders, along with a strategic perspective on CSR, shows a promising future for CSR in India.

Mitra et al. (2018) emphasized that there have been several rules and regulations introduced over time to guide CSR practices. The government has made laws to ensure companies contribute to social good. For example, under Section 135 of the Companies Act, 2013, companies in India with a net worth of INR 500 crore or more, a turnover of INR 1000 crore or more, or a net profit of INR 5 crore or more must spend at least 2 percent of their average net profit from the past three years on CSR activities. The specific areas where this money should be spent are listed in Schedule VII of the Companies Act, 2013.

Figure 1: Carroll's Pyramid Model of Corporate Social Responsibility (Carroll, 1991)


***Internationalization***

Internationalization is described as a gradual process where companies set up the necessary conditions to operate globally and grow into international markets. Diez et al. (2018) explained that internationalization strategies allow businesses to sell their products in new countries and regions. Companies use various methods to expand internationally, such as improving their business skills or building their brand (Parthasarathy et al., 2010). Carpano et al. (1994) noted that as competition grows, companies work harder to gain a bigger share of both local and global markets. They adopt different international strategies based on the regions they target and the specific customer groups they focus on.

Gaur and Kumar (2010) reviewed studies on how companies from emerging markets internationalize and found that their strategies differ from those of companies in developed countries. Over time, the industries and entry methods used by Indian companies in global markets have also evolved. Additionally, Indian entrepreneurs' ability to manage large operations across diverse regions in India, along with their smart engineering skills, has given them an edge in competing internationally and gaining market acceptance (Kumar, 2008). Studies also show that big multinational companies, due to their global operations and resources, tend to invest more in CSR activities.

According to Stakeholder Theory, past research suggests that CSR practices help companies present themselves as socially and environmentally responsible to their customers, suppliers, and other partners, which boosts their market competitiveness (Freeman, 1984; Galbreath & Shum, 2012; Laplume et al., 2008; Peloza & Shang, 2011; Turker, 2009). In the global business world, this is especially important because being seen as a responsible company that works well with its stakeholders can earn a "social license" to operate in certain markets, making them more appealing than companies that don't focus on CSR (Khojastehpour & Saleh, 2019; Laplume et al., 2008). This makes CSR increasingly vital for companies that export, as it can improve their export performance (EXP), which measures how well a company meets its financial goals (like profits and sales) and strategic goals (like market growth) when selling products abroad (Cavusgil & Zou, 1994).

So far, researchers haven't explored this topic much. Stakeholder Theory suggests that CSR generally improves company performance (Laplume et al., 2008; Peloza & Shang, 2011), but its link to export performance hasn't been studied enough (Kim, 2016; Xu et al., 2018). Moreover, earlier studies on this topic in other industries have shown mixed results. For instance, Boehe and Barin Cruz (2010) found that using CSR to make products stand out improved export performance, while Costa et al. (2015) and Kim (2016) discovered a negative connection. These conflicting findings indicate a need to better understand how CSR practices lead to better export performance (Costa et al., 2015; Xu et al., 2018). Norheim-Hansen (2015) specifically

looked into the factors connecting CSR practices to improved export performance.

This study takes a closer look at the relationship between CSR and export performance. Given the rising importance of the manufacturing sector in India's economy, this research focuses on how CSR efforts by Indian manufacturing companies affect their export performance.

**Research objectives**

The primary goal of this paper is to examine how CSR practices affect the export performance of sampled Indian textile companies.

**Research Methodology**

***Scope of the Study***

This research focuses on textile companies that are listed on the Bombay Stock Exchange. The initial list of 78 textile companies listed on the Bombay Stock Exchange was adjusted by removing companies that lacked data on exports or CSR spending during the study period. As a result, 12 Indian textile companies, which have been investing in CSR activities since 2014 and are involved in exports, were selected for the study. The period selected for this paper is from 2014 to 2024. This research relies on secondary data gathered from the annual reports of the chosen companies, specifically focusing on their CSR spending and export activities.

***Research Hypothesis***

**$H_0$:** CSR expenditure of the selected companies has no significant impact on the export performance of companies.

***Variables used in the Study***

- **Export ratio:** In the present study, the extent of internationalization has been measured using the export ratio, calculated as the proportion of export sales to total sales (Cavusgil & Zou, 1994; Lu & Beamish, 2001; Zahra & Garvis, 2000). This performance-based indicator has been widely used in international business literature as a reliable proxy to capture a firm's global market engagement and export success.
- **CSR Expenditure of Companies:** In this paper, the total amount spent by companies on CSR activities listed in Schedule VII of the Companies Act, 2013 has been used as a proxy for measuring CSR in Indian textile industry (Chatterjee & Das, 2020; Gupta & Sharma, 2021; Kumar & Singh, 2022; Bhatia & Makkar, 2023). This spending is required under Section 135 of the Companies Act, 2013. The information on CSR expenditure is collected from the annual reports and websites of the companies involved.
- **Control variables:** In this study, control variables have been introduced in the regression model to account for firm-specific factors that could independently influence export performance, thereby isolating the true effect of CSR expenditure. The inclusion of these variables ensures robustness and helps reduce omitted variable bias, which can distort the relationship between CSR spending and export performance. Control variables were selected based on their relevance in existing literature and their potential impact on firm-level internationalization outcomes. The following control variables have been considered in the study:
  1. ***Total Debt to Equity Ratio:*** This variable represents a firm's capital structure and financial risk profile. Highly leveraged firms may face constraints in financing export-related activities or CSR projects. Firms with stable financial positions are more likely to invest in long-term strategic initiatives such as CSR and export development. Gaur and Kumar (2010) emphasized that leverage levels affect internationalization strategies, particularly for firms in emerging markets.
  2. ***Inventory Turnover Ratio:*** This is a critical measure of operational efficiency and supply chain performance. A higher inventory turnover indicates faster conversion of inventory into sales, which is particularly important for firms engaged in export operations that require timely fulfilment and quality assurance. Efficient inventory management enables responsiveness to global market demands. Studies such as Chong et al. (2001) and Chen et al. (2007) found that inventory efficiency is positively associated with firm competitiveness and financial performance, which can in turn affect export readiness.
  3. ***Size of Company:*** Larger firms usually have greater access to financial, managerial, and technological resources, making them more capable of undertaking both CSR initiatives and international operations. Size

is also associated with reputational capital, which influences how firms are perceived in global markets. Prior research (Attig et al., 2016) confirms that firm size significantly affects the extent of CSR engagement and internationalization outcomes.

4. ***Growth Opportunities:*** Firms experiencing rapid growth may view CSR as a means to build goodwill and trust among international stakeholders. Simultaneously, growth reflects the firm's dynamic capabilities and competitiveness in seizing export opportunities. Studies such as Geroski and Machin (1992) and Barney (1991) have shown that firms with high growth rates are more inclined to engage in strategic investment, including CSR and global expansion, due to their forward-looking orientation and resource availability.

***Regression Model***

Export Performance = $\alpha$ + CSR Expenditure + Total Debt to Equity + Inventory Turnover Ratio + Size + Growth + $\varepsilon$

***Where:***

| | | |
|---|---|---|
| ***Export Performance*** | ***:*** | Export/ Total Sale of Selected Companies |
| ***CSR Expenditure*** | ***:*** | Log CSR Expenditure of Selected Companies |
| ***Total Debt to Equity*** | ***:*** | Total Debt/Shareholder's Equity |
| ***Inventory Turnover Ratio*** | ***:*** | Cost of goods sold/Average Inventory |
| ***Size*** | ***:*** | Log Total Assets |
| ***Growth*** | ***:*** | $(\text{Net Sales}_t - \text{Net Sales}_{t-1})/ \text{Net Sales}_{t-1}$ |
| $\alpha$ | ***:*** | Intercept |
| $\varepsilon$ | **:** | Error Term |

***Analytical Tools used in the Study***

The study has employed both correlation analysis and multiple linear regression analysis to assess the relationship between Corporate Social Responsibility (CSR) expenditure and export performance of selected Indian textile companies over the period 2014–2024. Correlation analysis has been employed to determine the strength and direction of the linear association between CSR spending and the export ratio. Year-wise as well as overall correlation coefficients has been computed to understand how this relationship evolved over time. To further investigate the impact of CSR on export performance while accounting for firm-specific characteristics, multiple linear regression analysis was applied. This technique enables the isolation of the effect of CSR expenditure from other influencing variables and has been widely used in similar empirical studies (e.g., Attig et al., 2016; Gupta & Sharma, 2021).

**Results and Analysis**

***Correlation Analysis***

The correlation between CSR (Corporate Social Responsibility) expenditure and export performance of selected textile companies has demonstrated an overall positive trend. The correlation values over the years indicate varying degrees of strength in the relationship between these two factors.

As shown in Figure 2, the analysis identified a strong positive correlation between CSR spending and export performance in 2015–16 (0.62) and 2023–24 (0.75), indicating that higher CSR investments in these years closely aligned with improved export outcomes for the selected Indian textile companies. The correlation remained moderately strong in 2016–17 (0.50), 2017–18 (0.56), and 2018–19 (0.53), which demonstrated a stable and consistent positive relationship during those periods. In contrast, the correlation weakened in 2019–20 (0.31) and 2020–21 (0.32), likely due to the disruptions caused by the COVID-19 pandemic. The pandemic slowed global economic activity, disrupted supply chains, and reduced workforce availability, all of which may have diluted the impact of CSR on export performance. However, in the years that followed, the correlation recovered, which reflected the resilience of these firms and the enduring strategic value of CSR engagement. This year-wise trend clearly indicated that CSR investments contributed significantly to strengthening the export competitiveness of Indian textile companies.

Further, the correlation matrix presented in the

Figure 2: Year Wise correlation between CSR expenditure and Export Performance of selected Textile Companies

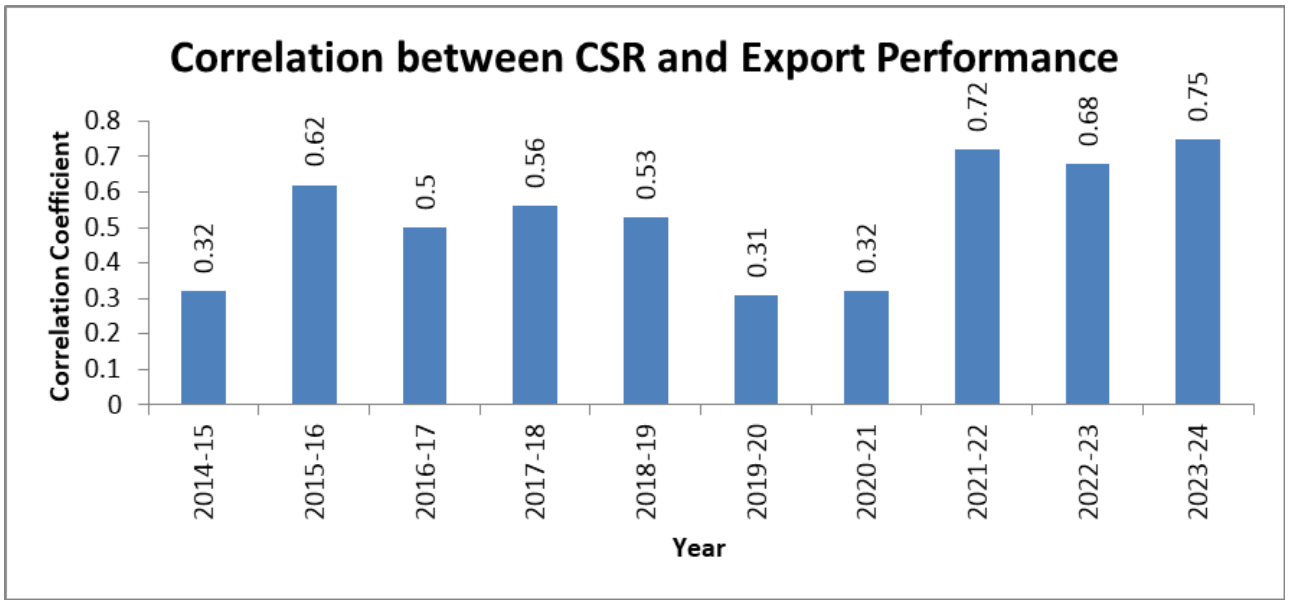


Table 1 highlights a moderate and statistically significant positive relationship between CSR expenditure and export performance ($r = 0.531$, $p < 0.01$). This finding reinforces that increased CSR spending by Indian textile companies is positively associated with their export success. This aligns with prior research suggesting that CSR activities enhance global legitimacy and stakeholder trust, thereby facilitating international market engagement (Gupta & Sharma, 2021; Attig et al., 2016; Kanwal, 2013).

In addition, export performance also showed significant positive correlations with company size ($r = 0.603$, $p < 0.01$), debt to equity ratio ($r = 0.476$, $p < 0.01$), and growth ($r = 0.279$, $p < 0.05$), indicating that larger and growing firms with greater financial leverage tend to perform better in international markets. These firm-level characteristics may complement CSR initiatives in strengthening export capability. Similarly, CSR expenditure was positively correlated with firm size ($r = 0.592$, $p < 0.01$) and debt to equity ratio ($r = 0.488$, $p < 0.01$), suggesting that companies with more resources and capital flexibility are more likely to engage in CSR. Inventory turnover ratio, however, showed weak and negative correlations with both export performance and CSR, and these associations were not statistically significant. Overall, the correlation results support the conceptual framework of the study by confirming the strategic link between CSR and export performance, while also validating the inclusion of firm-specific control variables in the regression analysis.

### *Regression Analysis*

The regression analysis has been performed to understand the impact of CSR expenditure on the export performance of the selected textile

*Table **1** Correlation analysis of variables used for the study*

| Variables | Export Performance | CSR Expenditure | Debt to Equity | Inventory Turnover | Size | Growth |
|---|---|---|---|---|---|---|
| ***Export Performance*** | 1 | | | | | |
| ***CSR Expenditure*** | 0.531** | 1 | | | | |
| ***Debt to Equity*** | 0.476** | 0.488** | 1 | | | |
| ***Inventory Turnover*** | -0.148 | -0.102 | -0.213* | 1 | | |
| ***Size*** | 0.603** | 0.592** | 0.411** | -0.187* | 1 | |
| ***Growth*** | 0.279* | 0.211 | 0.124 | 0.091 | 0.108 | 1 |

*Note: $p < 0.05$ indicated by *; $p < 0.01$ indicated by **.*

*Table 2: The model summary of regression analysis between CSR spending and export performance of selected textile companies during the period of study*

| Regression Statistics | | | | | |
|---|---|---|---|---|---|
| Multiple R | 0.812 | | | | |
| R Square | 0.659 | | | | |
| Adjusted R Square | 0.645 | | | | |
| Standard Error | 0.783 | | | | |
| Observations | 120 | | | | |
| ANOVA | | | | | |
| | Df | SS | MS | F | Significance F |
| Regression | 5 | 128.45 | 25.69 | 42 | 0.00* |
| Residual | 114 | 69.72 | 0.612 | | |
| Total | 119 | 198.17 | | | |
| | Coefficient | Std. Error | t Stat | p-value | |
| Intercept | 0.45 | 0.95 | 0.474 | 0.637 | |
| CSR Expenditure | 0.315 | 0.045 | 7 | 0.000** | |
| Total Debt to Equity | 0.52 | 0.13 | 4 | 0.000** | |
| Inv. Turnover Ratio | -0.025 | 0.035 | -0.714 | 0.477 | |
| Size | 1.05 | 0.12 | 8.75 | 0.000** | |
| Growth | 0.87 | 0.41 | 2.122 | 0.036* | |

*Note: $p < 0.05$ indicated by *; $p < 0.01$ indicated by **.*

companies. The Table 2 presents the summary of a regression analysis conducted to examine the relationship between CSR expenditure and the export performance of selected textile companies. The regression statistics indicate that the R-Square value is 0.659, which implies that approximately 65.9 percent of the total variation in export performance can be explained by the independent variables included in the model. The multiple R value of 0.812 suggests a strong positive correlation between the dependent and independent variables. The adjusted R-Square value is 0.645, which reflects the goodness of fit of the model after adjusting for the number of predictors. The standard error is reported at 0.783, indicating the average distance that the observed values fall from the regression line. The model was estimated using 120 observations.

The ANOVA results demonstrate that the overall model is statistically significant, as indicated by the F-statistic value of 42, which is significant at the 1 percent level ($p = 0.003$). This confirms that the independent variables collectively have a significant effect on export performance. The coefficient values shown in Table 2 reveals that CSR expenditure (0.315), total debt to equity (0.520), and size (1.050) have significant positive effects on export performance at the 1 percent level. Growth (0.870) also shows a significant positive effect at the 5 percent level ($p = 0.036$). Conversely, the inventory turnover ratio (-0.025) has a negative but statistically insignificant effect on export performance. The intercept value of 0.450 indicates the baseline export performance when all independent variables are held at zero. These findings imply that increased CSR spending and larger firm size enhance export performance. Moreover, the significant effect of total debt to equity and growth opportunities further underscores the importance of financial leverage and strategic expansion in improving export performance. The results align with the findings of Agnihotri & Bhattacharya (2019), reinforcing that CSR engagement can strengthen firms' global legitimacy and overcome barriers related to the Liability of Emergingness (LOE). The results of this paper are in corroboration with studies observing a positive link between CSR and firms' internationalization activities.

## Conclusion

This study makes a valuable contribution to the existing literature by exploring the connection between CSR initiatives and export performance

in Indian textile companies. It investigates how CSR activities influence the export performance of these companies using correlation and regression analysis techniques. In today's business environment, CSR plays a crucial role as society becomes increasingly conscious of companies' social responsibilities. Similarly, the importance of internationalization strategies has grown as businesses increasingly engage in global markets. The findings reveal a positive correlation, indicating that socially responsible activities undertaken by textile companies have a favourable impact on their export performance. This confirms that CSR efforts can enhance business growth by supporting the development of effective internationalization strategies.

The study establishes that CSR expenditure, total debt to equity ratio and company size has a significant positive impact on export performance, while growth opportunities also contribute positively. However, the inventory turnover ratio was found to have an insignificant negative impact. These results align with previous research, reinforcing the idea that CSR activities improve stakeholder relationships and enhance business value, as suggested by Stakeholder Theory (Peloza & Shang, 2011; Laplume et al., 2008). From a theoretical perspective, the study expands on Stakeholder Theory by offering a comprehensive view of CSR and its influence on a firm's performance. By linking CSR to export performance, the study highlights the strategic importance of CSR in strengthening the global competitiveness of firms. This research underscores that CSR engagement not only fulfils ethical obligations but also serves as a valuable tool for improving a company's market position internationally.

## Managerial Implications

Corporate Social Responsibility (CSR) has become a strategic tool for businesses, especially when it translates into tangible benefits. This study investigates the relationship between CSR initiatives and the internationalization of Indian textile companies over a ten-year period from 2014 to 2024. The findings reveal a significant positive impact of CSR on export performance, aligning with previous research that established a strong correlation between CSR and firms' international activities (Diez et al., 2018). However, the strength of this relationship fluctuated across different years, highlighting the influence of external market dynamics and internal business strategies.

From a managerial perspective, the study provides valuable insights into how targeted CSR investments can enhance export performance and global market positioning. Managers should recognize that while CSR has the potential to boost internationalization, blind or excessive spending on CSR may not necessarily yield positive results. The key lies in strategically aligning CSR initiatives with business objectives and market expectations. For example, the sensitivity of the target market to a company's social responsibility policies significantly influences the impact of CSR on export performance.

The study also underscores the role of external factors in moderating the CSR-export performance relationship. During the 2019-2020 and 2020-2021 financial years, despite increased CSR expenditure, export performance remained stagnant due to the disruptive effects of the Covid-19 pandemic. This highlights the importance of flexibility and adaptability in CSR strategies. Managers should assess market conditions, economic cycles, and geopolitical factors when planning CSR investments. Furthermore, integrating CSR into broader business strategies, such as supply chain improvements and market expansion, can amplify its positive effects on export performance.

Overall, the study confirms that CSR, when strategically executed, strengthens export performance and fosters international growth. Indian textile companies that align CSR activities with market dynamics and stakeholder expectations can achieve sustainable competitive advantages in global markets.

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# AI-Driven Detection of Greenwashing: Impact on Retail Investors' Trust and Investment Behavior in Rajasthan

Dr. Deepika Meena [1] | Raksha Sharma[2]

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**Abstract**

Since sustainable investing has become more popular, environmental, social, and governance (ESG) disclosures have become more important. However, the proliferation of greenwashing erodes their legitimacy and lessens the impact of real sustainability initiatives. This study explores whether greenwashing perceptions influence trust in ESG reporting, how trust influences investment decisions, and whether AI-based detection systems have the potential to enhance investor trust in sustainability reporting. In 2025, a survey on 246 retail investors in Rajasthan was conducted in a structured manner to get primary data about their awareness, level of trust and investment behaviour. The hypotheses were evaluated using non-parametric statistical tests like Spearman's correlation and Kendall's Tau. The findings show that being aware of greenwashing greatly affects trust in ESG disclosures, whereas increased trust strongly stimulates sustainable investment decisions. Furthermore, AI-enabled verification procedures serve to reduce information asymmetry, reveal fraudulent sustainability claims, and boost investor trust. This study adds to the existing literature by placing ESG and AI in the context of retail investors in an emerging market. It also has practical implications for corporations, regulators, and policymakers looking to foster transparency, integrate AI-driven monitoring, and promote ethical investment behaviour.

**Keywords**

Greenwashing, ESG Reporting, Artificial Intelligence, Retail Investors, Rajasthan.

## Introduction

With Environmental, Social, and Governance (ESG) reporting turning into a crucial instrument for drawing in socially conscious investors, sustainability has become a fundamental component of contemporary company operations. However, the legitimacy of sustainability disclosures has come under scrutiny due to the increase of greenwashing, which is the wilful exaggeration or fabrication of a company's environmental statements. Previous research has demonstrated that greenwashing damages stakeholder trust in addition to undermining the validity of ESG activities. As an example, Şenyapar (2024) pointed out that the notion of false sustainability narratives has been used to weaken investor confidence and erode actual environmental improvements, and that retail investors are more susceptible to fake green labelling (Kleffel and Muck, 2023).

Because they have less access to trustworthy verification methods than institutional investors, retail investors are especially susceptible to greenwashing. Olander (2024) pointed out that while investors are increasingly recognizing the importance of ESG factors, active involvement in sustainable investments is discouraged by scepticism about the veracity of disclosures. Zervoudi, Moschos, and Christopoulos (2025) provided similar data, arguing that unrestrained greenwashing distorts markets and poses long-term dangers to financial stability. These results show how urgent it is to improve transparency and win back investor confidence.

Artificial intelligence (AI) has gained more

[1]Assistant Professor, Department of ABST, University of Rajasthan, Jaipur (Corresponding Author), Email: divyanki.99@gmail.com
Contact No.: 9460014526
[2]Research Scholar, Department of ABST, University of Rajasthan, Jaipur, Contact No: 7877428023
Email: raksha82sharma@gmail.com

attention in recent years as a possible way to identify and stop greenwashing. Research has demonstrated that AI-enabled tools, including predictive analytics, machine learning, and natural language processing, can detect misreporting trends and guarantee more trustworthy ESG disclosures (Huang et al., 2025; Zeng, Wang, & Zeng, 2025). Liu et al. (2023) proposed the concept of the Veri-Green that combines AI and incentivized verification in case of making business sustainability claims more legitimate. Likewise, the implementation of AI will reduce cases of greenwashing by companies operating in highly regulated industries, as empirical studies conducted by Ren et al. (2025) have shown. These contributions show that AI is a catalyst for restoring investor confidence and guaranteeing true accountability in addition to being a detection tool.

Despite these developments, most of the writing to date has either been written about institutional investors or has been done in rich economies. Little attention has been given to the perception of greenwashing by retail investors in emerging countries and the possible effect of AI-based solutions on their trust and investment choices. This is especially clear in the Indian setting, where the retail involvement in financial markets is growing at an alarming pace and the adoption of ESG is gaining traction.

With an emphasis on Rajasthan, the current study aims to close this gap by investigating how retail investors' trust and investment choices are impacted by AI-enabled greenwashing identification. This study intends to add to the theoretical discussion of sustainability reporting as well as the useful development of AI-based tools that can improve market integrity by fusing insights from earlier research with primary data from retail investors.

## Review of Literature

The impact of greenwashing on investor trust, business legitimacy, and the integrity of sustainability reporting has drawn more scholarly attention to the subject. The current review is designed around three connected ideas to give readers a structured understanding. The impact of greenwashing on retail investors' perceptions and trust is examined in the first section. In the second section, the use of artificial intelligence (AI) to identify and counteract greenwashing methods is examined. The ramifications of these changes for market reactions and investment decisions are covered in the third section. These literary threads collectively offer the basis for pinpointing research gaps and situating the current study within the context of Indian retail investors.

### Greenwashing and the Trust of Retail Investors

Since businesses frequently exaggerate their environmental credentials to draw in investment, greenwashing has grown to be a major issue in sustainable finance. Retail investors are particularly susceptible to such tactics, as Kleffel and Muck (2023) showed. "Warm glow" investors rely on symbolic green designations, and environmentalist investors suffer from cognitive dissonance when presented with unsubstantiated promises. Similar issues were brought up by Şenyapar (2024), who emphasised how misleading sustainability narratives seriously erode investor and consumer trust by separating perceived and real business responsibility. Olander (2024) also demonstrated that even if investors recognise the significance of ESG considerations, many are hesitant to make an investment because they have concerns about the reliability of disclosure. According to studies, the effects of greenwashing go beyond investors. Indicatively, Zervoudi, Moschos, and Christopoulos (2025) asserted that unregulated practices distort markets and undermine long-term stakeholder trust, whereas Mu and Lee (2023) established that it reduces employee trust and identification with companies. All together, these results highlight how greenwashing undermines confidence on several levels, with retail investors being most vulnerable because they have less access to verification methods.

### Using AI to Spot Greenwashing

To tackle these issues, researchers have been looking more closely at how artificial intelligence (AI) may be used to spot and stop greenwashing. In order to ensure the quality of ESG reporting, Liu, Ma, Zhou, Fan, and Han (2023) introduced the so-called Veri-Green approach, which integrates AI with incentive-based verification systems. In a comprehensive review, Huang et al. (2025) highlighted how machine learning may identify recurrent trends in greenwashing and bolster the credibility of disclosure. To develop a predictive AI model that can more accurately and interpretably detect ESG misreporting, Zeng, Wang, and Zeng (2025) used XGBoost and SHAP theory. According to empirical data from Chinese listed companies, Ren et al. (2025) demonstrated that the use of AI lessens greenwashing, especially in state-owned

businesses. Also, Tian and Shi (2025) confirmed that AI not only encourages green innovation but also deters opportunistic disclosure. Together, these studies prove AI to be a groundbreaking tool to enhance corporate responsibility and regain investor confidence, not merely a detection tool.

**Market Reactions and Investment Decisions**

The effects of greenwashing and AI-based detection directly affect market stability and investor behaviour. Deng, Zhang, and Yu (2024) argue that greenwashing poses a risk of skewed decision-making because it generates false signals of sustainability, and ESG disclosures affect portfolio optimisation. Corbet, Muùiz, and Staunton (2025) argue that fintech firms that are accused of greenwashing face significant stock price penalties, which means that markets punish dishonest behaviour. According to Sarker and Nuruzzaman (2024), investor trust is moderated by perceived environmental responsibility, which also affects the adoption of AI in sustainable decision-making. Xu (2025) and Achimigu, Ukatu, and Anaege (2025) also found in wider scans that AI applications in ESG pillars increase reporting transparency and investment trust, yet issues such as data privacy, ethical issues, and implementation costs persist. According to these findings, AI-driven detection systems have the ability to rebuild confidence and encourage better-informed investment decisions, even though greenwashing presents systemic dangers to investor decision-making.

Although AI offers potential tools for detection, verification, and prevention, the reviewed literature unequivocally shows that greenwashing damages retail investor trust and distorts sustainable finance markets. Existing research on greenwashing, ESG reporting, and AI-based detection is insightful, but it mostly focusses on developed markets or institutional investors. Limited empirical data is available on the impact of AI-driven greenwashing detection on the trust and investment choices of retail investors in emerging economies, especially India. In a setting like Rajasthan, where retail investor engagement and ESG adoption are expanding quickly, this emphasises the necessity of looking at these dynamics.

**Research gap**

Existing research emphasises how investor trust is negatively impacted by greenwashing and how AI-based solutions might improve the dependability of ESG reporting. However, most research focusses on developed markets or institutional investors, mainly ignoring the behaviour of retail investors in emerging economies, especially in places like Rajasthan. Furthermore, there is yet little empirical data on how AI influences retail investors' trust and investment choices in Rajasthan, despite discussions about its potential relevance in identifying greenwashing. There hasn't been a thorough analysis of the ways in which greenwashing knowledge, confidence in ESG disclosures, and AI-enabled verification interact to affect sustainable investment decisions in this setting. By offering primary survey-based data from retail investors in Rajasthan, illustrating the interaction between these variables, and stressing the useful applications of AI for boosting investor confidence and encouraging moral investment practices, this study fills this knowledge vacuum.

**Objectives of the study**

1. To examine the impact of greenwashing on retail investors' trust in ESG reporting.
2. To analyse the relationship between retail investors' trust and their investment choices, considering the role of AI-based detection of greenwashing.

**Research methodology**

**Hypothesis**

$H_{01}$: There is no significant impact of greenwashing perception on retail investors' trust in ESG reporting.

$H_{02}$: There is no significant relationship between retail investors' trust and their investment choices.

$H_{03}$: AI-enabled detection of greenwashing does not significantly influence retail investors' trust in ESG reporting.

**Data Collection**

The paper examines how greenwashing and AI-based detection affect the trust and investment decisions of retail investors using a quantitative research design. In accordance with the objectives and hypothesis of the study, a structured questionnaire was created as the main instrument for gathering data. Using a convenience sample technique, the study mainly selected participants from the researcher's professional and personal networks. 246 retail investors from Rajasthan, India, responded to an online survey that gathered empirical data using a deductive research approach.

To fully meet the research objectives, the questionnaire employed in this study was methodically separated into five components. For profiling retail investors, the first segment gathered demographic information about the respondents, such as age group, greatest level of education, and investment experience. The second part examined how investors perceive greenwashing, determining if they think businesses overstate their environmental claims, have trouble confirming ESG disclosures, and lose credibility as a result of greenwashing. By looking at preferences for clear and verifiable assertions, dependence on audited or independently verified reports, and opinions about the value and dependability of ESG data, the third portion assessed trust in ESG reporting. The fourth part evaluated investment options, concentrating on the possibility of expanding investments in reputable companies, the preference for credible and transparent disclosures, and whether or not trust in ESG reporting influences investment decisions. By investigating whether investors would steer clear of businesses that were highlighted by AI-based tools and whether AI-verified ESG claims boost their confidence in disclosures, the final section examined the role of AI in identifying greenwashing.

A 5-point Likert scale was used largely for structured, scale-based items in the questionnaire to better correspond with the research objectives. Respondents could select how much they agreed or disagreed with this design, with 1 denoting Strongly Disagree, 2 Disagree, 3 Neutral, 4 Agree, and 5 Strongly Agree. A methodical way to measure the level of perceptions, and attitudes around sustainability reporting, greenwashing, and ESG-related investment decisions was to employ a Likert scale. Also, it made it possible to convert the answers into numerical data, which allowed for a thorough statistical examination of behavioural patterns and trust-related aspects in the process of making investment decisions.

The questionnaire was methodically divided into control, independent, and dependent variables to operationalise the constructs covered above. These variables, along with the type, number of objects, scale used, and illustrative dimensions, are structurally summarised in Table 1. This classification improves the alignment of survey items with the goals and hypotheses of the study and guarantees measurement clarity

*Table 1: Control, Dependent & Independent variables*

| Construct | Type | No. of Items | Scale Used | Example Dimension |
|---|---|---|---|---|
| Demographic Detail | Control | 3 | Categorical | Age, Education, Investment Experience |
| Greenwashing Perception | Independent | 3 | 5-point Likert | Trust reduction due to exaggeration |
| Trust in ESG Reporting | Dependent | 3 | 5-point Likert | Transparency, Verification |
| Investment Choices | Dependent | 3 | 5-point Likert | ESG influence, AI verification |
| AI in Greenwashing Detection | Independent | 2 | 5-point Likert | AI Trust and Verification Reliability |

***Source**: Questionnaire developed by the author.*

*Table 2: Demographic profile of respondents (N=246)*

| | | | | | |
|---|---|---|---|---|---|
| **Age Group (%)** | 18–25 (7.32) | 26-35 (25.20) | 36-45 (31.71) | 46-60 (28.05) | 60+ (7.72) |

| | | | | |
|---|---|---|---|---|
| **Education Level (%)** | High school or below (4.47) | Graduate (21.95) | Postgraduate (33.74) | Professional (39.84) |

| | | | | |
|---|---|---|---|---|
| **Investment Experience (%)** | < 1 year (11.38) | 1–3 years (21.95) | 4–6 years (41.46) | 7+ years (25.20) |

*Source: Author's compilation from survey data*

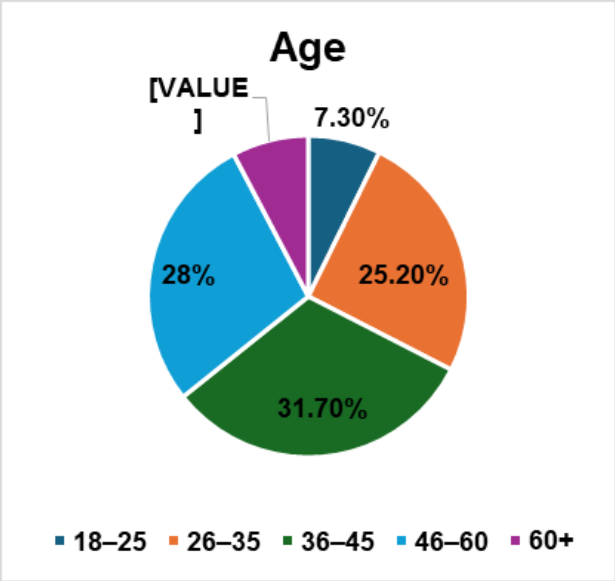


*Figure 1. Age-wise distribution of respondents*


*Figure 2. Distribution of respondents by investment experience*

According to the survey results, most of the sample is made up of seasoned and mid-career investors, with 59.76% of the
participants being between the ages of 36 and 60 (Figure 1).

Most respondents have substantial investment experience, with 66.66% reporting more than 4 years (Figure 2), while 73.58% have postgraduate or professional degrees. Insights on opinions on ESG reporting, greenwashing, and the use of AI in investment decision-making are more reliable because of this demographic composition, which points to a smart and financially conscious group. According to this demographic composition, the cohort is likely well-informed and financially conscious, which improves the validity of insights about opinions on greenwashing, ESG reporting, and the influence of AI on investment decisions-findings that are further examined in the research that follows.

## Data analysis

### Reliability Analysis

Cronbach's Alpha was used to evaluate the survey constructs' internal consistency to guarantee the measurement scales' dependability.

Excellent dependability was shown by the analysis for every construct. In particular, the Trust in ESG Reporting scale (3 items) demonstrated high dependability with $\alpha = 0.963$, while the Greenwashing Perception scale (3 items) demonstrated strong consistency with $\alpha = 0.926$. The three Investment Choice items showed very consistent measurement ($\alpha = 0.974$), and the two AI-related items ($\alpha = 0.940$), which captured the function of AI in identifying greenwashing, showed strong dependability. The entire questionnaire (all items combined) yielded a remarkable Cronbach's Alpha of 0.977, which indicates that the survey instruments measure the targeted constructs and provides a solid foundation to conduct additional statistical analysis and hypothesis testing.

*Table 3: Reliability Analysis of Constructs*

| Construct | No. of Items | Cronbach's $\alpha$ |
|---|---|---|
| Greenwashing Perception | 3 | 0.926 |
| Trust in ESG Reporting | 3 | 0.963 |
| Investment Choices | 3 | 0.974 |
| Role of AI in Greenwashing Detection | 2 | 0.940 |
| Overall Scale | 11 | 0.977 |

***Source**: Author's own analysis*

*Table 4: Descriptive Statistics and Normality Tests*

| Construct | Mean | Median | Std. Deviation | Shapiro-Wilk W | p-value |
|---|---|---|---|---|---|
| Greenwashing Perception | 3.89 | 4.00 | 1.00 | 0.891 | < .001 |
| Trust in ESG Reporting | 4.06 | 4.00 | 1.06 | 0.819 | < .001 |
| Investment Choices | 4.04 | 4.67 | 1.16 | 0.799 | < .001 |
| AI in Detection of Greenwashing | 4.22 | 5.00 | 0.938 | 0.780 | < .001 |

***Source**: Author's own analysis*

*Table 5: Spearman Correlation Results*

| Variables | ρ | p-value |
|---|---|---|
| Greenwashing Perception – Trust in ESG | -0.854 | <0.001 |
| Trust in ESG – Investment Choices | 0.928 | <0.001 |
| AI-enabled Detection – Trust in ESG | 0.903 | <0.001 |

***Source**: Author's own analysis.*

**Descriptive Statistics & Normality**

According to descriptive statistics, retail investors in Rajasthan have a mean score of 3.89 (SD = 1.00), indicating a modest level of awareness of greenwashing. This suggests that investors are still growing in their awareness of the possibility of inflated or deceptive ESG promises. A mean score of 4.06 (SD = 1.06), which indicates a minor increase in trust in ESG reporting, indicates that investors often depend on disclosures they believe to be credible and transparent. Trust in ESG disclosures leads to sustainable investment choices, as evidenced by the great responsiveness of investment choices to reliable ESG information (mean = 4.04, SD = 1.16).Significantly, items pertaining to AI had the highest mean score of 4.22 (SD = 0.94), suggesting that respondents believe AI-enabled detection to be a very successful method of spotting greenwashing and boosting trust in ESG reporting. Although investors demonstrate a moderate level of awareness on greenwashing, these findings indicate that investors place a high value on reliable reporting and technology verification, which combined influence investors' behaviour when making ethical investments.

Normality was determined using the Shapiro-Wilk test. P-values < 0.001 were obtained for all constructs, indicating a departure from normalcy. Since Likert-scale data frequently exhibits such aberrations, non-parametric approaches like Spearman's rank correlation were used as more suitable and reliable approaches for the ensuing hypothesis testing.

**Testing Hypothesis and Correlation Analysis**

The study examined the links between investment decisions, perceptions of greenwashing, trust in ESG reporting, and the use of AI-based detection.

According to Spearman correlation data, retail investors' faith in ESG reporting and their impression of greenwashing are strongly and significantly correlated negatively ($\rho$ = -0.854, $p < 0.001$), demonstrating that knowledge of greenwashing considerably lowers trust in ESG reporting. Trust in ESG reporting also had a positive correlation with investment decisions ($\rho$ = 0.928, $p < 0.001$), which means that higher trust in trustworthy ESG disclosures, in turn, significantly influences decisions about sustainable investments, highlighting the significance of accurate and transparent reporting. Lastly, trust in ESG reporting and AI-enabled detection were positively correlated (0.903, $p < 0.001$), which means that AI-based processes support the trust of investors in ESG statements and reduce the impact of potential greenwashing.

**Robustness Check**

Spearman's rho and Kendall's Tau correlation were calculated to confirm the validity of the observed relationships.

According to the findings, there is a constant and statistically significant correlation between the perception of greenwashing, trust in ESG reporting, investment choices, and AI-enabled detection. Kendall's Tau values showed substantial correlations in the predicted directions, ranging

**Table 6: Robustness Check – Kendall's Tau Correlations**

| Variables | Kendall's τ | p-value |
|---|---|---|
| Greenwashing – Trust | -0.746 | <0.001 |
| Greenwashing – Investment | 0.686 | <0.001 |
| Greenwashing – AI | 0.673 | <0.001 |
| Trust – Investment | 0.858 | <0.001 |
| Trust – AI | 0.823 | <0.001 |
| Investment – AI | 0.837 | <0.001 |

***Source**: Author's own analysis*

from -0.746 to 0.858 ($p < 0.001$). These results support the Spearman correlation analysis, showing that while trust has a beneficial effect on investment decisions and views of AI, heightened perceptions of greenwashing have a negative impact on trust. Regarding the impact of AI in boosting retail investors' trust in ESG reporting, the study's conclusions are supported by the consistency of the results across many non-parametric measures.

**Findings**

Investors' critical evaluation of overstated or unsubstantiated sustainability claims is highlighted by the analysis of retail investors in Rajasthan, which shows that retail investors' behaviour is shaped by the interaction of greenwashing awareness, trust in ESG disclosures, and AI verification. This is particularly evident among mid-career and experienced participants, and it underscores the significance of credible reporting and AI in promoting ethically sound and informed investment decisions in contexts like Rajasthan.

The empirical study of retail investors in Rajasthan offers a number of valuable insights into the dynamics of greenwashing perception, trust in ESG reporting, AI-based detection, and investment decisions. The study found a significant negative correlation ($\rho = -0.854$, $p < 0.001$) between increased awareness of greenwashing and trust in ESG disclosures. This suggests that anytime investors see exaggeration, selective disclosure, or unfounded assertions in sustainability reports, their trust in such disclosures plummets significantly. The findings demonstrate that investors do not passively consume ESG information; rather, they critically analyse the veracity of business sustainability statements before incorporating them into their decision-making.

Second, one important factor that influences sustainable investing behaviour is trust in ESG disclosures. Trust and investment decisions have a substantial positive association ($\rho = 0.928$, $p < 0.001$), indicating that investors are far more likely to put their money into companies that make transparent, reliable, and verifiable ESG disclosures. To guarantee that sustainability reporting results in real investment inflows, this emphasises the importance of trust-building procedures, such as independent verification, audit, and open communication.

Thirdly, the study illustrates how artificial intelligence (AI) may revolutionise the fight against greenwashing. The findings indicate that investor trust in ESG reporting, and AI-enabled detection have a highly significant positive association ($\rho = 0.903$, $p < 0.001$). This suggests that AI-powered technologies that can methodically examine, identify discrepancies, and verify ESG statements serve as useful tools to lessen the information imbalance that exists between investors and businesses. AI verification is seen by retail investors as a reliable defence against false or misleading information, not only as a technical development.

A comprehensive analysis of these findings reveals that the interaction of suspicion (about greenwashing), trust (about open disclosures), and confidence (obtained through AI verification) shapes investor behaviour. The results specifically show that mid-career and seasoned investors are more sensitive to these trends than younger or less seasoned investors, which is indicative of their greater dependence on methodical information processing and risk evaluation.

In emerging markets like Rajasthan, ethical and sustainable investment patterns can be significantly impacted by preventing greenwashing and increasing transparency through artificial intelligence, according to the research. This highlights the significance of combining technology assurance mechanisms with ESG disclosures to foster investor trust and direct investments towards truly sustainable enterprises, which has

important ramifications for companies, regulators, and policymakers.

## Discussion

The notion of greenwashing, trust in ESG reporting, investment decisions, and AI-enabled verificationare all strongly and meaningfully correlated, according to an analysis of retail investors in Rajasthan. First, investors are less vulnerable to deceptive claims and are more likely to rely on reliable reporting when they are more aware of corporate hyperbole and assess ESG disclosures more critically. Second, investors favour businesses with genuine, open, and independently verifiable ESG practices, which greatly influences their investment preferences due to their trust in ESG reporting. Third, artificial intelligence (AI) decreases information asymmetry, and boosts trust in sustainability data, making it an essential defence against false information. Notably, experienced and mid-career retail investors showed a very high level of reaction to AI-enabled ESG verification, demonstrating the usefulness of technology-driven processes in developing nations such as Rajasthan. The correlations obtained are quite high (ù = 0.9), which is not common in social science studies. However, within the present behavioural framework, these values reflect the strong and enduring reaction of retail investors to credible ESG reporting, greenwashing, and AI-based verification. These results are consistent with other research (Kleffel and Muck, 2023; Liu et al., 2023; Ren et al., 2025), which demonstrate that company openness, investor awareness, and AI integration are all complementary to improving sustainable and ethical investing practices. Overall, the findings show that market integrity can be greatly improved and well-informed sustainable investment decisions can be supported by combining investor vigilance, reliable company reporting, and AI verification.

## Summary & conclusion

This study demonstrates how retail investors in Rajasthan are becoming more wary of greenwashing and depend more on clear ESG disclosures. While accurate and verified reporting boosts confidence and favourably influences sustainable investment choices, knowledge of overstated or false promises drastically diminishes investor trust. The report also shows how important AI-enabled detection tools are for confirming sustainability data, lowering information asymmetry, and boosting investor confidence. According to this report, retail investors in Rajasthan are becoming more wary of greenwashing and depend more on clear ESG disclosures. Investor trust is greatly diminished when they are aware of overstated or false promises, yet reliable and verifiable information boosts confidence and favourably influences sustainable investment decisions. The report also shows how important AI-enabled detection tools are for preventing information asymmetry, boosting investor confidence, and verifying sustainability data.

The results have important consequences. For businesses, the findings highlight the importance of moving beyond symbolic disclosures and towards genuine, data-driven sustainability strategies that can resist technical verification. The study emphasises the significance of enhancing frameworks like BRSR and using AI-based oversight to improve disclosure credibility. The research demonstrates that combining personal due diligence with advanced technical tools can result in more informed and ethical investment decisions. Overall, the study demonstrates that openness, awareness, and AI work together to boost confidence in ESG disclosures and influence retail investors' long-term investment decisions in emerging markets such as Rajasthan.

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# Evaluating the Impact of AI-Driven Environmental Accounting on CSR And ESG Performance in India

Dr. Mohit Jain[1] | Rekha Choudhary[2]

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**Abstract**

The present study examines the role of AI-based environmental accounting on CSR expenditure and ESG performance of the firms in India. This study sets out to answer three primary questions: (1) Do companies that adopt AI spend more on CSR than those that do not? (2) Does adopting AI improve ESG ratings? (3) Is there a significant link between CSR spending and ESG performance? The study takes place over one year (2024-25) and uses secondary data from company annual reports and CRISIL databases. The sample includes both AI-adopting and non-adopting firms from various sectors. For analysis, the study uses independent samples t-tests, Pearson correlation, and simple regression to test its hypotheses. The results show that AI-adopting firms reported higher CSR spending, but this difference was not statistically meaningful ($t = 0.124$, $p > 0.05$). On the other hand, AI adoption had a significant positive impact on ESG ratings ($p = 0.003$), indicating it plays a strong role in promoting sustainability performance. CSR spending had a moderate positive correlation with ESG ratings ($r = 0.59$), but this relationship was not significant ($p = 0.73$). The findings of the study indicate that CSR spending contributes to only 34.8% of the changes in ESG ratings, highlighting the role of other factors. Ultimately, the research concludes that CSR spending is not a sole determinant of ESG performance, whereas AI adoption has a significant positive impact on ESG outcomes. These findings are important for corporate leaders and policymakers, highlighting the need to integrate AI-based environmental accounting with strategic CSR efforts for sustainable growth in India.

**Keywords**

Artificial Intelligence, Environmental Accounting, CSR, ESG, Sustainability, India, CRISIL

## Introduction

Artificial intelligence (AI) is a speedily expanding technology that is changing many aspects of business, people, society, and the environment **(Dwivedi et al., 2023)**. With the rise in use of digital devices and the increase in big data, AI offers valuable opportunities for businesses and society **(Dwivedi et al., 2023)**. Automated decision-making and predictive analytics making use of AI may change how governments, individuals, and private entities respond to climate and ecological changes **(Galaz et al., 2021)**. This includes making use of AI in areas like green finance, where it can enhance environmental risk assessment and sustainable investment portfolios **(Wang et al., 2025)**.

AI is navigating a new wave of technological change as well as industrial transformation. This shift is attracting crucial attention from researchers **(Liu et al., 2021)**. AI-driven technologies, such as industrial robots, can optimize resource use and minimize emissions, ultimately reducing environmental impact **(L. Liu et al., 2024)**. Making use of new technological tools to make business processes easier is an important aspect of how companies are going digital **(Han et al., 2022)**. While research on accounting, ESG, and artificial intelligence is escalating, we still need a more harmonized perspective **(Silitonga et al., 2024)**.

In this context, studying how environmental

[1]Assistant Professor; Department of ABST, University of Rajasthan, Jaipur Phone No.9462186799;
Email Id: arobhinder@gmail.com
[2]Research Scholar; Department of ABST, University of Rajasthan, Jaipur Phone No. 7014997936;
Email Id: rekhachoudhary07011996@gmail.com

accounting is impacted by AI is important, especially its effects on CSR and ESG: Social and Sustainable Responsibility performance. Natural capital accounting, a crucial part of environmental accounting, as it leads to sustainable management and protects natural resources **(Jabeur, 2024)**. AI is already used to estimate energy consumption and greenhouse gas emissions based on data **(Y. Zhang et al., 2022)**. AI can significantly cut down on carbon emissions by making manufacturing more efficient and promoting the use of clean energy sources **(Luo & Wang, 2025)**. To address a gap in the literature by analyzing the influence of AI-driven environmental accounting on CSR and ESG performance in India is the main purpose of this study. While prior studies have looked into the impact of AI on accounting efficiency and sustainable developmentWhile prior studies have looked into the impact of AI on accounting efficiency and sustainable development **(Mutashar & Flayyih, 2024)**, this research will offer a fresh viewpoint on how AI technology can be effectively used to meet sustainability targets in India.

## Literature review

ESG (environmental, social, and governance) frameworks and CSR (corporate social responsibility) have emerged as vital components of business strategy due to the global trend towards sustainability **(Moodaley & Telukdarie, 2023)**. For accountability, transparency, and stakeholder trust, Environmental accounting is becoming more essential **(Lee et al., 2024)**. The 2013 Companies Act mandates CSR spending in India. Requirements for ESG disclosure have also increased under SEBI's Business Responsibility and Sustainability Reporting (BRSR) framework. But accuracy and timeliness are problems for traditional methods. These problems can be solved by artificial intelligence (AI), which can standardize data, automate reporting,

and enable predictive analytics **(Alshi & ASMSOC, NMIMS Deemed to be University, Mumbai, 2025)**.

It is shown that environmental accounting disclosure enhances corporate outcomes. According to **Agyemang et al. (2023)**, ecological disclosure will establish the legitimacy and, therefore, the confidence of investors in the entities in China. According to **Dhar et al. (2021)**, green accounting contributes to sustainable development in Bangladesh, particularly with the CSR initiatives. Traditional approaches have their limitations. The treatment of carbon and carbonlike substances has been reported **(Alqahtani, 2023)** as challenging, inconsistent, and less expert-driven. He argued that AI could assist with accuracy, consistency, and alignment with financial reporting, particularly in high-emitting sectors.

Digitalization is crucial for tackling these issues. **Klychova et al. (2024)** found that AI, blockchain, and cloud computing cut down on human error, allow for predictive analysis, and boost collaboration in accounting systems. The credibility of reports on corporate sustainability is also increased by a methodology proposed by **W. Zhang and Zhu (2022)** that combines blockchain, AI, and sensor integration to provide safe data storage and real-time monitoring. Additionally, **Tian et al. (2025)** showed that using AI improves ESG outcomes by making financing easier, increasing transparency, and encouraging innovation, particularly in assetheavy and competitive fields. **S. Wang et al. (2025)** also discovered that using AI improves environmental performance when firms experience strong governance, Big Four audits, or media attention. This indicates that institutional factors amplify the sustainability benefits of AI.

Beyond individual firms, AI has been useful in environmental monitoring that informs corporate and policy-level accounting. **Zareba et al. (2024)** employed machine learning techniques to predict air pollution in the city of Krakow. **Anjos and Meier (2025)**, on the other hand, used high-resolution AI models to analyze urban COù emissions in Berlin. These are steps towards building AI-based monitoring systems that could provide a positive supplementary tool for improving ESG disclosures, particularly in a country such as India, where pollution is a serious problem in many cities. Similarly, **Zhang et al. (2023)** presented that AI can be applied to decrease energy costs in terms of the relationship between environmental goals and economic savings, optimizing consumption and demand predictions.

The literature presents an order of effects. In the beginning, work focused on disclosure and legitimacy **(Agyemang et al., 2023; Dhar et al., 2021)**. Subsequent studies recognized the shortcomings of traditional methods and the demand for technologically advanced solutions. **Alqahtani (2023)**. AI has the potential to change

the predictability, uniformity, and transparency of some procedures or operations, according to some recent studies **(Klychova et al., 2024; W. Zhang & Zhu, 2022)**. In fact, using AI has been shown to support ESG results in empirical research **(Tian et al., 2025; S. Wang et al., 2025)**. Anthropogenic research demonstrates the utility of AI for detecting pollution, tracking city emissions, and optimizing energy use, among others **(Zareba et al., 2024; Anjos & Meier, 2025; Zhang et al., 2023)**. To sum up, there is ample proof that the environmental aspect of CSR and ESG can be augmented through AI, rendering sustainability reporting more precise, transparent, and functional. AI deployment is said to enhance corporate legitimacy and societal sustainability outcomes, even though a number of hurdles, such as the energy use of AI technologies and non-uniform uptake in firms, persist. Particularly in an Indian context, where regulatory pressure for CSR and ESG is mounting, these insights strongly position AI as a means for enhancing corporate accountability and aiding sustainable development.

**Research gap**

Although CSR and ESG performance have been widely studied, there is limited research on how Artificial Intelligence (AI) affects these sustainability practices, especially in India. Existing studies rarely look at whether adopting AI impacts CSR spending or improves ESG outcomes. Additionally, the link between CSR investment and ESG performance is not well explored. This study aims to fill that gap by examining the effect of AI on CSR spending and ESG ratings, offering evidence on how technology can support corporate sustainability.

**Research methodology**

This study uses a quantitative research design based on secondary data from annual reports, Business Responsibility and Sustainability Reports (BRSR), and ESG disclosures of selected companies on the BSE 100 index. A purposive sampling method selects ten companies, consisting of five Information Technology (IT) companies and five Non-Banking Financial Companies (NBFCs), for the financial year 2024-25. These two sectors have been chosen because IT companies are early adopters of Artificial Intelligence (AI) technologies, including in environmental accounting and sustainability reporting. In contrast, NBFCs represent a part of the financial sector where AI adoption in environmental practices is lower. Comparing these categories allows the study to see if AI integration affects environmental CSR spending and ESG ratings across sectors with different levels of AI use.

The study defines AI adoption in environmental accounting as the independent variable, measured as a binary variable where 1 indicates companies that use AI for environmental accounting and 0 indicates those that do not. The dependent variables include CSR expenditure, which is the amount spent on CSR projects under CSR obligations (measured in INR Crores), and ESG ratings, obtained from trusted sources like CRISIL ESG scores. Control variables include company size (measured by revenue or total assets) and industry type to strengthen the analysis.

To meet the research goals, three hypotheses are tested. The first objective evaluates whether companies using AI in environmental accounting report higher CSR environmental spending. An Independent Samples t-test will be used. The second objective evaluates whether companies using AI in environmental accounting report higher ESG ratings. An Independent Sample t-test will be applied. The third objective investigates the connection between CSR environmental spending and ESG ratings, using Pearson's correlation coefficient. Additionally, Simple Linear Regression will measure how well CSR environmental spending predicts ESG ratings, and the $R^2$ value will be reported to evaluate the model's explanatory power.

Data analysis will be done using Microsoft Excel. Excel will assist in organizing data, calculating descriptive statistics, and creating visualizations. This includes bar charts to compare CSR environmental spending and ESG ratings for companies that use AI and those that do not. It will also include scatter plots with regression lines to illustrate the relationship between CSR spending and ESG ratings. Excel will be used for t-tests and correlation analysis. The descriptive analysis will give metrics like mean, standard deviation, minimum, and maximum values for CSR spending and ESG ratings. Hypothesis testing and visual

representations will provide a clear interpretation and presentation of the findings.

**Objectives**

1. To explore how Artificial Intelligence (AI) adoption improves environmental accounting

and corporate sustainability reporting.

2. To examine the impact of AI on CSR spending and ESG performance, showing how technology supports better sustainability decisions.
3. To assess existing literature on the role of AI and other technological innovations in promoting transparency, accountability, and efficiency in environmental and social reporting.
4. To evaluate if the use of Artificial Intelligence (AI) in environmental accounting results in higher CSR spending by selected Indian companies.
5. To assess whether the use of Artificial Intelligence (AI) in environmental accounting leads to better ESG (Environmental, Social, and Governance) ratings among selected Indian companies.
6. To examine the relation between CSR spending and ESG ratings of the selected companies.

**Hypotheses**

**$H_{01}$:** The use of AI in environmental accounting does not result in a significant difference in CSR spending among selected Indian companies.

**$H_{02}$:** The adoption of AI in environmental accounting has no meaningful impact on the ESG ratings of selected Indian companies.

**$H_{03}$:** CSR spending shows no significant relationship with the ESG ratings of selected Indian companies.

**AI Non-adopting firms:**

| Variable | Mean | Std. dev. | Variance | Max | Min |
|---|---|---|---|---|---|
| **CSR Spending(Cr.)** | 113.38 | 90.59 | 8206.37 | 257.5 | 28.8 |
| **ESG ratings** | 61.8 | 3.49 | 12.2 | 65 | 56 |

**AI adopting firms:**

| Variable | Mean | Std. dev. | Variance | Max | Min |
|---|---|---|---|---|---|
| **CSR Spending(Cr.)** | 413.13 | 344.41 | 118620.74 | 960 | 95.44 |
| **ESG ratings** | 74.8 | 1.92 | 3.7 | 77 | 72 |

**Data analysis and findings**

**1. Descriptive statistics:**

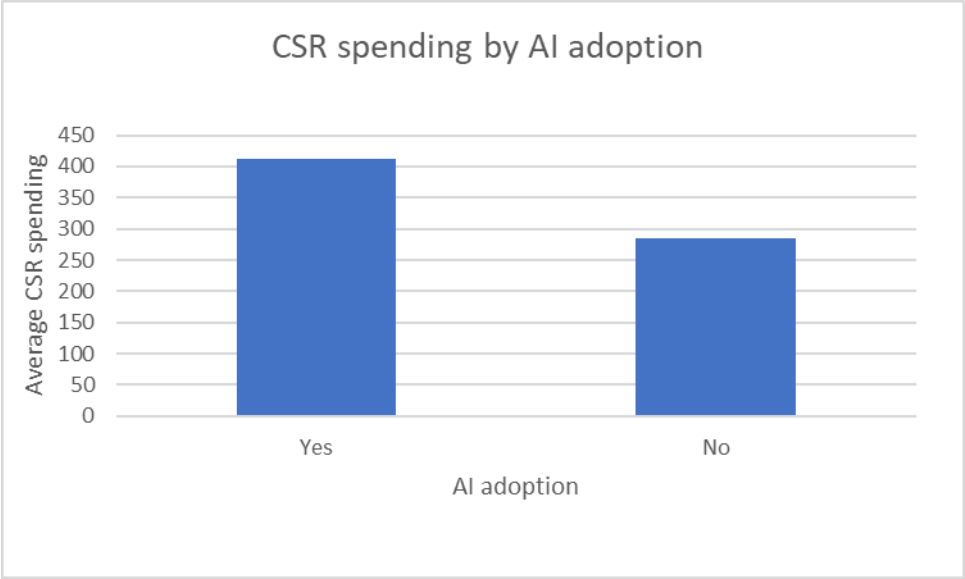
AI-adopting firms spend significantly more on CSR, `413.13 Cr., compared to non-adopters, `113.38 Cr. They also show a wider range of spending, which suggests they have more potential for investment and more variability. AI adopters had a better overall average of 74.8 on ESG ratings compared to 61.8 for non-adopters. They are also more consistent, as seen by their reduced standard deviation. Improved ESG performance, higher CSR spending, and AIdriven environmental accounting are all positively correlated, according to these trends. Further statistical analysis is required to ascertain whether these differences are substantial and unaffected by other variables.

An independent samples t-test was done to see if companies using AI in environmental accounting spend more on CSR than those that do not. The calculated t-test value was 0.124, which is very small and shows only a weak difference between the two groups. The p-value for this test was greater than 0.05, indicating that the difference is not statistically significant. While AI-adopting firms had a higher average CSR spending than non-adopting firms, the difference is not statistically significant.

The test value (t = 0.124) shows no significant difference between AI-adopting and nonadopting firms. AI-adopting firms had a higher average CSR spending (M = 413.13) compared to non-adopting firms (M = 113.38). But this difference is not statistically significant at the 5% level. Therefore, the null hypothesis ($H_{01}$) is accepted, concluding

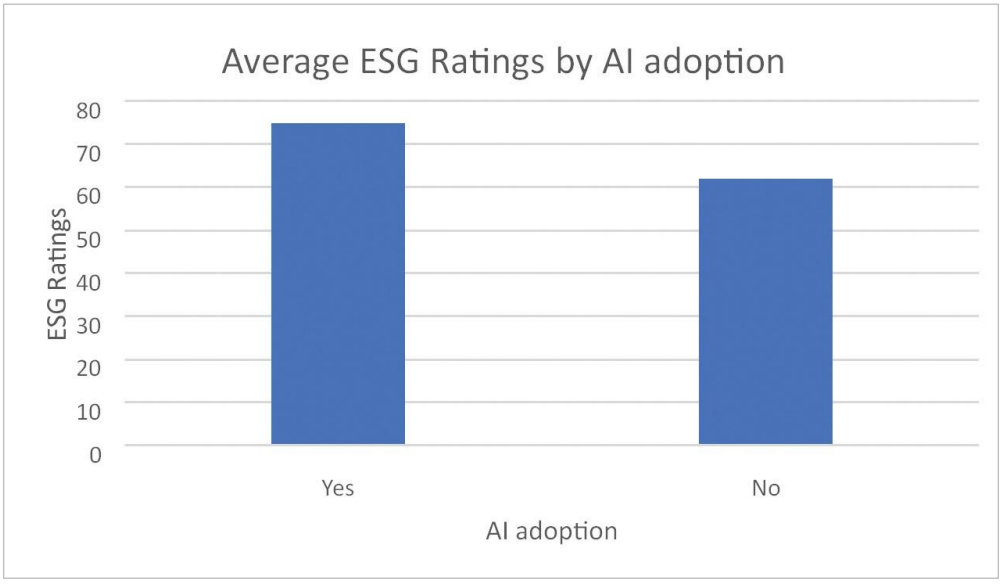
**2. $H_{01}$ :**

| Group | No.of items | $\bar{x}$ (Mean) | Std. dev. | P -Value |
|---|---|---|---|---|
| **AI adopting firms(1)** | 5 | 413.13 | 344.41 | 0.124278918 |
| **AI Non- adopting firms(0)** | 5 | 113.38 | 90.59 | |




**3. $H_{02}$ :**

| Group | N | Mean | Std. dev. | P -Value |
|---|---|---|---|---|
| **AI adopting firms(1)** | 5 | 74.8 | 1.92 | 0.0003 |
| **AI Non- adopting firms(0)** | 5 | 61.8 | 3.49 | |



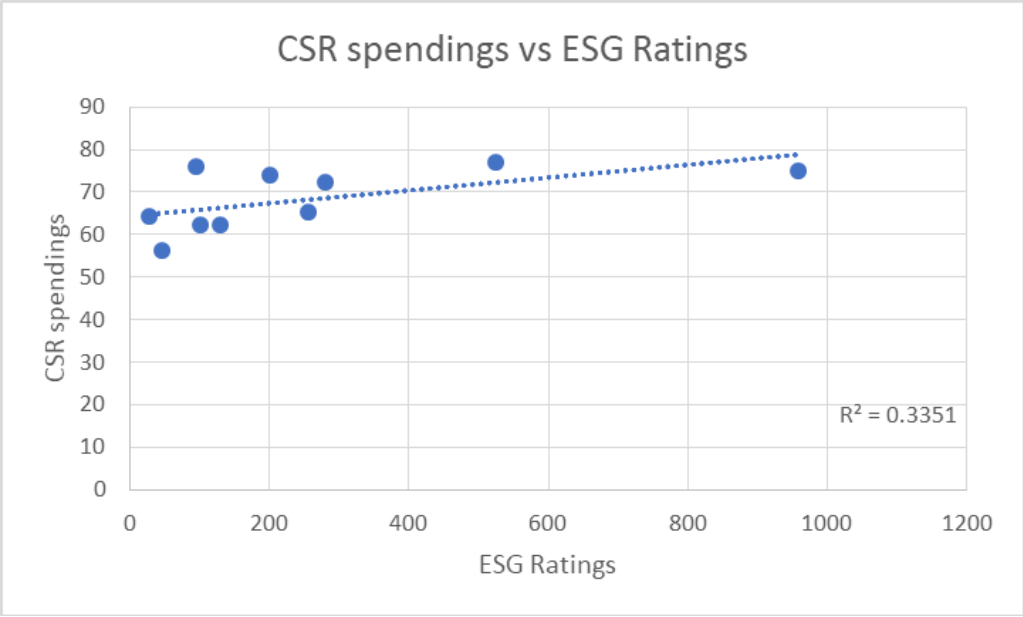

that AI adoption does not significantly influence CSR spending in this sample.

An independent samples t-test was applied to examine whether companies using AI in environmental accounting have higher ESG ratings than those that do not. The calculated pvalue was 0.003, which is much lower than the 0.05 significance level. This shows that the difference between the two groups is statistically significant. The results suggest that adopting AI has a real impact on ESG ratings, as firms using AI performed better in sustainability and governance measures.

These tests indicate that the difference in ESG ratings between firms that adopted AI and those that did not is statistically significant. Firms that adopted AI experienced higher ESG ratings compared to those that did not adopt AI. This is also confirmed by the p-value, which is 0.003, which is significant at the 5% level. This result is compelling evidence of a positive relationship between the adoption of AI technologies and performance in ESG. Thus, we reject the null hypothesis and state

**4. $H_{03}$ :**

| Variable 1 | Variable 2 | N | Correlation coefficient(r) | Df | p-value |
|---|---|---|---|---|---|
| CSR spending (cr.) | ESG ratings | 10 | 0.59 | 8 | 0.073 |




that AI adoption leads to a significant positive change in ESG ratings of the sample companies.

The relationship between expenditure on CSR and ESG ratings for specific Indian corporations was examined using a Pearson correlation test. These two parameters have a somewhat favorable relationship, as indicated by the correlation coefficient of r = 0.59. However, the pvalue was 0.73, which is much higher than the 0.05 significance level. This indicates that the observed correlation is not statistically significant.

Thus, the association between CSR expenditures and ESG scores was a moderate positive one, r = .59. The p-value of 0.73 also shows that this is not significant at 5% level. These results indicate that either higher CSR expenditures do not necessarily correlate with better ESG ratings in this sample, or it is not a uniform response. Thus, $H_{03}$ is accepted. To summarize, there appears to be no relationship between CSR expenditure and ESG ratings amongst the chosen companies in India.

**$R^2$:**

Dependent variable: ESG ratings
Independent variable
CSR spendings Regression Output (r = 0.59): $R^2$ = 0.592 = 0.3481 (≈ 34.8%)

The regression model suggests that 34.8% $R^2$: Coefficient of determination: Dependent variable = ESG ratings, Independent variable = CSR spending. Regression Output (based on r = 0.59): R-squared = 0.592 = 0.3481 (≈ 34.8%). The regression model suggests that 34.8% of the variation in ESG ratings can be explained by CSR spending. This shows a moderate level of explanatory power, but there is still a large portion of ESG performance influenced by other factors (e.g., governance policies, social practices, industry type)

**Summary and conclusions**

This research attempted to study the effect of AI adoption on CSR expenditure and ESG outcomes in a selection of companies in India. It shows the potential of technology for enhancing sustainable corporate practices. The results indicate the Average CSR Expenditure of AI firms is ` 413.13Cr, while that of non-AI firms is ` 113.38Cr. Plus, firms that adopt AI have higher and more consistent ESG ratings, with a mean of 74.8. This underscores the role of AI in boosting environmental, social, and governance performance.

While statistical tests indicated that the difference

in CSR spending was not significant, likely due to small sample size and flexibility, the difference in ESG ratings was highly significant.

This points to a clear advantage for AI-adopting firms regarding sustainability outcomes. Correlation and regression analyses suggested that CSR spending has a moderate effect on ESG performance, accounting for about 35% of the variation. Other factors, including governance structures and social initiatives, also play a role.

In the aggregate, the findings show that AI significantly predicts higher ESG performance. It allows for better environmental accounting within companies, better CSR policies, and more accurate firm sustainability performance. Integrating AI within a company can provide higher levels of CSR efficiency and consistency, and as a result, a more responsible corporation and a trusted relationship with stakeholders. The implications of these findings are twofold, supporting the idea that AI can be instrumental in the evolution of how companies incorporate sustainability, while simultaneously indicating that larger samples are needed to understand the nature of the connection between technology, CSR investment, and ESG performance. Ultimately, the study highlights how adopting AI and focusing on the business's role and impact is not just about technology, but a business strategic decision to move toward a more responsible, transparent, and sustainable future.

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# Market Reactions to Bank Mergers: Event Study of PSB Consolidation and HDFC Bank Merger in India

Dr. Shilpa Lodha[1] | Dr. Ekta Kumawat[2]

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**Abstract**

The paper explores the impact of bank mergers on Indian stock prices, focusing on two significant events: the merger of four public sector banks in 2019 and the HDFC Bank merger in 2022. The study aims to understand the behavior of stock prices around and on the date of the merger announcement. The study utilizes event study, analyzing an event window of -10 to +10 and an estimation window of 120 days. The statistical analysis of the study reveals Average Abnormal Returns exhibit a mix of positive and negative trends pre-event, with a substantial positive reaction on the announcement day. Cumulative Average Abnormal Returns show a significant positive impact during the pre-event period, followed by a sharp and sustained negative adjustment post-event. The findings suggest a lasting and continuous influence on stock returns, emphasizing the long-term significance of bank mergers in the Indian financial landscape.

**Keywords**

Merger, Event Study, Abnormal Returns, AAR, CAAR

## Introduction

The merger and acquisition of banks hold significant importance in the financial sector, serving as catalysts for growth, efficiency, and stability. This strategic integration often results in expanded market presence, a broader range of products, and improved operational efficiency. Mergers enhance competitiveness by leveraging synergies, reducing costs, and optimizing overall performance. Furthermore, they contribute to the financial robustness and adaptability of banks in dynamic economic landscapes. Through the consolidation of resources and expertise, mergers and acquisitions strengthen the banking sector, benefiting customers, shareholders, and the broader economy.

In 1969, the Indian government initiated the nationalization of 14 private banks, followed by the amalgamation of six private banks in 1980, marking a pivotal effort to reshape the country's banking landscape and stimulate economic growth. Subsequent consolidations included the merger of Bank of India with Punjab National Bank in 1993 and State Bank of Saurashtra with State Bank of India (SBI) in 2008. In 2017, SBI became India's largest bank following the merger with remaining associates and Bhartiya Mahila Bank. Dena Bank and Vijaya Bank merged with Bank of Baroda in 2019. In 2020, the Finance Minister announced the merger of ten public sector banks with four major banks. Lastly, HDFC Bank and HDFC Ltd. had announced a decision to merge on April 4, 2022.

The announcement of a bank merger is expected to impact the capital markets. Therefore, the present study attempts to contribute positively to the understanding of the behavior of Indian stock prices in relations to merger announcement and market movement.

## Review of literature

Literature available regarding merger & acquisition of banks and event analysis were reviewed and a summary of the same has been presented below:

The study examined the effects of news on the

[1]Assistant Professor, Department of Accountancy and Business Statistics, Mohanlal Sukhadia Unviersity, Udaipur
Email ID: lodhashilpa80@gmail.com. Contact No.: +91 94607 27311
[2]Assistant Professor, Faculty of Commerce, Parul University, Vadodara
Email ID: ektakumawat38@gmail.com. Contact No.: +91 9680090439

privatization of two Indian public sector banks across 22 banks. Results indicated that while private sector banks initially saw positive abnormal returns, the overall impact of the privatization announcement was negative for both private and public sector banks (Jose & Jegadeeshwaran, 2023). The event study on the merger announcement of three Indonesian Islamic banks revealed an insignificant abnormal return within a 14-day window, suggesting weak-form efficiency, but post-announcement, significant positive reactions in stock returns and trading volume were observed (Indupurnahayu, 2022). The study investigated the impact of merger announcements on shareholder wealth for State Bank of India (SBI) and associated banks, revealing moderate gains for SBI but overall positivereturnsfor target banks. Notably, themerger announcements contributed additional wealth to both anchor and target bank shareholders (Das & Mariappan, 2022). In their 2019 study, Khan and Zia (2019) investigated the influence of mergers on the stock volatility of the State Bank of India (SBI) following nationalization in 1969. Correlogram tests revealed that the merger exhibited both positive and negative effects on share price volatility. Chatterjee (2016) analyzed the expected return during a 13-day window around the merger announcement of SBI with its five associates, revealing a decline in net profit for transferor banks like State Bank of Patiala just before the amalgamation. Despite an initial abnormal increase in share prices post-announcement, they later declined, suggesting the initial surge was not sustainable. The paper evaluated the financial performance of Indian banks before and after mergers, focusing on cases like ICICI Bank's merger with The Bank of Rajasthan and HDFC Bank's merger with Centurion Bank of Punjab, finding a positive impact on the banks' financial performance (Gupta, 2015). Using the event study method, the research examines the effects of merger and acquisition announcements on stock returns for 14 acquiring banks in India and the US, revealing that market reactions differ, but consistently influence stock prices, with greater sensitivity observed in the emerging Indian market compared to the developed US market (Pandey & Kumari, 2020).

### Objectives

The main purpose of the study is:

- To examine the behavior of stock prices around and on the date of merger announcement.

## Research methodology

### Hypothesis

**$H_{01}$:** The investors cannot earn abnormal returns by trading in the stocks after the merger announcements.

*$H_{02}$:* The average abnormal returns and the cumulative average abnormal returns are close to zero.

### *Data Collection*

This study focused two distinct merger announcements: the announcement of the merger involving four public sector banks on August 30, 2019, and the HDFC Bank merger announced on April 4, 2022. In the examination of the public sector bank merger, the dataset comprises the Nifty PSU Bank indices, serving as the benchmark index, and includes banks listed on this index. Meanwhile, for the analysis of the HDFC Bank merger, the Nifty Bank index are employed as the benchmark index and includes banks listed on this index. The daily close, open, high and low prices of the sample stocks and the benchmark indices have been collected from the NSE's official website (www.nseindia.com). These prices were averaged on daily basis. The details of the sample banks are provided in Table 1.

### Event Study Methodology

An event study aims to evaluate the relationship between an event and security rate of return, investigating potential abnormal returns for stockholders. Events or announcements containing information are anticipated to trigger market reactions, which reflected in the security's price change and commonly measured through abnormal returns. The concept of abnormal returns serves to indicate deviations from the usual market return, signifying that informative announcements yield distinct returns compared to regular market responses. The event analysis in this paper relies on the market model, which comprises following steps, as outlined by Lodha & Kumawat, 2022)

### Estimation Period and Event Period

In this study, the merger of bank is taken as event and the announcement date of the banks' merger is considered the event date. The event window determines the study's timeframe by specifying the number of days before and after the event date to be included; for this study, a 10-day period before and

Table 1: Sample Bank Index and Listed Bank

| Merger | PSU Bank Merger | HDFC Bank Merger |
|---|---|---|
| Benchmark Index | Nifty Financial Service | Nifty Bank |
| Bank Listed on Benchmark Index | Bank of Baroda | AU Small Finance Bank Ltd. |
| | Bank of India | Axis Bank Ltd. |
| | Bank of Maharashtra | Bandhan Bank Ltd. |
| | Canara Bank | Bank of Baroda |
| | Central Bank of India | Federal Bank Ltd. |
| | Indian Bank | HDFC Bank Ltd. |
| | Indian Overseas Bank | ICICI Bank Ltd. |
| | Punjab & Sind Bank | IDFC First Bank Ltd. |
| | Punjab National Bank | IndusInd Bank Ltd. |
| | State Bank of India | Kotak Mahindra Bank Ltd. |
| | UCO Bank | Punjab National Bank |
| | Union Bank of India | State Bank of India |

Figure 1: Time Line of the Estimation Period and Event Window

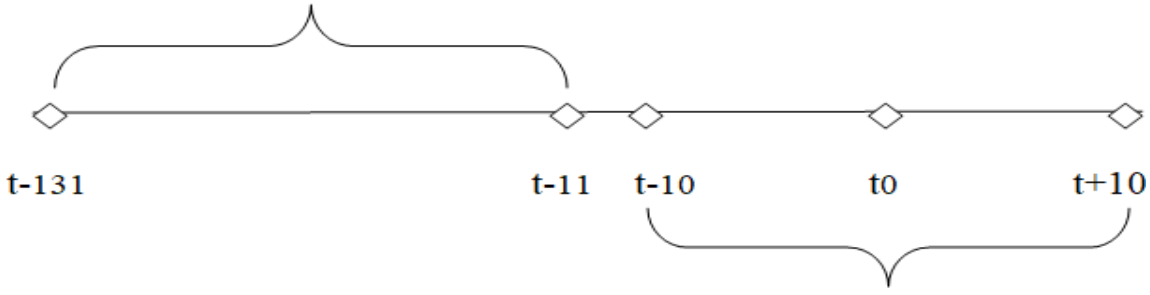



Table 2: Estimation Period and Event Window

| S. No. | Acquirer Bank | Acquired Bank | Event Date* | Estimation Period | Event Window |
|---|---|---|---|---|---|
| 1 | Punjab National Bank | United Bank of India and Oriental Bank of Commerce | 30-08-2019 | 14-02-2019 to 14-08-2019 | 16-08-2019 to 17-09-2-19 |
| 2 | Union Bank of India | Corporation Bank, and Andhra Bank | 30-08-2019 | 14-02-2019 to 14-08-2019 | 16-08-2019 to 17-09-2-19 |
| 3 | Canara Bank | Syndicate Bank | 30-08-2019 | 14-02-2019 to 14-08-2019 | 16-08-2019 to 17-09-2-19 |
| 4 | Indian Bank | Allahabad Bank | 30-08-2019 | 14-02-2019 to 14-08-2019 | 16-08-2019 to 17-09-2-19 |
| 5 | HDFC Bank | HDFC Ltd | 04-04-2022 | 23-09-2021 to 17-03-2022 | 21-03-2022 to 20-04-2022 |

*Event Date is merger announcement date

after the event date was selected. The estimation period is the timeframe employed to calculate the company's returns through the market model, assuming the event has not taken place. To neutralize the event's impact, the estimation period excludes the event window. An estimation period in this study is 120 days prior to the event window. Figure 1 shows the timeline of estimation period and Table 2 provides a summary of the event window and the estimation period for the purpose of this study.

Event Date = 1 Day (t0)
Pre Event Period = 10 Days (t-10, t-2. ….t-10)
Post Event Period= 10 Days (t+1, t+2. ……t+10)
Estimation Period= 120 Days (t-11, t-12…… t-131)

As the merger of 4 public sector bank announce on same day, hence it taken as single event i.e. event 1 for the study and the event 2 is merger of HDFC bank merger.

**Estimating Expected Returns and Abnormal Returns**

To calculate estimated expected return, firstly security return and market return calculated as follows:

- Security Returns $R_{it} = \log(P_{it}-P_{it-1})$ Equation 1
- Market Returns $R_{mt} = \log(P_{mt}-P_{mt-1})$ Equation 2

Here,

$R_{it}$ is return from security *i* at time *t*

$P_{it}$ is the price of security *i* at time *t*

$P_{it-1}$ is price of security *i* at time *t-1*

$R_{mt}$ is the return from market index *m* at time *t*

$P_{mt}$ is the value of market index *m* at time *t*

$P_{mt-1}$ is the value of market index *m* at time *t-1*

These calculated security returns and market returns are actual returns. These returns are to be compared with expected return. The expected returns have been calculated on the basis of estimation period using market model. The market model uses the following OLS regression equation:

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad \text{Equation 3}$$

Here,

$E(R_{it})$ = Expected return from security *i* at time *t*

$\alpha_i$ = Intercept coefficient

$\beta_i$ = Slope coefficient (or sensitivity of the stock to market returns)

$R_{mt}$ = Return on market index *m* at time *t*

$\varepsilon_t$ = Residuals

$$AR_t = R_{it} - E(R_{it}) \quad \text{Equation 4}$$

The $\alpha$ and $\beta$ coefficients are determined by regressing individual stock returns on market index returns for estimation period. These coefficients are subsequently employed to calculate the expected returns for the security over the relevant event window, based on actual market index returns during the same event window (Lodha & Kumawat, 2019).

After computing expected returns, it is necessary to verify whether the actual returns differ from the expected values. Hence, abnormal returns have been calculated by finding the difference between the actual returns and the expected returns for the security during the event window, as follows:

Here,

ARt = Abnormal Returns from security *i* at time *t*

Rit= Actual Returns from security *i* at time *t*

E(Rit)= Expected or normal returns from security *i* at time *t*

**Average Abnormal Returns and Cumulative Average Abnormal Returns (AAR and CAAR)**

The Average Abnormal Returns (AAR) for a specific day in the event window are then calculated by averaging these abnormal returns, first daily and then cross-sectionally.

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_i \quad \text{Equation 5}$$

Average abnormal returns are then cumulated to have Cumulative Average Abnormal Returns (CAAR) as follows:

$$CAAR_{(t1,t2)} = \sum_{t=t1}^{t2} AAR_{it} \quad \text{Equation 6}$$

**Test of Significance**

The statistical analysis followed the approach suggested Brown and Warner's (1985) to assessed the significance of cumulative average abnormal returns by testing the null hypothesis that these returns are equal to zero. It follows a t-distribution and is formulated as:

$$t_{(AAR)} = \frac{AAR_{i,t}}{\sigma_{(AAR)}/\sqrt{N}} \quad \text{Equation 7}$$

Here,

$\sigma$(AAR) = Standard deviation of AAR

*N*= Number of merger announcement on day *t*.

Significance testing of CAAR can also be done in a similar way:

$$t_{(CAAR)} = \frac{CAAR_t}{\sigma_{(CAAR)}/\sqrt{d}} \quad \text{Equation 8}$$

Here,

$\sigma$(CAAR)= Standard deviation of CAAR

*d*= Number of days for which the AAR is cumulated.

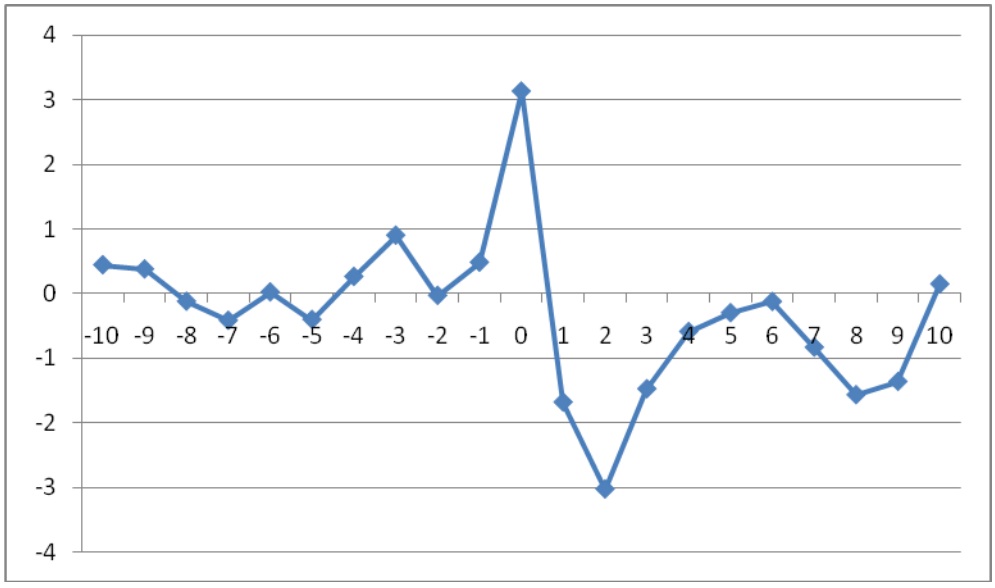
These calculated *t* values were tested at 5 % level of significance.

Table 4: Alpha and Beta Values obtained from Regression Equation

| PSU MERGER | | | HDFC MERGER | | |
|---|---|---|---|---|---|
| **BANK** | α | β | **BANK** | α | β |
| Punjab National Bank | 0.004 | 1.132 | AU Small Financial Bank | 0.088 | 1.236 |
| Union Bank | -0.020 | 1.095 | Axis Bank | -0.041 | 1.092 |
| Canara Bank | 0.070 | 1.063 | Bandhan Bank | 0.062 | 1.115 |
| Indian Bank | -0.107 | 1.083 | Bank of Baroda | 0.282 | 1.151 |
| Bank of India | -0.092 | 1.201 | Federak Bank | 0.187 | 1.217 |
| Bank of Baroda | 0.045 | 1.218 | HDFC Bank | -0.021 | 0.862 |
| Bank of Maharashtra | -0.012 | 0.884 | ICICI Bank | 0.033 | 1.059 |
| Central Bank of India | -0.329 | 0.721 | IDFC First Bank | -0.086 | 1.068 |
| Indian Overseas Bank | -0.095 | 0.694 | IndusInd Bank | -0.148 | 1.084 |
| Punjab & Sind Bank | -0.060 | 0.815 | Kotak Mahindra | -0.070 | 0.902 |
| State Bank of India | 0.111 | 0.835 | Punjab National Bank | -0.027 | 1.090 |
| UCO Bank | -0.053 | 0.252 | State Bank of India | 0.121 | 1.034 |

Source: Author's Own Compilation

Figure 2: Plot of Average Abnormal Returns




**Quantitative Analysis and Results**

Table 4 presents alpha and beta values for PSU and HDFC Bank mergers, offering insights into banks' performance relative to benchmarks and market volatility. In the PSU Merger, six banks show positive alpha values, suggesting potential outperformance, while six banks exhibit negative alpha values, indicating potential underperformance against expected market returns. Furthermore, six banks have beta values greater than one, indicating higher volatility, while six banks have beta values below one, suggesting lower volatility during the merger.

In the HDFC merger, six banks show positive alpha values, indicating potential outperformance, while six banks display negative alpha values, suggesting potential underperformance against expected market returns. Additionally, nine banks have beta values greater than one, signifying higher volatility, while three banks have beta values below one, indicating lower volatility during the merger.

Figure 2 displays the Average Abnormal Return (AAR) analysis over a 21-day period of event window. This data provides insights into market sentiments and reactions surrounding the merger event. The Average Abnormal Returns (AAR)

Figure 3: Plot of Cumulative Average Abnormal Returns

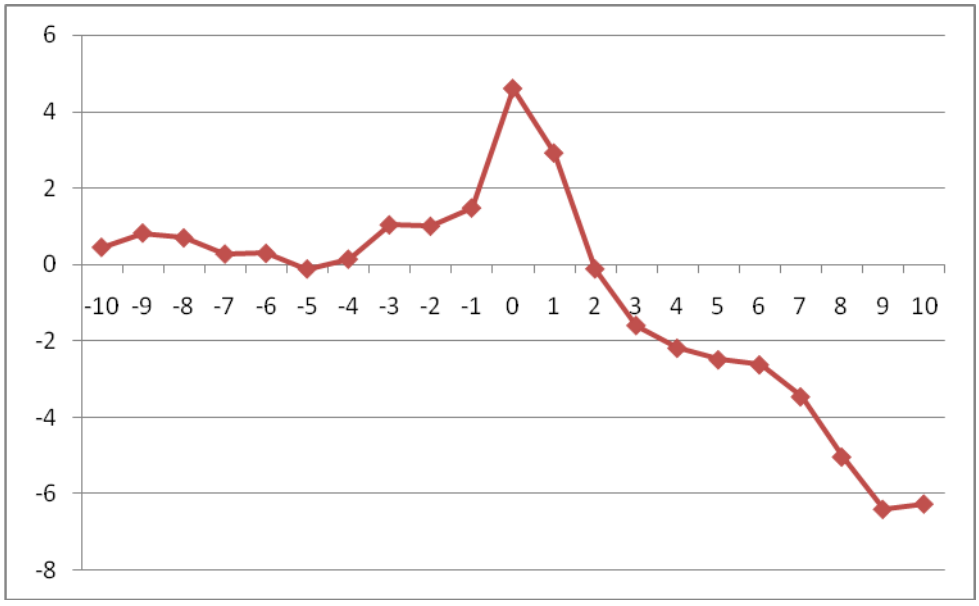



Table 5: AAR, CAAR and t-statistics

| Days | AAR | T-STATISTICS | P-VALUE | CAAR | T-STATISTICS | P-VALUE |
|---|---|---|---|---|---|---|
| -10 | 0.43754 | 1.1407319 | 0.2675 | 0.43754 | 0.691030096 | 0.7164 |
| -9 | 0.37304 | 0.9725774 | 0.3424 | 0.81058 | 1.280195907 | 0.2151 |
| -8 | -0.1264 | -0.329651 | 0.7451 | 0.68414 | 1.080500861 | 0.2928 |
| -7 | -0.4216 | -1.099117 | 0.2848 | 0.26256 | 0.414680431 | 0.6828 |
| -6 | 0.01735 | 0.0452276 | 0.9644 | 0.27991 | 0.442078326 | 0.6632 |
| -5 | -0.4083 | -1.06441 | 0.2998 | -0.1284 | -0.20271748 | 0.8414 |
| -4 | 0.25694 | 0.6698682 | 0.5106 | 0.12858 | 0.203073797 | 0.8411 |
| -3 | 0.89553 | 2.3347724 | 0.0301* | 1.02411 | 1.6174271 | 0.1215 |
| -2 | -0.0357 | -0.092993 | 0.9268 | 0.98844 | 1.561093898 | 0.1215 |
| -1 | 0.47734 | 1.2445026 | 0.2277 | 1.46578 | 2.314985978 | 0.0314* |
| 0 | 3.12437 | 8.145689 | 0.0001* | 4.59015 | 7.249463629 | 0.0001* |
| 1 | -1.686 | -4.395724 | 0.0003* | 2.90412 | 4.586631369 | 0.0002* |
| 2 | -3.0304 | -7.900805 | 0.0001* | -0.1263 | -0.19950122 | 0.8439 |
| 3 | -1.4802 | -3.859152 | 0.001* | -1.6065 | -2.53728999 | 0.0196* |
| 4 | -0.5947 | -1.550561 | 0.1367 | -2.2013 | -3.47658539 | 0.0024* |
| 5 | -0.3039 | -0.79229 | 0.4375 | -2.5052 | -3.95653721 | 0.0008* |
| 6 | -0.1305 | -0.340265 | 0.7372 | -2.6357 | -4.16266206 | 0.0005* |
| 7 | -0.8375 | -2.183448 | 0.0411* | -3.4732 | -5.48534668 | 0.0001* |
| 8 | -1.573 | -4.101133 | 0.0006* | -5.0462 | -7.96972197 | 0.0001* |
| 9 | -1.3679 | -3.566416 | 0.0019* | -6.4141 | -10.1301774 | 0.0001* |
| 10 | 0.1413 | 0.3683979 | 0.7164* | -6.2728 | -9.90701018 | 0.0001* |

Source: Author's Own Compilation
*Significant at 5% level of significance

exhibit a fluctuating trend around the event day (Day 0). Pre-event, AAR values show a mix of positive and negative returns, indicating market anticipation. On the event day (Day 0), there is a significant spike in AAR to 3.12, suggesting a substantial positive reaction. Post-event, AAR values turn negative, reaching a minimum of -3.03 on Day 2, reflecting a corrective adjustment and potential market correction following the initial positive surge on the announcement day. Overall, the trend indicates varying investor sentiments and adjustments surrounding the event.

Figure 3 presents the Cumulative Average Abnormal Return (CAAR) analysis over a 21-day period of event window. It shows that before the event day (Day 0), the Cumulative Average Abnormal Returns (CAAR) show a consistent positive trend, reaching 4.59 on the event day. This indicates a substantial positive cumulative impact during the pre-event period. However, post-event, CAAR experiences a significant decline, reaching a low of -6.41 at t+9, reflecting a sharp and sustained negative adjustment. The overall trend suggests a pronounced positive market sentiment before the event, followed by a considerable negative impact and prolonged adjustment period afterward.

Table 5 shows the AARs and CAARs, their t-statistics with P-Value. The table indicates that AAR is significantly positive on Day 0, signifying a substantial positive abnormal market reaction to the merger announcement. The CAAR remains significant on Day 0 and the subsequent days, implying a sustained and cumulative impact on stock performance. This signifies that the merger announcement not only triggers an immediate positive response but also leads to a lasting and continuous influence on the stock returns of the involved Indian banks, reflecting the long-term significance and market perception of the merger event.

## Conclusion

In Conclusion, the study finds that bank merger announcements in India result in substantial abnormal returns on the announcement day, with a sustained impact on stock prices. The research indicates a pronounced positive market sentiment leading up to the event, followed by a significant and lasting negative adjustment post-event. These findings emphasize the enduring influence of bank mergers on stock performance, providing crucial insights into investor reactions and market dynamics surrounding such strategic financial events in the Indian banking sector. This study contributes valuable insights into the complex dynamics of stock price movements surrounding bank mergers, informing investors, policymakers, and financial analysts about the long-term implications and market perceptions associated with these transformative events in the banking sector.

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(with special reference to qualitative research)

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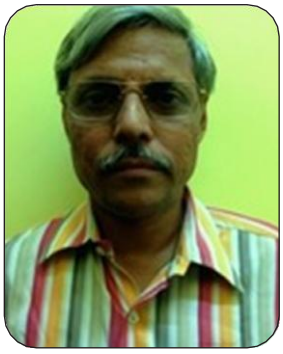

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