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It is with great pleasure that I present Volume 22, Issue 1 of JIM QUEST: Journal of Management and Technology. This issue brings together fourteen insightful research papers that span a broad spectrum of contemporary management and business themes, including corporate governance and board diversity, accounting practices and firm performance, financial inclusion and MSME development, digital banking adoption and financial behaviour, consumer behaviour and marketing analytics, behavioural finance and investment decision-making, tourism analytics and public policy effectiveness, green marketing and sustainable consumption, women's entrepreneurship and economic empowerment, stakeholder capitalism, ESG performance, and broader dimensions of sustainability.

This collection reflects the increasing complexity of India's economic and managerial ecosystem, where governance structures, financial systems, technological adoption, and behavioural dynamics intersect to influence organizational and societal outcomes. The opening paper on corporate governance highlights the strategic importance of board gender diversity, demonstrating that inclusive leadership not only contributes to improved corporate performance but also moderates the influence of accounting conservatism on managerial decision-making. In doing so, it reframes governance as a source of value creation rather than a mere compliance requirement.

The theme of financial inclusion and enterprise development is further advanced through studies on MSMEs and women's entrepreneurship. These papers draw attention to persistent structural barriers in access to finance, especially for micro and small enterprises, while also showing how targeted financial inclusion initiatives can foster entrepreneurial growth and empowerment among women. Together, these studies underscore the need for policy frameworks that recognize the heterogeneity of enterprises and social groups and respond accordingly. Digital transformation emerges as another important thread in this issue. The analysis of e-banking adoption in public sector banks reveals that technology infrastructure alone is not sufficient to drive usage; psychological factors such as trust, digital literacy, and anxiety play a decisive role in shaping user behaviour. Similarly, the study on the National Pension System extends the discussion into financial behaviour, emphasizing how awareness, perception, and institutional trust influence participation in long-term financial products.

Consumer behaviour and marketing dynamics are examined through multiple perspectives in this volume. Studies on surrogate advertising and consumer perception, customer loyalty in the telecom sector, and showrooming behaviour collectively highlight the importance of satisfaction, perceived value, and psychological engagement in shaping consumer choices. In addition, the exploration of impulsivity, materialism, and ethical consumption offers deeper insight into the darker dimensions of consumer decision-making and its implications for responsible marketing. Behavioural finance continues to gain prominence in this issue through research on retirement planning and trading under uncertainty. The study focusing on tribal communities offers a valuable perspective by integrating cognitive and psychological

determinants of financial behaviour, identifying self-control as a key mediating factor. Likewise, the analysis of retail derivatives trading in geopolitically sensitive regions shows how external stressors can intensify behavioural biases and lead to less effective financial decisions.

The issue also includes strong sectoral and policy-oriented contributions. The tourism forecasting study presents a striking paradox of rising public investment alongside declining tourist inflows, raising important questions about policy effectiveness and implementation. At the same time, the paper on green consumer segmentation reflects the growing importance of sustainability, showing that environmentally conscious behaviour is diverse and requires differentiated marketing approaches. Finally, the reconceptualization of banking success through stakeholder capitalism and ESG performance captures a broader transformation in business thinking. Moving beyond conventional profit-centric models, this research emphasizes that environmental, social, and governance considerations are essential to long-term value creation, stakeholder trust, and sustainable growth.

Taken together, the papers in this issue highlight three important transitions in contemporary management research: from homogeneous to heterogeneous perspectives, from purely rational to behaviourally informed frameworks, and from growth-centred to sustainability-oriented development. The methodological diversity of the contributions, ranging from panel data analysis and structural equation modelling to ARIMA forecasting, further enhances the depth and credibility of the insights presented.

I extend my sincere appreciation to all the contributing authors, reviewers, and members of the editorial team for their scholarly commitment and rigorous efforts in bringing this issue to fruition. It is our hope that this volume will not only advance academic discourse but also provide meaningful guidance for policy, practice, and future research.

Chief Editor

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Exploring Corporate Governance: The Moderating Role of Board Gender Diversity on Accounting Conservatism and Corporate Performance in India

*Vaghela Jigarkumar Laljibhai

Abstract

The presence of female directors on corporate boards has been increasingly recognized as a best practice in corporate governance, particularly in India. This study utilizes a sample of BSE 100-listed firms in India from 2015 to 2024. Panel data models are applied to examine the relationship between accounting conservatism (ACC-CONS) and corporate performance (CP), with a focus on the moderating role of board gender diversity (BGD). The findings suggest that the increased representation of women on corporate boards positively impacts corporate performance, resulting in improved corporate outcomes. Furthermore, ACC-CONS negatively impacts CP, indicating that excessive conservatism may hinder managerial decision-making and resource allocation. Importantly, BGD moderates the relationship between ACC-CONS and CP, particularly in the context of ROA and Tobin's Q. The study provides theoretical and practical insights into the role of gender diversity in enhancing board effectiveness. However, this study relies solely on secondary data. Future research is encouraged to explore industry-specific effects, qualitative boardroom dynamics, and the influence of other governance mechanisms, such as the presence of independent directors. This study has numerous practical consequences for policymakers, auditors, shareholders, investors, and practitioners, particularly in emerging countries.

Keywords: Board Gender Diversity, Accounting Conservatism, Corporate Performance, Corporate Governance, India.

1. Introduction

Accounting conservatism is a key principle in accounting and a crucial aspect of financial reporting quality (Bolgorian & Mayeli, 2020). It represents a cautious approach to measurement, defined as “anticipate no profit but anticipate all losses” (Bliss, 1924). Basu (1997) characterizes it as the tendency to examine good news more critically than bad news when reporting earnings. Givoly and Hayn (2007) emphasize its significance in accelerating expense recognition while delaying revenue recognition. Accounting conservatism manifests when firms recognize losses more quickly than profits (Watts, 2003). This principle enhances the reliability of financial statements by supporting corporate governance mechanisms and minimizing moral hazard issues (Mohammed et al., 2017). Additionally, it reduces litigation risks and addresses uncertainties in economic activities by promptly recognizing potential losses while deferring potential gains (García et al., 2009; Hajawiyah et al., 2020).

In the Indian context, the emphasis on accounting conservatism has increased due to regulatory reforms by the Securities and Exchange Board of India (SEBI) and the implementation of Indian Accounting Standards (Ind AS), which are aligned with International Financial Reporting Standards (IFRS). This study distinguishes itself from previous research by examining how board gender diversity influences accounting conservatism and enhances corporate performance in India.

Empirical findings regarding the influence of accounting conservatism on corporate performance are inconsistent. Some studies have reported a positive association between accounting conservatism and corporate performance (Aminu & Hassan, 2017; El-Habashy, 2019; Fariz et al., 2020), suggesting that conservative reporting practices, aligned with ethical business conduct, can enhance stakeholder trust and firm value. Conversely, earlier studies have indicated a neutral or negative

effect of accounting conservatism on corporate performance (Hamdan et al., 2011; Cui et al., 2021), emphasizing its role in enhancing financial stability in emerging economies. These mixed results suggest that the relationship may not be straightforward. Nonetheless, limited research still explores other possible explanations that could provide further insights into this complex dynamic.

The presence of female directors on corporate boards is increasingly recognized as a best practice in corporate governance, particularly in India (Marinova et al., 2016; Sarkar & Selarka, 2021). In recent years, the Companies Act of 2013 (Section 149(1)) and subsequent mandates from the Securities and Exchange Board of India (SEBI) have required listed companies to appoint at least one female director to their boards and emphasized the inclusion of women directors to address gender disparities and strengthen governance mechanisms (Chatterjee & Nag, 2023). Board-level gender diversity is encouraged within corporate governance in India. Although the presence of women in this field is evolving, their overall representation remains low. Numerous barriers and challenges persist in their careers, leading to a growing global research interest in the impact of gender diversity on boards (Khidmat et al., 2020; Shahzad et al., 2020; Arvanitis et al., 2022; Alshirah et al., 2022; Chatterjee & Nag, 2023; Raut et al., 2023). Emerging economies, such as India, present distinct challenges, including sociocultural biases, limited female representation in leadership roles, and board tokenism, which may undermine the intended benefits of gender diversity. Furthermore, accounting conservatism could interact with gender diversity in complex ways, potentially moderating its effect on corporate performance.

Despite its significance, limited empirical research has examined the moderating role of board gender diversity on the relationship between accounting conservatism and corporate performance in the Indian context. Existing studies have primarily focused on the direct effects of board composition or conservatism, overlooking the potential interaction between these variables (Ho et al., 2015; Brahma et al., 2021). This study aims to bridge this gap by investigating whether gender-diverse boards mitigate or amplify the effect of accounting conservatism on corporate performance. By analyzing data from firms listed on the BSE 100 over a ten-year period, this research provides valuable insights for policymakers, corporate regulators, and investors.

This study is organized as follows. Section 2 reviews the relevant literature on accounting conservatism, board gender diversity, and corporate performance, presenting the hypotheses.

Section 3 outlines the research methodology. Section 4 discusses the empirical results and includes a comprehensive analysis. Section 5 discusses results and discussion. Lastly, Section 6 concludes with a discussion of the theoretical and practical implications, limitations, and suggestions for future research.

2. Literature Review and Hypotheses Development

2.1 Theoretical background

Corporate governance mechanisms and financial reporting practices rely on established theories. This study used Agency Theory, Resource Dependence Theory, and Positive Accounting Theory to clarify the relationships among board gender diversity, accounting conservatism, and corporate performance.

Agency theory highlights the conflict of interest between managers and shareholders (Means, 2017; Jensen & Meckling, 2019). This theory emphasizes the board of directors' crucial role in managing and monitoring firms by overseeing the managers and resolving agency conflicts and concerns (Fama & Jensen, 1983; Michaelidou & Moraes, 2017). Board gender diversity enhances independence, improves the quality of monitoring, and introduces varied perspectives, thereby reducing agency problems (Arvanitis et al., 2022; Chatterjee & Nag, 2023). Previous studies have shown that a more diverse board is likely to demand greater transparency and accountability, which positively influences corporate performance (Vishwakarma, 2017; Srivastava et al., 2018; Nigam et al., 2022). Conversely, some studies suggest that board gender diversity has a negative impact on corporate performance (Singh et al., 2022; Ahern & Dittmar, 2012). Furthermore, Resource Dependence Theory (Pfeffer & Salancik, 2015) emphasizes the strategic importance of board diversity for firm success. It asserts that well-diversified boards are more effective than homogeneous groups in providing access to critical external resources for a firm's operations (Alshirah et al., 2022). Thus, gender diversity enhances governance effectiveness and serves strategic purposes by improving the firm's ability to navigate complex environments and meet stakeholder expectations, ultimately contributing to better corporate performance (Gallego-Álvarez et al., 2010).

Agency theory relates to financial reporting practices and suggests that conservative accounting mitigates managerial opportunism by preventing overstatements of earnings and assets, thus safeguarding shareholders (Ball & Shivakumar, 2005). The Positive Accounting Theory suggests that firms adopt

conservative accounting to reduce contracting costs, manage debt covenants, and respond to political and regulatory scrutiny (Watts & Zimmerman, 1986). Conservative financial reporting increases the credibility of information provided to investors and creditors, building trust and potentially enhancing corporate performance (El-Habashy, 2019; Fariz et al., 2020).

This study builds on existing theoretical foundations to examine how board gender diversity influences the relationship between accounting conservatism and corporate performance in the context of Indian firms. Following the discussion of relevant theories and prior literature, a theoretical framework has been developed, as shown in Figure 1. The subsequent subsections thoroughly review the related literature.

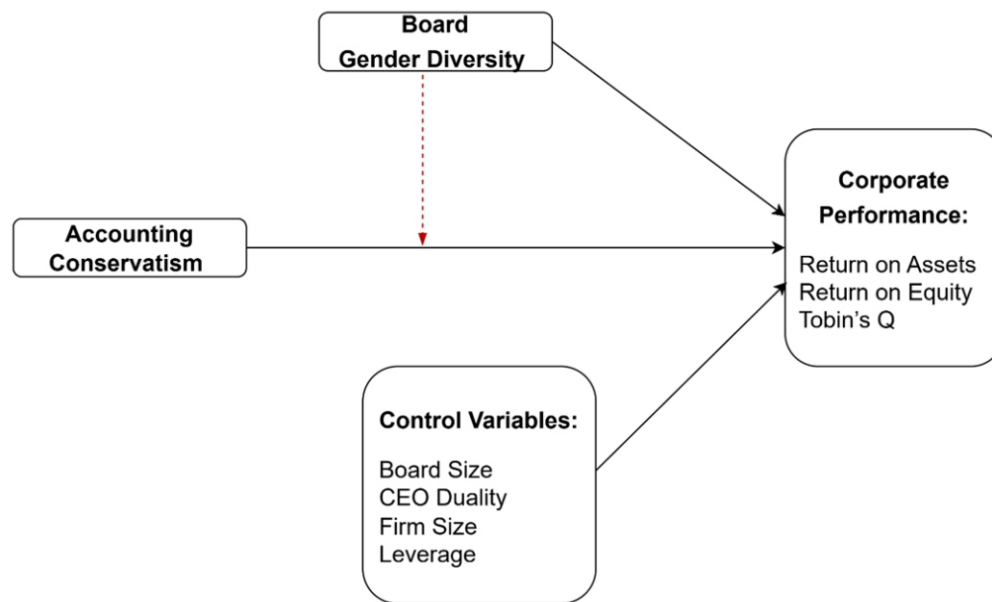


Figure 1. Theoretical framework

2.2 Accounting Conservatism and Corporate Performance

Numerous studies have investigated the relationship between accounting conservatism (ACC-CONS) and corporate performance (CP), yielding varied outcomes. For example, studies such as El-Habashy (2019) indicated that accounting conservatism has a positive impact on performance indicators, including Return on Assets (ROA) and Return on Equity (ROE), as well as market-based measures like Tobin's Q. This reinforces the role of accounting conservatism in enhancing financial resilience. Similarly, Fariz et al. (2020) demonstrated that conservative accounting practices improved the financial performance of Sharia-compliant firms in Malaysia. Conversely, Aminu and Hassan (2017) found that accounting conservatism has a negative impact on the performance of banks in Nigeria, suggesting that the conservative accounting practices may vary depending on Firm size, sector characteristics, and regulatory frameworks. The existing studies on the relationship between ACC-CONS and CP present a complex and inconsistent set of results, with some showing both positive and negative effects. The lack of consensus in these findings suggests a need for further exploration to better understand the conditions under

which ACC-CONS influences CP. Therefore, this study aims to bridge the gap in the literature by examining the relationship between ACC-CONS and CP in Indian firms. Based on the literature review discussion, the following hypothesis is proposed:

H₁: Accounting conservatism has a significant impact on corporate performance.

2.3 Board Gender Diversity and Corporate Performance

Prior studies have explored the associations between board gender diversity (BGD) and corporate performance (CP), yielding varying results across different regions. Arvanitis et al. (2022) found a favorable relationship between BGD and CP in Greek-listed firms, suggesting that the inclusion of female directors enhances decision-making and corporate governance. Similarly, Khidmat et al. (2020) observed a significant positive effect of BGD on the performance of Chinese A-listed firms, supporting resource-based and agency theories. In contrast, Endraswati (2018) reported that findings in Indonesia revealed a negative impact of BGD on the performance of Sharia banking.

Likewise, Kweh et al. (2019) identified an adverse effect of BGD on CP among Malaysian firms. In addition to earlier studies, some researchers have noted a negligible impact of female representation on BGD regarding CP. For instance, Alshirah et al. (2022) demonstrated no discernible effect of BGD on performance in Jordan. Similarly, Marinova et al. (2016) found an insignificant relationship between BGD and firm performance in Dutch and Danish firms, suggesting that the influence of gender diversity may vary depending on cultural and regulatory frameworks. Thus, based on the literature review discussion, the following hypothesis is proposed:

H₂: There is a significant relationship between board gender diversity and corporate performance.

2.4 Moderating Role of Board Gender Diversity

The discussion above highlights the lack of consensus on the relationship between ACC-CONS and CP. A significant factor contributing to this variation is that many studies focus exclusively on the direct relationship while overlooking other potential influences on this association. This limited scope has hindered our understanding of the interconnections among various factors that affect this relationship. Consequently, BGD could play a crucial role in shaping it. BGD can enhance the importance of boards by introducing diverse perspectives, improving decision-making, and augmenting monitoring capabilities (Sahu et al., 2025). In emerging economies, conservative accounting practices often protect against managerial opportunism, particularly in the presence of weak

regulatory frameworks (Saeed & Saeed, 2018; Ali et al., 2021). Affes & Sardouk (2016) found that corporate governance significantly moderates the relationship between conservatism and corporate performance. Similarly, Anas et al. (2022) find that BGD strengthens the association between board characteristics and firm value. A study in Pakistan revealed a favorable relationship between ACC-CONS and CP, with effective corporate governance as a moderating factor (Ali et al., 2021). Existing studies have primarily focused on the direct association between ACC-CONS and CP while neglecting other potential factors that may influence this relationship. One such element, BGD, has yet to be examined as a moderating variable within the context of ACC-CONS and CP, especially in India. Thus, based on the literature review discussion, the following hypothesis is proposed:

H₃: There is a significant moderating effect of board gender diversity on the relationship between accounting conservatism and corporate performance.

3.1 Research Methodology

3.1 Sample and data

The BSE 100 companies in this study were selected using a purposive sampling technique. The study relies on secondary data sources covering ten years, from 2015 to 2024. The dataset comprises financial and governance-related disclosures extracted from publicly available annual reports and financial databases, such as Prowess, maintained by the Centre for Monitoring Indian Economy (CMIE).

Table 1. Sample and Data

Criteria	Description	Number of Firms
Total BSE 100 Listed Firms	The initial sample comprises all firms listed in the S&P BSE 100 index.	100
Exclusion: Financial Firms	Banking and financial firms are excluded due to differing accounting treatments, which may affect the comparability of accounting conservatism measures.	23
Exclusion: Incomplete Data	Firms were excluded due to missing financial or corporate governance data in their annual reports.	15
Final sample	The remaining companies with complete financial and governance data are available for analysis.	62

3.2 Variables and Measurement

This study investigates the moderating effect of board gender diversity on the relationship between accounting conservatism and corporate performance in Indian-listed firms. The empirical model incorporates dependent, independent, moderating, and control variables. Board size and CEO duality are established

governance variables that independently influence corporate performance (Singh et al., 2022; Brahma et al., 2021). They are included as control variables to prevent confounding effects and to isolate the actual impact of accounting conservatism and board gender diversity.

Table 2. Variables and Their Measurement

Variable	Measurement	Literature support
Return on Assets (ROA)	It calculates net income as a percentage of total assets at the end of the financial year.	Vishwakarma (2017), Brahma et al. (2021)
Return on Equity (ROE)	It examines net profit as a percentage of total equity at the end of the financial year.	Alshirah et al. (2022)
Tobin's Q (TQ)	Market value of equity plus book value of debt divided by total assets or Enterprise value/ Total assets	Brahma et al. (2021)
Independent variable		
Accounting Conservatism (ACC-CONS)	<p><i>Givoly & Hayn (2000) accrual-based model:</i></p> $Accruals = \frac{EBEXT_{it} + DEP_{it} - OCF_{it}}{TA}$ <p>ACC-CONS = (Accruals / 3 years) × (-1)</p> <p>ACC-CONS refers to accounting conservatism, measured using an accrual-based approach for firm i in year t. In this context, EBEXT represents earnings before tax and extraordinary items, DEP stands for depreciation expense for the year, OCF indicates operating cash flow, and TA refers to total assets.</p>	Sharma and Kaur (2021), Givoly and Hayn (2000)
Moderating variable		
Board Gender Diversity (BGD)	It examines the Percentage of female directors on the board	Singh et al. (2022), Marinova et al. (2016)
Control variable		
Firm Size (FSIZE)	The total assets are expressed as the natural logarithm	Singh et al. (2022), Sharma and Kaur (2021),
Leverage (LEV)	Total debts divided by total assets	Singh et al. (2022), Sharma and Kaur (2021),
Board Size (BS)	The total number of directors on the board.	Singh et al. (2022), Brahma et al. (2021)
CEO Duality (CEODUO)	Dummy variable: 1 if CEO = Chairman, 0 otherwise	Brahma et al. (2021)

3.3 Model estimation:

The study used panel data analysis to achieve its objectives and test the proposed hypotheses. This approach aligns with previous research (Sharma & Kaur, 2021). The study utilized a balanced panel comprising 620 observations for the estimated models. The study employed pooled and panel models to analyze data from 62 firms over a 10-year period. The study used STATA and GRET software for the statistical analyses.

The study developed three models using the panel data model. The first model examines the direct impact of accounting conservatism on corporate performance. The second model assessed the direct effect of board gender diversity on corporate performance. Additionally, the third model explored the

moderating effect of board gender diversity and accounting conservatism on corporate performance. The empirical models are as follows:

Model 1: The direct effect of ACC-CONS on CP

$$CP_{it} = \alpha + \beta_1 ACC-CONS_{it} + \beta_2 FSIZE_{it} + \beta_3 LEV_{it} + \beta_4 BS_{it} + \beta_5 CEODUO_{it} + \varepsilon_{it}$$

Model 2: The direct effect of BGD on CP

$$CP_{it} = \alpha + \beta_1 BGD_{it} + \beta_2 FSIZE_{it} + \beta_3 LEV_{it} + \beta_4 BS_{it} + \beta_5 CEODUO_{it} + \varepsilon_{it}$$

$$CP_{it} = \alpha + \beta_1 BGD_{it} + \beta_2 FSIZE_{it} + \beta_3 LEV_{it} + \beta_4 BS_{it} + \beta_5 CEODUO_{it} + (\varepsilon_{it} + \mu_i)$$

Model 3: Moderating effect of BGD on the linkage between ACC-CONS and CP

$$CP_{it} = \alpha + \beta_1 ACC-CONS_{it} + \beta_2 BGD_{it} + \beta_3 ACC-CONS_{it} * BGD_{it} + \beta_4 FSIZE_{it} + \beta_5 LEV_{it} + \beta_6 BS_{it} + \beta_7 CEODUO_{it} + \varepsilon_{it}$$

4. Empirical analysis

4.1 Descriptive statistics

Table 3. Descriptive statistics

Variables	N	Mean	S.D.	Min	Max
ROA	620	9.75	7.80	-20.87	51.61
ROE	620	1620	2274	-13040	15556
TQ	620	4.09	3.88	-1.37	25.15
ACC-CONS	620	-0.29	0.20	-1.12	-0.02
FSIZE	620	10.19	1.34	6.79	13.79
LEV	620	0.21	1.22	0.00	18.59
BS	620	11.37	2.63	4.00	22.00
BGD	620	16.29	11.85	0.00	70.00
Dummy variable	Dummy	N	(%)		
CEODUO	Coded 0	435.00	70.16		
	Coded 1	185.00	29.84		

Source: Author's compilation

Table 3 shows descriptive statistics and provides an overview of the key variables used in the study. The results in Table 3 indicate that the sampled companies have a negative mean ACC-CONS of -0.29, with a relatively low standard deviation of 0.20, indicating consistent conservatism levels across firms. Meanwhile, the mean proportion of females on the board of directors was 16.29%, with a standard deviation of 11.85. The sampled companies have an average return on assets (ROA) of 9.75,

ranging from -20.87 to 51.60. The average ROE is 2,274, ranging from -13,040 to 15,556. Additionally, the average Tobin's Q (TQ) is 3.88, reflecting the companies' market valuation. Regarding control variables, CEO duality (CEODUO) is coded as a dummy variable, with 70.16% of firms having a separate CEO and Chairman and 29.84% exhibiting CEO duality. The average values of Leverage, Board size, and firm size were 0.21, 11.37, and 10.19, respectively.

4.2 Correlation matrix and test of multicollinearity

Table 4. Correlation matrix and test of multicollinearity

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) ROA	1								
(2) ROE	0.5594* (0.0000)	1							
(3) TQ	0.6474* (0.0000)	0.3188* (0.0000)	1						
(4) ACC-CONS	-0.3175* (0.0000)	-0.759* (0.0000)	-0.3395* (0.0000)	1					
(5) FSIZE	-0.2450* (0.0000)	-0.0832* (0.0384)	-0.4380* (0.0000)	0.2697* (0.0000)	1				
(6) LEV	0.0766 (0.0565)	0.0428 (0.2868)	0.1434* (0.0003)	-0.0171 (0.6708)	0.0708 (0.0781)	1			
(7) BS	-0.0619 (0.1234)	-0.1023* (0.0108)	-0.1278* (0.0014)	0.0376 (0.3495)	0.2562* (0.0000)	-0.0577 (0.1509)	1		
(8) BGD	0.1164* (0.0037)	0.0387 (0.3357)	0.2333* (0.0000)	0.1244* (0.0019)	-0.1719* (0.0000)	-0.0564 (0.1611)	-0.1420* (0.0004)	1	
(9) CEODUO	-0.0826* (0.0398)	-0.1268* (0.0016)	-0.1689* (0.0000)	-0.0131 (0.7453)	0.2746* (0.0000)	0.1344* (0.0008)	0.1390* (0.0005)	-0.2108* (0.0000)	1
VIF	1.77	1.15	1.59	1.24	1.45	1.08	1.10	1.17	1.16
Tolerance	0.5660	0.8708	0.6274	0.8049	0.6916	0.9267	0.9069	0.8555	0.8639

Source: Author's compilation, Notes: * At a significance level of 0.05 (two-tailed)

Table 4 shows the correlation results for the key variables examined in this study. The results indicate an adverse relationship between ACC-CONS and corporate performance metrics (ROA, ROE, and TQ), suggesting that conservative accounting may reduce reported earnings, which in turn leads to a lower perceived corporate performance. Correlation metrics also reveal that BGD has a positive correlation with corporate performance metrics (ROA and TQ), supporting the argument that diverse boards enhance decision-making and firm value. Moreover, BGD showed a positive correlation with ACC-CONS, suggesting that more female directors on the board are associated with increased financial transparency in corporate performance.

The correlation matrix revealed the absence of multicollinearity, as none of the correlations exceeded 0.80. A pairwise correlation exceeding 0.80 suggests a substantial collinearity problem (Gujarati & Porter, 2004). The study also employed the VIF to assess multicollinearity among the independent and control variables, as none of the VIFs exceeded 5. Therefore, there is an absence of multicollinearity in this study (Mondal & Sahu, 2024).

Correlation metrics also reveal that firm size has an adverse correlation with corporate performance metrics (ROA, ROE, and TQ), suggesting that larger firms may experience lower operational efficiency. Leverage correlates favorably with TQ but is insignificantly associated with other performance measures (ROA and ROE), indicating that debt financing has a limited influence on profitability in Indian firms. Board size

correlates negatively with performance metrics; a larger board may lead to inefficiencies in decision-making, thereby reducing firm value. CEO duality correlates adversely with all performance metrics and aligns with the view that separating the CEO and Chairman roles strengthens corporate governance and improves corporate performance.

4.3 Panel data analysis

Table 5 shows that diagnostic tests were conducted on the sample data to ensure the robustness and reliability of the models. The Wald test for heteroskedasticity rejected the null hypothesis of constant variance (homoskedasticity), indicating that the firms differ in size and that heterogeneity is unavoidable within this dataset (Baltagi, 2005). In addition, the Breusch-Pagan Lagrange Multiplier (LM) test results confirm the inappropriateness of a pooled regression model. The significant chi-squared value at the 1% level indicates the presence of unobserved heterogeneity across firms, necessitating the use of panel data models (Breusch & Pagan, 1980). Finally, the Hausman specification test is used in panel data analysis to determine whether a fixed effects model (FEM) or a random effects model (REM) is more appropriate for a given dataset (Hausman, 1978). Table 5 also shows that the Hausman test produced a significant p-value, confirming that the fixed effects model (FEM) is the appropriate model for further analysis, except for the direct effect of board gender diversity on the ROA model using the random effect model (REM) due to the insignificant p-value of the Hausman test in this study.

Table 5. Direct and Moderating Effects of BGD on the Relationship between ACC-CONS and CP

Variables	ROA			ROE			TQ		
	Direct effect	Direct effect	Moderating effect	Direct effect	Direct effect	Moderating effect	Direct effect	Direct effect	Moderating effect
const	-4.40536 (5.14135)	21.7948*** (4.12799)	-1.95876 (5.29222)	-10876.8*** (1638.39)	-10112.6*** (1508.92)	10630*** (1691.84)	-15.7132*** (2.58421)	-2.66393 (2.55377)	-13.7189*** (2.64481)
ACCCONS	-23.3040*** (2.36792)		-20.5552*** (2.71187)	-674.259 (754.582)		-78.1290 (866.943)	-11.6917*** (1.1902)		-9.86037*** (1.35527)
BGD		0.0575512** (0.0232715)	-0.0231382 (0.0385169)		2.55833 (7.31884)	-11.6164 (12.3133)		0.0399946*** (0.0123868)	-0.00695117 (0.019249)
BGD*ACC-CONS			-0.183880* (0.10031)			-43.9928 (32.0677)			-0.117235** (0.0501306)
CEODUO	0.801569 (0.831618)	0.561067 (0.821094)	0.866253 (0.82955)	-83.5607 (265.01)	-88.3961 (265.108)	-70.2483 (265.195)	0.486931 (0.417998)	0.401141 (0.448684)	0.530947 (0.414572)
BS	-0.147654 (0.110782)	-12.1054 (35.5139)	-0.148049 (0.115054)	-13.0495 (35.3026)	-13.1275 (35.4859)	-15.8277 (35.5892)	-0.00965592 (0.0556824)	-0.0132296 (0.0600584)	-0.00535449 (0.0556356)
FSIZE	0.888413* (0.460792)	-1.11025*** (0.393054)	0.680868 (0.489859)	1225.37*** (146.84)	1165.61*** (147.378)	1220.38*** (156.6)	1.62003*** (0.231609)	0.612924** (0.24943)	1.43041*** (0.244809)
LEV	-0.538581*** (0.204138)	-0.733078*** (0.210293)	-0.538100*** (0.203884)	-25.1528 (65.0522)	-34.2290 (64.1489)	-27.6679 (65.1785)	-0.345645*** (0.102606)	-0.505611*** (0.108569)	-0.341964*** (0.101892)
Observation	620	620	620	620	620	620	620	620	620
Number of Panels	62	62	62	62	62	62	62	62	62
Model fit	FEM	REM	FEM	FEM	FEM	FEM	FEM	FEM	FEM
F- Value	25.1462***	30.3993***	18.8583***	14.9209***	14.7676***	10.9356***	27.2802***	9.00782***	21.5367***
Wald Test	12276.5***	20384.7***	12440.2***	89080.4***	79975.8***	100232***	30361.4***	83428.3***	33037.8***
Breusch-Pagan LM test	1364.86***	1317.78***	1302.28***	1235.56***	1289.46***	1238.93***	842.349***	847.209***	754.158***
Hausman Test	16.9674**	8.32123	20.0948**	38.1719***	32.7057***	36.0322***	88.1727***	50.7401***	91.7975***

Source: Author's compilation, Notes: ***p < 0.01; **p < 0.05; *p < 0.10.

5. Results and discussion

Table 5 presents the direct influence of ACC-CONS and BGD on CP (ROA, ROE, and TOBIN'S Q) and the moderating impact of BGD on the relationship between ACC-CONS and CP.

5.1 Direct effect of ACC-CONS on CP

The results in Table 5 (Columns 2, 5, 8) estimate the direct effect of ACC-CONS on CP. The finding indicates that ACC-CONS has a significant negative influence across the models of ROA and Tobin's Q. This finding aligns with the argument that excessive conservatism may lead to the recognition of losses earlier while deferring the recognition of gains, thus reducing reported profitability in the short term and causing lower market valuations (Ball et al., 2005; Beaver & Ryan, 2005). However, this result contradicts studies (El-Habashy, 2019; Fariz et al., 2020) demonstrating that accounting conservatism positively impacts the performance indicators of ROA and Tobin's Q, thereby supporting its role in enhancing financial resilience. Additionally, the results reveal an insignificant negative relationship between ACC-CONS and ROE. One probable reason for this insignificance is that conservatism provides reliable financial information and may not directly enhance financial performance, especially in markets where other governance mechanisms are more influential (García et al., 2009). Similarly, external aspects such as the regulatory framework and economic conditions may surpass the impact of conservative accounting practices on corporate performance, especially in emerging markets like India (Ball et al., 2000).

5.2 Direct effect of BGD on CP

Table 5 (Columns 3, 6, and 9) investigated the impact of BGD on CP, indicating that a more excellent representation of female board members could improve CP by boosting ROA and TOBIN'S Q. These results align with the findings of prior studies (Vishwakarma, 2017; Kagzi & Guha, 2018; Srivastava et al., 2018; Nigam et al., 2022) while contradicting the findings of (Singh et al., 2022), which claimed a negative impact of BGD on CP. However, BGD has a positive, insignificant influence on ROE. This result aligns with the prior study's (Alshirah et al., 2022) findings, which indicated that BGD has a positive but insignificant effect on corporate performance, as measured by the ROE in Jordanian firms. These findings indicate that firms with a higher BGD generally exhibit stronger CP than those with fewer female board members (Sahu et al., 2025). These results support agency theory, indicating that companies can improve performance by increasing the number of female board members (Yadav & Yadav, 2021).

These findings align with studies from various countries. For instance, Arvanitis et al. (2022) identified an inverted U-shaped

relationship between female directors' presence and Greek-listed firms' performance. In a broader context, Shahzad et al. (2020) found a positive association between board gender diversity and corporate performance (CP) across 5,879 US firms. Marinova et al. (2016) examined the Netherlands and Denmark-listed firms and found no relation between board diversity and corporate performance. Furthermore, Khidmat et al. (2020) examined Chinese A-listed firms. They concluded that the impact of BGD on CP is not standalone but is influenced by a combination of other board characteristics, including board education diversity and foreign national diversity, as well as firm characteristics. These findings demonstrate diversity in the impact of BGD across diverse regions.

5.3 The moderating effect of BGD on the linkage between ACC-CONS and CP

Table 5 (columns 4, 7, 10) shows BGD's moderating role in the linkage between ACC-CONS and CP. The interaction effect of BGD and ACCCONS has a negative significance on ROA and Tobin's Q, indicating that board gender diversity moderates the adverse impact of accounting conservatism on firm performance. These findings also support the theoretical frameworks of agency theory and resource dependence theory. These theories suggest that BGD can enhance transparency, increase stakeholder engagement, and encourage meaningful discussions that challenge excessive conservatism in financial reporting (Arvanitis et al., 2022; Alshirah et al., 2022). The interaction effect of BGD and ACCCONS has a negative impact on ROE, suggesting that the relationship between gender diversity and accounting conservatism may vary across different performance measures.

Regarding the control variables, board size and CEO duality were found to have a negligible impact on any performance measure. Leverage has a negative impact on corporate performance, particularly in terms of Return on Assets (ROA) and Tobin's Q. Excessive leverage can increase financial risk, restrict growth prospects, and lower market valuation. The positive effect of firm size on CP, specifically on ROE and Tobin's Q, suggests that larger firms enjoy economies of scale, improved market presence, and increased investor confidence.

6 Conclusion and policy implications

This study investigates how Board gender diversity moderates the relationship between accounting conservatism and corporate performance using a sample of 62 listed firms in India from 2015 to 2024. The study utilized panel data to test its hypotheses despite multiple theoretical linkages advocating that board gender diversity is beneficial for firms.

The study concludes that accounting conservatism significantly and adversely affects corporate performance. These findings align with positive accounting theory, suggesting that while conservative accounting practices can mitigate agency conflicts, they may underreport financial performance, which can negatively influence firm valuation and profitability indicators. On the other hand, gender diversity on corporate boards has a significant positive impact on corporate performance. A higher percentage of female directors is linked to improved return on assets (ROA) and Tobin's Q. This indicates that companies with at least one female board member tend to perform better than those with an all-male board. Additionally, drawing from agency theory and resource dependency theory, having women on the board enhances monitoring and provides better protection for shareholders. The strategic connections of women directors enhance the availability of resources for firms through interconnections. Board gender diversity moderates the relationship between accounting conservatism and corporate performance, aligning with agency and resource dependence theories, suggesting that diverse boards enhance oversight and resource access, thereby mitigating the negative impact of accounting conservatism on corporate performance.

The findings provide several policy recommendations to enhance gender diversity and improve transparency in corporate performance. The Securities and Exchange Board of India (SEBI) mandates the inclusion of at least one female director on the boards of listed companies, which is a positive development. Firms should invest in diversity and inclusion programs to grow a channel of suitable female directors. Additionally, institutional investors can significantly impact firms to prioritize diversity in board appointments. Policy implications should promote gender diversity, enhance transparency, and foster accounting practices that support improved corporate performance and long-term economic prosperity.

This study offers significant insights, but it also has a few drawbacks. First, this study is limited to secondary data. Further research could also use primary data collection methods such as interviews or case studies. Second, although the study focuses on BSE 100 firms, the findings may not be generalizable to smaller or unlisted firms in India. Future research could address these limitations by employing mixed-methods approaches and considering other governance mechanisms, such as the presence of independent directors.

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Influencing Factors of MSMEs' Growth: The Moderating Effect of Enterprise Type on Access to Finance

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Abstract

Micro, Small, and Medium Enterprises (MSMEs) contribute significantly to the country's Gross Domestic Product (GDP), however, their access to finance remains largely untapped. Despite policy schemes, financial restraints hinder their development. This study assesses factors influencing MSME growth, identifies barriers to accessing capital, and examines the moderating role of enterprise type. A quantitative survey was conducted among 320 MSMEs across Calicut district, Kerala, between January and April 2023. Structural Equation Modelling (SEM) analyzed interrelationships between variables. Findings indicate financial constraints are a massive hindrance, while improved capital access accelerates growth. Enterprise size and category significantly affect funding ability, with smaller and micro units facing greater difficulty than medium enterprises. MSMEs remain weak financially due to limited credit access. The study suggests an integrated policy framework and sector-specific designs. Strong financial access can streamline MSME development and sustain growth, contributing to GDP.

Keywords: Financial Access, MSME financing, Growth constraints, Structural Equation Modelling, Policy Framework

Introduction

Global context

Micro, Small, and Medium Enterprises (MSMEs) serve as critical drivers of national economic success, especially in developing nations. They contribute to employment generation, GDP growth, and development of economy (Government of India, 2020). MSMEs comprise approximately 80% of global economic growth, with their importance extending even to emerging economies. MSMEs strengthen their potential for creating jobs, encouraging entrepreneurship, and driving innovation. Across developing nations, MSMEs play a key role in reducing unemployment and alleviating poverty. Additionally, MSMEs contribute significantly to industrial GDP through enhanced productivity, economic diversification, and competitiveness (Belas et al., 2019). As suppliers to more prominent industries, MSMEs support interlinkages and value chain development, resulting in higher GDP growth rates and economic stability.

Indian scenario

MSMEs represent a significant share of the country's economic output, manufacturing production, and exports. As per the

Confederation of Indian Industry (CII), in 2019, MSMEs contributed 24.63% to overall economic output, 33.4% to manufacturing, and 34.1% to total exports, stressing their importance in the Indian economy. Projections highlight that MSMEs' employment generation could reach 15 crores by 2025, with export contributions expected to rise to 75%. Currently accounting for 24% of India's GDP, MSMEs are expected to increase their share to 50% by 2025, propelling India towards the goal of \$5 trillion economy (Ministry of MSME, 2021). Despite this optimistic outlook, MSMEs in India faced a credit deficit of INR 28.10 trillion in 2019, while external credit demand amounted to INR 41.64 trillion (Son, 2023). Bridging this credit gap is inevitable for ensuring the sustainable growth of MSMEs and the national economy (Biswas, 2014).

Challenges in access to finance

MSMEs face considerable barriers in accessing finance, particularly in India, due to stringent government regulations and limited start-up capital (Karedza et al., 2014). A complex and burdensome regulatory framework discourages lenders, while financial institutions prefer larger and more established firms,

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restricting MSMEs' ability to secure adequate funds (Prasad, 2006). Capital structure decisions are critical for MSMEs' financing, as they influence the cost of capital, financial risk, and enterprise stability. A balance between debt and equity financing is essential to optimize resources and minimize insolvency risk (Belas et al., 2019). Shortage of financial resources, coupled with inadequate management practices, may slow down MSME growth and competitiveness (Prasad, 2006).

Research gap and statement of the problem

Limited access to finance presents a significant research gap (Saeed and Sameer, 2015). Arora and Kashiramka (2024) highlight long-lasting systemic issues, worsened by the pandemic, that constrain MSME development, particularly in navigating financial and regulatory burdens. Theoretical gaps remain in understanding how specific barriers, such as government regulations and start-up capital limitations, hamper financial access. While previous research acknowledges these challenges, in-depth analysis of the precise mechanisms and its effect on financial performance is still lacking. The current study addresses these gaps by investigating the obstructions encountered by MSMEs in credit access, focusing on the influence of government regulations, start-up capital availability, and enterprise type. By examining the factors influencing finance seeking behaviour of MSMEs in Kerala across different stages of growth, it evaluates how funding sources, financial constraints, and awareness shape performance. The findings aim to bridge the disconnect between MSMEs, financial institutions, and stakeholders, offering practical recommendations to improve financial accessibility, thereby contributing to sustainable MSME growth, economic development, and job creation.

Literature Review

MSMEs require access to capital throughout their existence to make investments that contribute to economic development and reduce poverty (Beck and Demirguc-Kunt, 2006). Accessing funding also influences economic development in developing nations (IFC 2011). Access to flexible financial support enables MSMEs to achieve sustainable growth and contribute to economic resilience and job creation (Karedza et al., 2014; Zindiye, 2008).

The success and growth of MSMEs are closely tied to their reach to finance and ability to adapt to the challenges presented by various life-cycle stages. At each phase, MSMEs experience different financial and performance considerations (Prasad, 2006). They face unique difficulties securing start-up capital at inception, often through personal savings, family contributions, or microfinance institutions. In the development phase,

additional funds may be necessary for expansion, marketing, and hiring initiatives. MSMEs in decline can face financial obstacles caused by declining demand or competition, necessitating either restructuring or external investment (Quinn & Cameron, 1983).

MSMEs can access financing sources such as bank loans, non-bank loans, microfinance loans, venture capital funding, equity finance, and informal sources (Rajamani et al., 2022). These options enable MSMEs to select financing that best meets their requirements, objectives, and risk tolerance (Rautanen, 2013). Governments are essential in supporting MSMEs through loan schemes, subsidies, and tax advantages (Prasad 2006; Thampy 2010). A supportive financial ecosystem is critical for their growth and success (Saeed & Sameer, 2015).

MSMEs face financial restrictions due to regulations, higher interest rates, and crisis (Saghir & Aston, 2017). Onerous requirements and high compliance costs create barriers to formal financing (Belas et al., 2017). High interest rates escalate this issue with limited collateral or short credit histories, limiting access as lenders become risk-averse (Pissarides et al., 2003). Accessing capital is a significant challenge, and only some studies have investigated their funding difficulties (Beck 2007; Banerjee 2014; Dong & Men 2014). High interest rates further restrict MSMEs' ability to secure loans, as lenders grow wary of financing businesses lacking substantial collateral or established credit (Mittal & Raman, 2022).

Literature reviews facilitate a comprehensive understanding of MSMEs' challenges, their impact on performance, and sectoral growth (Chittenden, Hall, & Hutchinson, 1996; Lekhanya, 2014). MSMEs in India require assistance with capital procurement, while high interest rates and policy hurdles remain obstacles. Similarly, economic downturns and financial crises accelerate these difficulties. Although prior research discussed these issues, an in-depth analysis is desired.

Precise studies on the Kerala context must be explored, as it contributes significantly to national GDP. This study addresses gaps such as determinants of finance accessibility, financial constraints impact, the influence of life-cycle stages, the relationship between finance access and a firm's performance, and the moderating role of enterprise type. It provides an analysis of MSMEs' life cycle stages and access to finance and examines how enterprise type affects financial access and growth within Kerala's MSME sector.

Hypothesis Development

The source of finance is the key factor of financial accessibility in an MSME. The theory of Pecking Order states that businesses

prioritize financing sources depending on cost and availability, setting up a hierarchy (Myers & Majluf, 1984). It suggests that MSMEs opt for internal resources, then debt, and finally external equity, due to lower cost and fewer obligations (Myers, 1984). This reflects MSMEs' financing approach and aligns with research findings on financing sources and accessibility (Chittenden, Hall, & Hutchinson, 1996; Lekhanya, 2014). Accordingly following hypothesis is proposed:

H1: Source of finance significantly influences MSMEs' access to finance.

H1 proposes that MSMEs prefer specific funding channels within this hierarchy. As per Pecking Order Theory, MSMEs first use internal resources, then debt, and lastly external equity. This emphasis on cost-effectiveness and access resonates with H1's assertion that the source of finance impacts MSMEs' access to funds.

MSMEs with financial limitations face difficulty obtaining funds, reducing growth and investment. Pecking Order Theory suggests MSMEs rely on external sources when internal resources fall short due to rising costs (Myers & Majluf, 1984). Theory of Financial Intermediation highlights the role of institutions in bridging gaps between savers and borrowers (Diamond, 1984). Research also indicates that firms under constraints often show stronger growth and investment (Chiu, Ho, & Tsai, 2022; Beck & Demirgüç-Kunt, 2006). Thus, the following hypothesis is proposed:

H2: Financial constraints significantly influence MSMEs' access to finance.

H2 anticipates that MSMEs under constraints will face barriers in accessing funds. Financial institutions may impose criteria MSMEs cannot meet, reducing credit access. These barriers align with both Pecking Order and Financial Intermediation theories, which emphasize the disruptive effect of financial constraints.

The Life Cycle Theory states that business stage shapes financing needs: young firms depend more on external sources, while mature ones rely on internal resources (Berger & Udell, 1998). Information Asymmetry Theory suggests younger MSMEs, with limited records, face greater uncertainty in finance accessibility. Chavis, Klapper, and Love (2010) support this, leading to the hypothesis:

H3: The life cycle of MSMEs significantly influences their financial reachability.

H3 reflects that young MSMEs face higher information asymmetry and caution from lenders, while mature firms benefit from established records. This aligns with theories highlighting how life cycle stages shape financing challenges.

Financial Constraint Theory states that access to finance promotes innovation, investment, and growth (Fazzari, Hubbard, & Petersen, 1988). The Resource-Based View (RBV) Theory adds that external financing enables MSMEs to acquire resources for competitive advantage (Barney, 1991). Research supports strong links between financing and MSME growth (Beck et al., 2000; Giang et al., 2019), giving rise to:

H4: MSMEs' access to finance significantly influences their growth.

H4 resonates with Financial Constraint and RBV theories, asserting that finance enhances resource acquisition, competitiveness, and innovation. Empirical studies (Beck et al.; Redmond & Van Zandweghe; Giang et al., 2016) confirm that financial access drives MSME growth. Access to finance and growth may also vary by enterprise type. Institutional Theory stresses the role of external environments (Scott, 1995), while Contingency Theory emphasizes firm-specific traits (Donaldson, 2001). Kira and He (2012) support this, leading to:

H5: The type of enterprise moderates the relationship between financial access and the progression of MSMEs.

H5 highlights that different enterprises have distinct needs, risks, and trajectories. Institutional and contingency perspectives support the idea that type of enterprise shapes how financial access translates into performance outcomes, as shown in Figure 1

Research Design and Methods

Study on determinants of finance access for MSMEs and their influence on growth was conducted in Calicut district, Kerala, India, between January 2023 and April 2023 (Zindiye, 2008). MSMEs were selected based on enterprise size, sector/industry, geographical representation, accessibility, and willingness to participate (Zindiye, 2008). An in-depth literature review was performed to identify variables related to financial resources, constraints, life-cycle, access, and growth. The questionnaire was designed to capture these aspects, with validity and reliability ensured through expert review, pilot testing, and refinements (Hair et al., 2017). It was administered to upper and lower-level staff in finance departments responsible for financial management and decision-making.

Sample size of 320 responses was measured using simple random sampling, adhering to statistical principles (Hair et al., 2017). With this, findings can be generalized to MSMEs in Kerala with confidence due to unbiased sampling. The study assessed credit access, life-cycle stage, and growth indicators. Exploratory Factor Analysis (EFA) identified latent constructs, while Structural Equation Modeling (SEM) examined relationships and model fit. Data analysis used SPSS version 26.

Data Analysis and Results

Demographic Attributes

Respondents exhibited in Table 1, were obtained through a primary survey conducted for this study (Hair et al., 2017). Questions covered gender, age, type of business, years of operation, and business activities. Understanding these characteristics is important for interpreting the data, generating insights, and informing policymakers, financial institutions, and MSMEs on access to finance. It also provides a clearer perception of the MSME landscape in Kerala and supports the generalizability of the study findings.

The gender distribution showed that 71.9% of respondents were male and 28.1% were female, providing valuable information on potential gender-related differences in accessing finance and MSME performance. Analyzing the age distribution, with 44.9% of respondents falling within the 26 to 35 age group, helps assess how different age groups perceive and experience access to finance and its impact on businesses. This also highlights the dynamics between younger and more experienced entrepreneurs in Kerala, along with their financial needs and constraints.

The breakdown of respondents based on the type of business shows that 52.2% represented medium enterprises. This helps examine whether business size influences access to finance, enabling comparisons of hurdles faced by different enterprises. The distribution of years of operation, with 46.3% of MSMEs operating for 6 to 10 years, allows understanding how duration of operation relates to accessing finance and performance outcomes. Comparisons between newer and more established enterprises provide insights into the financial needs at various business development stages. Breakdown based on business activities further highlights the sectors represented in the Kerala sample, enabling sector-specific analysis of financial access and performance outcomes.

Overall, the demographic profile captures the diversity of Kerala's MSME sector, providing a solid foundation for further analysis. The study examined the underlying factors affecting financial availability through factor analysis.

Factor Analysis

The factor analysis focused on identifying underlying parameters of MSMEs' financial availability. Principal component analysis with Varimax rotation acquired five factors focused on the Eigenvalue >1 criterion, explaining 80.079% of total variance. Item Q8 was removed due to loadings below 0.7. The Kaiser-Meyer-Olkin (KMO) statistic of 0.924 confirmed sample adequacy, while Bartlett's Sphericity test at 1% level

supported significance. These results indicate strong adequacy for further analysis for MSMEs in Kerala, as presented in Table 2.

At Table 3, the selection of five factors was based on their ability to capture the diversity and critical characteristics of the sample, relevance to research objectives, and impact on access to finance and the firm's performance. Reliability of scale items within each factor was assessed using Cronbach's alpha: Source of Finance (0.887), Finance Constraints (0.846), MSMEs Life-cycle (0.898), Access to Finance (0.889), and Growth of MSMEs (0.903), indicating high internal consistency. These factors provide significant insights into the financial dynamics of MSMEs in Kerala. The study proceeded to explore relationships among these variables through correlation analysis.

Correlation Analysis

Table 4 presents the correlation analysis examining the growth of MSMEs (criterion variable) in relation to access to finance, sources of finance, financial constraints, and the MSME life cycle. Significant associations were observed across all dimensions. As MSMEs advance through their life cycle, access to finance improves ($r = 0.576$, $p < 0.01$), while financial constraints decline ($r = -0.415$, $p < 0.01$). This positive shift in accessibility is further linked to the availability of diverse funding sources ($r = 0.495$, $p < 0.01$), contributing to overall business growth ($r = 0.477$, $p < 0.01$). Reduced financial constraints correlate with improved access to formal financing ($r = -0.545$, $p < 0.01$) and greater business flexibility ($r = -0.479$, $p < 0.01$), both of which strengthen growth potential ($r = -0.453$, $p < 0.01$). Notably, access to finance shows a strong relationship with growth ($r = 0.595$, $p < 0.01$). Overall, MSME growth is positively and significantly correlated with access to finance, sources of finance, and life cycle. SEM was applied to estimate the hypothesized causal relationships.

Structural Model

Table 5 presents the structural model of MSME growth, showing an overall good fit. Fit statistics indicate acceptable values: CMIN (2.602), RMSEA (0.055), CFI (0.953), GFI (0.906), AGFI (0.871), TLI (0.942), and NFI (0.926). Recommended thresholds for GFI, CFI, NFI, and AGFI suggest values close to 1, while an RMSEA value below 0.08 confirms adequacy. Collectively, these indices validate that the SEM model appropriately represents the data and supports the study's analytical framework.

The study employed Structural Equation Modelling (SEM), as mentioned in Figure 2, with maximum likelihood estimation to analyse the connection between variables. The SEM results reveal that financial accessibility holds a critical role in MSME growth. Businesses with access to diverse financial sources and those at more mature stages of their life cycle face fewer

barriers to finance. Conversely, financial constraints significantly and negatively affect access, reflecting restrictive lending practices and insufficient collateral. Strong factor loadings across latent constructs reinforce the theoretical framework, confirming the validity of observed relationships. Model fit indices further support the adequacy of the structural model. The values of CMIN (2.602), RMSEA (0.055), CFI (0.953), GFI (0.906), AGFI (0.871), TLI (0.942), and NFI (0.926) all indicate a strong model fit.

Analysis presented in Table 6 reveals significant relationships between the examined variables, with p-values below 0.05 for all hypotheses. The standardized path coefficient (β) between the source of finance and financial accessibility is 0.231 ($p = 0.000$), supporting H1. Financial constraints show a negative path coefficient ($\beta = -0.200$, $p < 0.05$), confirming H2, denoting that higher financial constraints reduce MSMEs' access to finance. The MSME life cycle positively influences finance accessibility ($\beta = 0.380$, $p < 0.05$), supporting H3, suggesting that more mature enterprises experience improved access. Access to finance strongly impacts MSME growth ($\beta = 0.564$, $p = 0.000$), supporting H4. R^2 values indicate that 24% of variation in finance accessibility is explained by the three factors, and finance access accounts for 32% of MSME growth.

Moderation Analysis

The moderation analysis using the Hayes Process Macro examined the hypothesis that the relationship between access to finance and MSME growth is moderated by enterprise type (categorical variable). Access to finance was considered the independent variable (continuous), performance of MSMEs as the dependent variable, and type of enterprise as the moderator. Table 7 shows that the interaction term between access to finance and enterprise type significantly affects MSME growth ($\beta = 0.2150$, $p < 0.05$), confirming that the type of enterprise moderates the finance growth relationship, and thus, H5 is accepted. These findings align with previous studies highlighting that financial resources are inevitable for MSME development (Biswas, 2014; Cheng et al., 2014; Wang, 2016) and align with research indicating that larger firms typically require more capital to support expansion (Prasad, 2006). Figure 3 plots the interaction across Micro (code 1, $\beta = 0.3857$, $p = 0.000$), Small (code 2, $\beta = 0.5380$, $p = 0.000$), and Medium firms (code 3, $\beta = 0.6690$, $p = 0.000$). The results affirm that as firm size increases, the effect of access to finance on MSME growth becomes stronger, highlighting that medium enterprises require greater financial support for substantial expansion.

Discussion

Study findings explore the significance of varied influencing factors of MSMEs' access to finance and their subsequent effect

on growth. MSMEs' life cycle was found to have the most substantial impact on access to finance, suggesting that an MSME's stage in its life cycle determines its ability to secure financial support (Biswas, 2014; Karedza et al., 2014). The Asian Development Bank report on the finances of MSMEs in Bangalore revealed that financial access differs per the enterprise's life cycle stage (Singh and Wasdani, 2016). Our study extends this evidence by confirming that the life cycle is the most critical factor in securing finance. The life cycle also determines the type of financial sources accessible, indicating that both are complementary (Rajamani et al., 2022). Thus, MSMEs must understand their life-cycle stage and modulate their approach accordingly. Owners/managers should carefully consider their development stage when seeking finance, as it crucially influences growth.

The study also revealed that financial constraints hurt performance (Belas et al., 2017; Pissarides et al., 2003). Restrictions in financial access limit growth potential and business execution (Rajamani et al., 2022). It is recommended that MSMEs address such constraints through effective loan management, structured support, and training initiatives. Financial accessibility plays a central role in MSME prosperity, enabling them to meet obligations, expand operations, and seize opportunities (Prasad, 2006; Saghir & Aston, 2017). Ensuring timely availability of funds at fair interest rates and with minimal obstacles will strengthen resilience and competitiveness.

Associations representing MSMEs can help by disseminating financial scheme information and promoting adoption through digital platforms like WhatsApp and SMS. Non-banking financial sources also offer viable options, though their suitability depends on risk-return profile, business stage, and financial expertise (Tambunan, 2018). Long-term growth opportunities, including MSME listings, should be evaluated as they open additional avenues for sustainable expansion.

Study limitations include the focus on MSMEs in the Calicut district of Kerala, restricting generalization to other regions. The study also emphasized urban enterprises, while capital access in rural areas may differ significantly. Future research could compare rural and urban MSMEs to highlight disparities in financial opportunities and accessibility.

Conclusion

This research paper has spotlighted the critical need to facilitate financial support and accelerate access to finance for MSMEs to foster their development and ensure long standing success. The outcomes stress the need for tailored approaches that consider the clear-cut needs and stages of development of MSMEs. By

facilitating access to funds, MSMEs can overcome the financial constraints that often hinder their expansion and performance. This includes addressing challenges such as limited collateral, high interest rates, complex application procedures, and the need for more financial literacy among MSME owners. Moreover, this research highlights the decisive role of policymakers in creating an enabling environment for MSMEs. This includes implementing favourable regulatory frameworks, promoting financial literacy and entrepreneurship education, fostering public-private partnerships, and establishing mechanisms for monitoring and evaluation. Policymakers should collaborate with industry associations, financial institutions, and stakeholders to ensure that MSMEs can access various financial services, including credit, insurance, and investment opportunities. By recognizing the immense potential of MSMEs and actively working towards improving their access to finance, policymakers can unleash a powerful engine for economic growth and development. When adequately supported, MSMEs can drive job creation, enhance productivity, cultivate innovation, and contribute to overall economic diversification. Thus, policymakers and stakeholders must prioritize providing financial assistance and implement targeted interventions to empower MSMEs and unlock their full potential.

Future research should examine the thought processes, operational processes, and financial parameters evaluated by funding agencies while funding MSMEs, along with the mechanisms through which they operate. Differences in funding between cities and the testing of sustainable methods of financial access should also be assessed. Multi-center studies involving policy makers, funding agencies, privately funded companies, and MSME owners are essential to develop an inter sectoral approach to addressing these issues.

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Tables and Figures

Tables 1

Demographic profile respondents (N=320)

Measures	Items	Frequency	Percentage
Gender	Male	230	71.9
	Female	90	28.1
Age	Upto 25	68	21.3
	26-35	131	40.9
	36-45	72	22.5
	46-55	44	13.8
	Above 55	5	1.6
Type of business	Micro	42	13.1
	Small	111	34.7
	Medium	167	52.2
Operational Years	Up to 5 years	92	28.7
	6-10 years	148	46.3
	11-15 years	39	12.2
	16-20 years	5	1.6
	Above 20 years	36	11.3
Activities of business	Manufacturing	109	34.2
	Transport	24	7.5
	Construction	27	8.4
	Trade and commerce	112	35.1
	Restaurants	17	5.2
	Service	23	7.12
	Others	8	2.48

Source: Author's Analysis

Tables 2

KMO and Bartlett's test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.891
Bartlett's Test of Sphericity	Approx. Chi-Square	3843.586
	Df	136
	Sig.	.000

Source: Author's Analysis

Tables 3

Scale items and factor loadings

	Scale Items	Factor Loadings	Cronbach's alpha
Source of Finance			
Q1	Loan from Moneylenders	.845	0.887
Q2	Loan from financial institutions	.837	
Q3	Funds from IPOs	.795	
Finance constraints			
Q4	Lack of knowledge about available schemes	.829	0.846
Q5	Collateral requirement	.797	
Q6	Lengthy procedures in documentation	.833	
Q7	High-Interest Rates	.813	
MSMEs Life-cycle			
Q9	Conception/ Development stage	.855	0.898
Q10	Growth stage	.832	
Q11	Maturity stage / Expansion stage	.813	
Access to finance			
Q12	Loans offered without need for collateral security	.838	0.889
Q13	Flexibility in the repayment schedule	.790	
Q14	Loans guaranteed by government-backed schemes	.894	
Growth of MSMEs			
Q15	Increase in production volume	.847	0.903
Q16	Increase in Sales turnover	.794	
Q17	Increase in profit	.794	
Q18	Increase in overall business performance	.801	

Source: Author's Analysis

Tables 4

Correlation of all variables

		MSMEs Life cycle	Finance Constraints	Source of Finance	Access to Finance	Growth
MSMEs Life cycle	Pearson Correlation	1				
	Sig. (2-tailed)		0	0	0	0
Finance Constraints	Pearson Correlation	-.415**	1			
	Sig. (2-tailed)	0		0	0	0
Source of Finance	Pearson Correlation	.495**	-.545**	1		
	Sig. (2-tailed)	0	0		0	0
Access to Finance	Pearson Correlation	.576**	-.479**	.528**	1	
	Sig. (2-tailed)	0	0	0		0
Growth	Pearson Correlation	.477**	-.453**	.489**	.595**	1
	Sig. (2-tailed)	0	0	0	0	

Source: Author's Analysis

**Correlation is significant at the 0.01 level (2-tailed)

Tables 5

Goodness-of-Fit Indices

Fit Index	Derived Value	Recommended Value
Chi-Square/degree of Freedom (CMIN/DF)	2.602	≤ 3.0
Goodness-of-Fit Index (GFI)	0.906	≥ 0.90
Adjusted Goodness of Fit Index (AGFI)	0.871	≥ 0.80
Tucker-Lewis Index (TLI)	0.942	≥ 0.90
Normalized Fit Index (NFI)	0.926	≥ 0.90
Comparative Fit Index (CFI)	0.953	≥ 0.90
Root Mean Square Error of Approximation (RMSEA)	0.055	≤ 0.10

Source: Author's Analysis

Tables 6

Path coefficients of the structural model

Outcome variables		Causal Variables	S.E.	C.R.	P	Path coefficient	Results
Access to finance	<---	Source of finance	.045	3.975	***	0.231	Hypothesis H1 supported
Access to finance	<---	Finance constraints	.057	-3.443	***	-0.200	Hypothesis H2 supported
Access to finance	<---	MSMEs life-cycle	.054	6.303	***	0.380	Hypothesis H3 supported
Growth	<---	Access to finance	.055	8.834	***	0.564	Hypothesis H4 supported

Source: Author's Analysis

P refers to the differential probability. ***=p<0.000, **=p<0.01, *=p<0.05

Tables 7

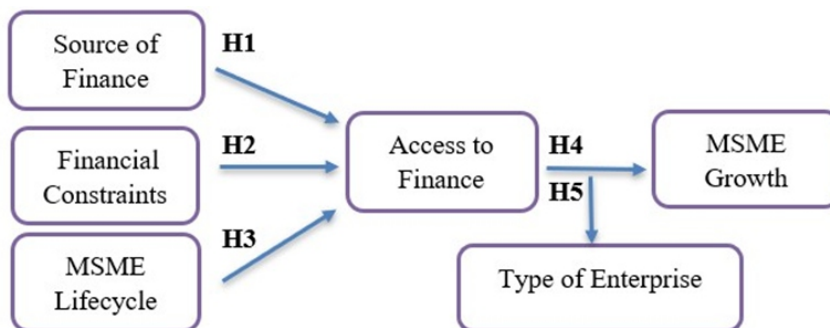
Summary of moderation analysis

	Coefficient	SE	T	P
Constant	3.5007	.7732	4.5169	.0000
Access to finance	.5590	.2071	2.7391	.0065
Type of enterprise	-.7663	.3015	-2.5457	.0101
Interaction	.2150	.0848	2.5881	.0114

Figures

Figure 1

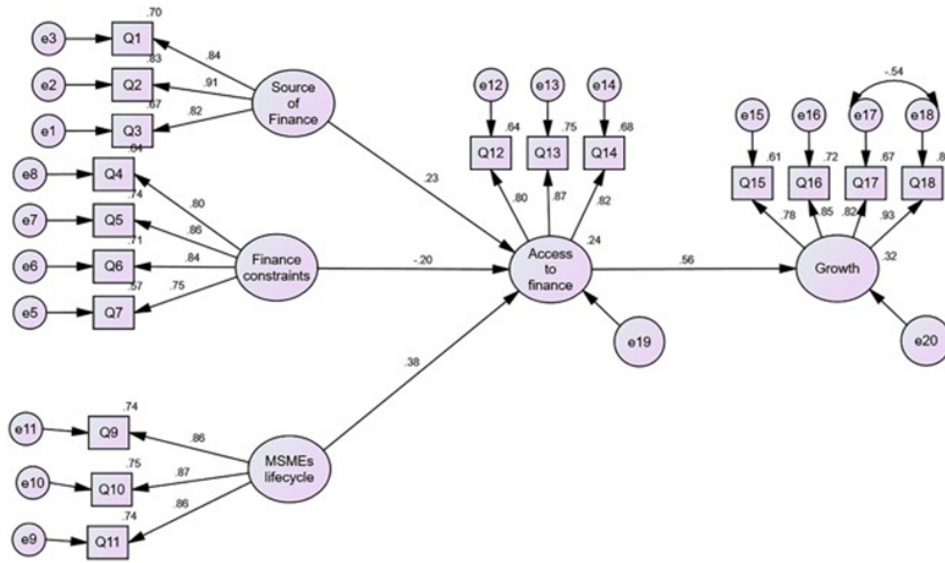
The conceptual model



Source: Author's Analysis

Figure 2

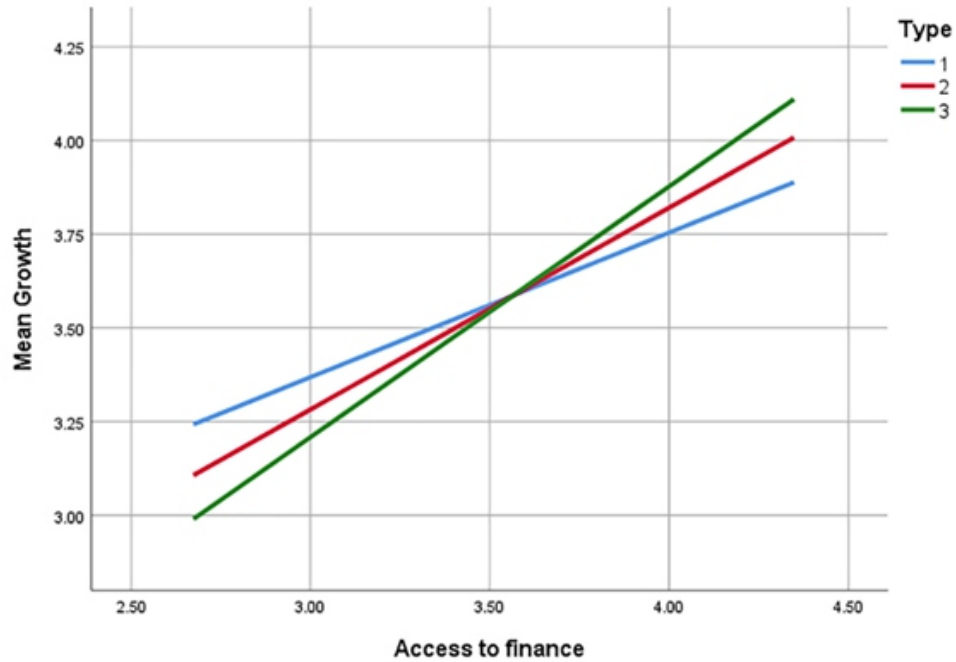
Structural Equation Model



Source: Author's Analysis

Figure 3

Slope for type of enterprise as moderator



Source: Author's Analysis

Bridging the Digital Divide: Unpacking E-Banking Adoption in India's Public Sector Banks through PLS-SEM and Customer Segmentation

*Gangadhara B
**K. Mala

Abstract

This study investigates the driving factors and barriers to e-banking service adoption among public sector bank customers in India, integrating psychological, infrastructural, and relational aspects. Utilizing a dual-stage methodology, data collected from 367 respondents were analysed using PLS-SEM to examine the influence of Technology Anxiety, Digital Literacy, and Access to Technology, Trust in Technology, and Bank Support and Communication on e-banking adoption. Subsequently, cluster analysis segmented customers into distinct behavioural profiles. Findings reveal that while Digital Literacy, Trust in Technology, and Bank Support and Communication positively influence adoption, Technology Anxiety and, most significantly, Access to Technology act as critical inhibitors. The cluster analysis identified "Digital Champions," "Willing but Cautious Users," and "Disengaged Skeptics," highlighting the diverse challenges and opportunities for digital inclusion. These results provide actionable insights for public sector banks to develop targeted strategies, emphasizing infrastructure development, tailored digital education, user-friendly interfaces, robust security, and personalized support to foster equitable e-banking adoption across different customer segments.

Keywords: Digital Champions, E-banking, Digital Literacy, Technology Anxiety and Digital inclusion

Introduction

The financial services industry has experienced a profound digital transformation in recent years, largely driven by technological innovations that have redefined how customers interact with banks. Electronic banking (e-banking)—which includes mobile banking, internet banking, and various digital payment systems—has emerged as a central channel for delivering banking services. This shift toward digital platforms is no longer optional for financial institutions; it has become a strategic necessity in meeting modern customer expectations and maintaining competitive advantage [1, 2]. Through enhanced convenience, accessibility, and operational efficiency, e-banking is fundamentally altering the traditional banking paradigm [3].

India, as one of the fastest-growing digital economies, is at the forefront of this global transition. Flagship government initiatives such as Digital India have accelerated the transition towards a cash-light and digitally inclusive economy. These initiatives have led to a sharp rise in digital transactions and a

growing ecosystem of fintech services [3, 4]. Official statistics reflect this digital surge: Volume of digital payment transactions jumped from around 2,071 crore in 2017–18 to nearly 18,737 crore in 2023–24 – with a CAGR of 44%. Similarly, the value of transactions grew in the same period from ₹1,962 lakh crore to ₹3,659 lakh crore [4]. A significant consolidation factor in this increase is the Unified Payments Interface, which witnessed exponential growth—92 crore in FY 2017–18 to over 13,000 crore in FY 2023–24—with a total value of more than ₹200 lakh crore [4]. At the beginning of 2025, more than 640 banks are connected to UPI, which handles over 16 billion transactions per month [5]. This momentum is matched by the Indian digital banking market, which stood at USD 1.18 billion in 2023 and is estimated to cross the \$5 billion mark by 2035 [6].

Within this evolving landscape, Public Sector Banks (PSBs) play a pivotal role, particularly in extending banking services to underbanked and rural populations [7]. These institutions are instrumental in achieving the broader goals of financial

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inclusion and digital access. In recent years, PSBs have undertaken several digitalization efforts, balancing both physical and digital outreach through "phygital" strategies [8]. However, the pace and pattern of e-banking adoption in PSBs differ significantly from that of private sector and fintech players, often due to structural constraints and the diversity of their customer base.

Despite the exponential rise in digital transaction volumes, challenges related to equitable e-banking adoption still remain, especially in the public banking domain. A critical review of the literature reveals that while several studies have explored constructs like user satisfaction, loyalty, or intention to use digital banking [9, 10], there has been relatively less focus on identifying barrier-oriented antecedents—such as psychological discomfort (technology anxiety), capability-related gaps (digital literacy), or infrastructural challenges (access inequality)—particularly in the PSB context [11, 12]. Moreover, few studies integrate both causal modeling and segmentation analysis, which limits the practical applicability of findings in developing targeted digital adoption strategies. This gap is identified in the provided literature gap, and this research endeavor to make an attempt to fill this gap by proposing and empirically validating a comprehensive conceptual framework to analyze the impact of few barriers and facilitators in the adoption of e-banking services in public sector banks.

The aims of this work are:

1. To ascertain the influence of major psychological and infrastructure constructs—technology anxiety, digital literacy, access barriers, trust and bank support—on e-banking adoption in public sector banks of India.
2. To classify the customers based on these selected barriers and facilitators.
3. To provide actionable guidelines to increase inclusion in digital banking, by tackling the key barriers to adopting it.

Literature Review

Recent progress in digital technology has caused huge changes to the world of banking and finance globally which has led to substantial research about the antecedents of e-banking usage. Grounded theories, such as the TAM and UTAUT, have been used as theoretical foundations in this area, and have emphasized constructs including perceived usefulness, ease of use and social influence to account for user behaviours [9,10,13]. Parallel research have expanded to investigate the impact of quality dimension on the satisfaction and continuance usage in mobile banking and online banking [14].

In India, the digital banking ecosystem has witnessed substantial growth, propelled by government-led digital initiatives and rising smartphone penetration [15, 16]. Research within the Indian context has explored multiple facets of digital banking, ranging from customer attitudes and adoption challenges to the transformative impact of platforms like the Unified Payments Interface (UPI) [3]. UPI has emerged as a preferred digital payment method due to its user-friendly interface and real-time transaction capabilities [4]. Despite this growth, deeper insights are needed into the barriers that inhibit broader and more meaningful adoption of digital banking services beyond simple payment functions.

While much of the existing literature emphasizes enablers of adoption, there is a growing recognition of the importance of understanding barriers that restrict certain segments of the population from fully engaging with e-banking platforms. Among these, technology anxiety has been identified as a psychological inhibitor, causing hesitation or avoidance of digital interfaces [17-22]. Digital literacy, referring to users' ability to navigate and operate digital tools effectively, has also been highlighted as a key determinant of successful adoption [23-26]. In addition, access to technology, including stable internet connectivity and device ownership, remains a fundamental prerequisite for digital participation, particularly in geographically and economically marginalized communities [27, 28].

Trust in digital platforms, encompassing perceptions of system security, reliability, and privacy, continues to play a pivotal role in shaping consumer decisions related to digital banking [29-32]. Additionally, the quality of bank support and communication, including responsiveness and clarity of information, has been shown to influence user confidence and engagement [33].

Despite the breadth of research, few studies have holistically examined the combined impact of these barrier-oriented constructs within the unique operational environment of India's public sector banks (PSBs). These institutions serve a wide demographic, including digitally inexperienced users, and face distinct challenges compared to private and fintech entities. Moreover, there is limited application of dual-stage analytical methodologies—specifically, integrating Partial Least Squares Structural Equation Modeling (PLS-SEM) with cluster analysis—in e-banking adoption research. This methodological gap restricts the ability to both test causal relationships and identify behavioral segments within the user base.

In order to fill this gap, the current research offers a holistic model that aims to investigate how technology anxiety, digital

literacy, access disparity, trust, and organizational support all together affect PSBs' e-banking service adoption. Through causal modelling and customer segmentation analysis, this study seeks to provide theoretical insights and practical recommendations for advancing digital inclusion in India's public banking space.

Theoretical Framework and Research Hypotheses

This study draws upon a synthesis of theoretical perspectives to construct a comprehensive framework for understanding e-banking service adoption, particularly focusing on the barriers and enabling factors within public sector banks. The chosen theories provide a robust foundation for hypothesizing the relationships between technology anxiety, digital literacy, access to technology, trust in technology, bank support and communication, and the ultimate adoption of e-banking services.

Theoretical Foundations and Conceptual Framework

Technology Acceptance Model (TAM) and Technology Anxiety

The TAM, developed by Davis [34], provides a base for comprehending users' adoption of innovations. In particular, it underscores the importance of perceived usefulness and perceived ease of use in determining acceptance behavior. While TAM has historically been centered on factors that enable adoption, later extensions have argued that adverse emotional reactions, specifically anxiety related to digital tools, may be significant barriers.

Technology anxiety reflects the discomfort or fear experienced when individuals engage with, or anticipate interacting with, unfamiliar or complex digital systems [17]. In the context of e-banking, such anxiety may stem from concerns about navigating unfamiliar interfaces, fear of making errors, or general low self-efficacy in using technology [18, 22]. When users perceive e-banking platforms as overwhelming or insecure, their likelihood of adoption decreases [19, 20].

- **H1:** *Technology anxiety negatively influences e-banking service adoption.*

Diffusion of Innovations (DOI) Theory and Digital Literacy & Access to Technology

Rogers' [35] Diffusion of Innovations (DOI) theory offers insights into how innovations gain acceptance across populations. Key attributes influencing adoption include perceived complexity, compatibility, and the ability to observe benefits. Within this

framework, both individual competencies and external resources shape the innovation diffusion process.

Digital literacy represents an individual's capability to effectively use digital technologies for accessing, evaluating, and applying information [23, 24]. In the e-banking context, this entails the user's competence in securely navigating digital banking platforms, understanding functionalities, and conducting transactions [25, 16]. As digital proficiency increases, the perceived ease and usefulness of e-banking also improve, facilitating adoption [26].

In parallel, access to technology encompasses the infrastructural elements—such as internet connectivity and device availability—that are essential to digital participation [27]. In many regions, limited or inconsistent access to these foundational tools continues to exclude otherwise willing users from engaging in digital banking services [28,36].

- **H2:** *Digital literacy positively influences e-banking service adoption.*
- **H3:** *Technology access barriers negatively influences e-banking service adoption.*

Trust Theory and Trust in Technology

Trust theory underscores the importance of perceived reliability and safety in fostering adoption, especially in virtual service environments where face-to-face interaction is absent [29]. In e-banking, trust in technology refers to the belief that platforms are secure, dependable, and capable of protecting sensitive financial data [30, 31].

This trust is shaped by users' perceptions of system performance, data protection policies, and past experiences. A high level of confidence in the integrity and security of e-banking systems reduces perceived risk, which in turn encourages adoption [32, 37, 38].

- **H4:** *Trust in technology positively influences e-banking service adoption.*

Service Quality Theory: Bank Support and Communication

The Service Quality (SERVQUAL) Model developed by Parasuraman et al. [39] emphasizes the impact of service reliability, responsiveness, and assurance on customer perceptions and behaviours. In the digital banking context, while the platform itself delivers the service, the role of human interaction—particularly in support and communication—remains crucial.

Bank support and communication refers to how well financial institutions assist users in understanding and using e-banking

platforms. This includes the clarity of communication, responsiveness of customer support teams, and availability of training or onboarding resources [33]. Such supportive efforts are particularly critical for digitally hesitant users, as they reduce confusion, build confidence, and promote sustained use of digital services [40, 41].

- **H5: Bank support and communication positively influences e-banking service adoption.**

Methodology

Research Design

The given study was of quantitative, cross-sectional design and was carried out using a standardized survey where behavioural and infrastructure factors that could influence e-banking adoption in public sector banks in India were explored. A two-phase analytical approach was used. At first, the hypothetical relationships among constructs were tested using Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM was applied due to its ability to control for the non-normality of data distributions and its ability to test complicated models [42]. After this, cluster analyses were used to classify respondents according to levels of the latent variables, allowing for user profiles to be discursively identified and for the provision of strategies to differentiate banking interventions in the future. Such an all-inclusive analysis is not widespread in current research of e-banking, particularly for public sectors.

Population and Sampling

The research examined those customers who are current or potential user of e-banking facilities of public sector banks in India. The large and geographically divided population determined the use of convenience sampling. Although this non-probability sampling approach has the disadvantage of low generalizability, it permitted us to reach many respondents of various types given our resources [43]. An attempt was made to obtain demographic diversity (e.g. age, gender, education level, income group) in the sampling to increase the representativeness of this sample.

Table 1. Respondents details

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	202	55.00%
	Female	165	45.00%
Age Group	Below 25 years	76	20.70%
	25–35 years	149	40.60%
	36–45 years	92	25.10%
	Above 45 years	50	13.60%
Education Level	Undergraduate	89	24.20%

Instrument Development

The questionnaire was comprised of questions that were rated using a 1–5-point Likert scale (Strongly agree to strongly disagree). Operationalization for all constructs has been done using items from published and validated scales of prior studies to ensure both content validity and contextual match with the Indian public banking context. Items for Technology anxiety were adopted from Lee [21] but were modified by referring to Galdolage and Rasanjalee [17]. Digital Literacy was assessed by adjusting scales from Ullah et al. [23] and Munari & Susanti [25]. Barriers to technology access were evaluated based on indicators inspired by Aishwaryalaxmi [27] and Rujitoningtyas et al. [28]. Trust in Technology was measured using items adapted from Ahmad & Soleymani [29] and Skvarciany & Jurevičienė [30]. Bank Support and Communication was measured by items as per Sheshadri & Rani [33], and Alkami [40]. The dependent variable E-Banking Service Adoption was operationalised with items based on Yates [44] and Choudhary et al. [1].

Data Collection Procedure

All data was gathered through an online survey that was sent out through different digital channels such as mail, messenger and social media. Before proceeding, the participants were screened to verify if they were associated with the public sector banks. An informed consent statement explained that participation was voluntary, that anonymity and confidentiality were guaranteed, and that participants had the right to withdraw at any time.

Data Analysis Strategy

Data analysis proceeded in a planned order. Descriptive statistics were computed to describe respondent profiles. The PLS-SEM using SmartPLS 4.0 involved assessing the measurement model and the structural model by path coefficients. Latent variable scores were subjected to cluster analysis starting with two-means cluster analysis to detect the best divisions and then utilizing k-means clustering for grouping and interpretation using SPSS version (30.0).

Occupation	Graduate	178	48.50%
	Postgraduate & above	100	27.30%
	Student	64	17.40%
	Private sector employee	143	39.00%
	Government employee	67	18.30%
	Self-employed	57	15.50%
	Homemaker/Other	36	9.80%
E-banking Usage Experience	Less than 1 year	56	15.30%
	1–3 years	136	37.10%
	More than 3 years	175	47.60%

Results

Measurement Model Evaluation: Model fit was also examined based on the Standardized Root Mean Square Residual (SRMR). The estimated SRMR is 0.049, suggesting a good model fit below the recommended value of 0.08 [45].

Indicator reliability: The reliability of the indicators is assessed through analysis of the outer loadings of the indicators on their respective constructs (Table 2). All outside loadings exceeded the recommended level of 0.7, suggesting that the manifest variables significantly measure the associated constructs.

Reliability: Cronbach's Alpha and Composite Reliability (CR) were used to measure the internal consistency of the constructs. As shown in Table 3, the value was greater than 0.7, indicating good reliability of the measurement scale [42].

Convergent Validity – Average Variance Extracted (AVE) was used for testing this validity. for all constructs. As presented in Table 3, the values for all AVE were acceptable (above 0.5), they ranged from 0.755 (Technology Anxiety) to 0.833 (Bank Support & Communication). This means that each construct accounts for a considerable amount of the variance in their indicators, providing evidence of acceptable convergent validity [46].

Table 2. Factor loadings

	Items	Loadings
My bank provides clear instructions on how to use digital banking services.	BSC1	0.911
I receive timely support from the bank when I face technical issues.	BSC2	0.918
My bank communicates effectively about new digital features or updates.	BSC3	0.919
I feel the bank offers enough education or awareness about using e-banking.	BSC4	0.903
I am confident in using digital platforms for financial transactions.	DL1	0.812
I can independently operate mobile or online banking applications.	DL2	0.917
I can evaluate whether digital banking sites or apps are genuine and safe.	DL3	0.88

Discriminant validity was evaluated using two established methods: the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio, as presented in Tables 4 and 5, respectively.

- **Fornell-Larcker Criterion:** Discriminant validity is confirmed when the square root of the AVE for each construct is greater than its correlations with all other constructs (off-diagonal elements). This indicates that each construct shares more variance with its own indicators than with those of other constructs. For example, the AVE square root for Bank Support & Communication is 0.913, which is higher than its correlations with Digital Literacy (0.281), E-Banking Adoption (0.503), Technology Access Barrier (–0.243), Technology Anxiety (–0.196), and Trust in Technology (0.533), thus supporting its distinctiveness.
- **HTMT Ratio:** The HTMT values, shown in Table 5, were all below the conservative threshold of 0.85, further confirming discriminant validity. For instance, the HTMT value between Bank Support & Communication and Digital Literacy was 0.299, while the value between Technology Anxiety and Trust in Technology was 0.153—both well within acceptable bounds, indicating sufficient separation between constructs.

I know how to reset passwords or manage digital credentials securely.	DL4	0.917
I can resolve minor technical issues while using e-banking without help.	DL5	0.919
I regularly use mobile or online banking services.	EBA1	0.92
I prefer digital transactions over physical branch visits.	EBA2	0.906
I use multiple digital channels (app, website, UPI) for banking needs.	EBA3	0.894
I am willing to try new digital banking services offered by my bank.	EBA4	0.861
I find e-banking convenient and effective for managing my finances.	EBA5	0.888
I feel anxious when I have to perform banking tasks online.	TA1	0.892
I avoid digital banking due to fear of making mistakes.	TA2	0.891
The idea of using online banking systems stresses me.	TA3	0.883
I feel uncomfortable learning new digital banking features.	TA4	0.895
I often hesitate to use e-banking because of privacy concerns.	TA5	0.849
Using e-banking systems feels overwhelming to me.	TA6	0.798
I do not always have reliable access to internet or mobile data.	TAB1	0.904
I face frequent technical issues (e.g., slow speed, app crashes) during e-banking.	TAB2	0.854
I do not own a suitable device (e.g., smartphone or computer) for digital banking.	TAB3	0.885
Poor mobile or network coverage limits my use of e-banking.	TAB4	0.891
Digital banking apps are often not compatible with my device.	TAB5	0.905
I lack access to updated software/tools for smooth banking transactions.	TAB6	0.87
Limited access to technical support prevents me from resolving digital banking issues.	TAB7	0.91
I trust the bank's digital systems to protect my personal data.	TT1	0.841
I believe online banking transactions are secure.	TT2	0.885
I trust that my bank provides accurate and transparent digital services.	TT3	0.874
I feel safe sharing my financial information via digital banking platforms.	TT4	0.895

Table 3. Constructs reliability and validity

	Cronbach's alpha	CR	AVE
Bank support & communication	0.933	0.952	0.833
Digital literacy	0.934	0.95	0.792
E-Banking adoption	0.937	0.952	0.799
Technology access barrier	0.956	0.963	0.789
Technology anxiety	0.935	0.949	0.755
Trust in technology	0.896	0.928	0.763

Table 4. Discriminant validity (Fornell- Larcker criterion)

	Bank support & Communication	Digital literacy	E-Banking adoption	Technology access barrier	Technology anxiety	Trust in Technology
Bank support & communication	0.913					
Digital literacy	0.281	0.89				
E-Banking adoption	0.503	0.492	0.894			
Technology access barrier	-0.243	-0.249	-0.547	0.888		
Technology anxiety	-0.196	-0.205	-0.373	0.288	0.869	
Trust in technology	0.533	0.285	0.472	-0.226	-0.145	0.874

Table 5. Discriminant validity (HTMT ratio)

	Bank support and Communication	Digital literacy	E-Banking adoption	Technology access barrier	Technology anxiety	Trust in technology
Bank support and communication						
Digital literacy	0.299					
E-Banking adoption	0.535	0.524				
Technology access barrier	0.255	0.261	0.573			
Technology anxiety	0.204	0.217	0.389	0.296		
Trust in technology	0.584	0.312	0.51	0.241	0.153	

Structural Model Evaluation

Path Coefficients and Hypothesis Testing

The results of the structural model assessment are presented in the hypothesis testing table 6 and Figure 1. Each hypothesized relationship was evaluated based on its standardized path coefficient (β), corresponding T-statistic, and P-value, using a 5,000-sample bootstrapping procedure in SmartPLS. A hypothesis was considered supported if the P-value was less than 0.05 and the T-statistic exceeded 1.96.

Technology Anxiety was found to have a significant negative effect on e-banking service adoption ($\beta = -0.151$, $T = 3.372$, $P = 0.001$), thus supporting H1. Digital Literacy demonstrated a significant positive effect on e-banking adoption ($\beta = 0.262$,

$T = 7.084$, $P < 0.001$), providing support for H2. Technology Access Barriers also had a significant negative influence on e-banking adoption ($\beta = -0.344$, $T = 8.508$, $P < 0.001$), supporting H3.

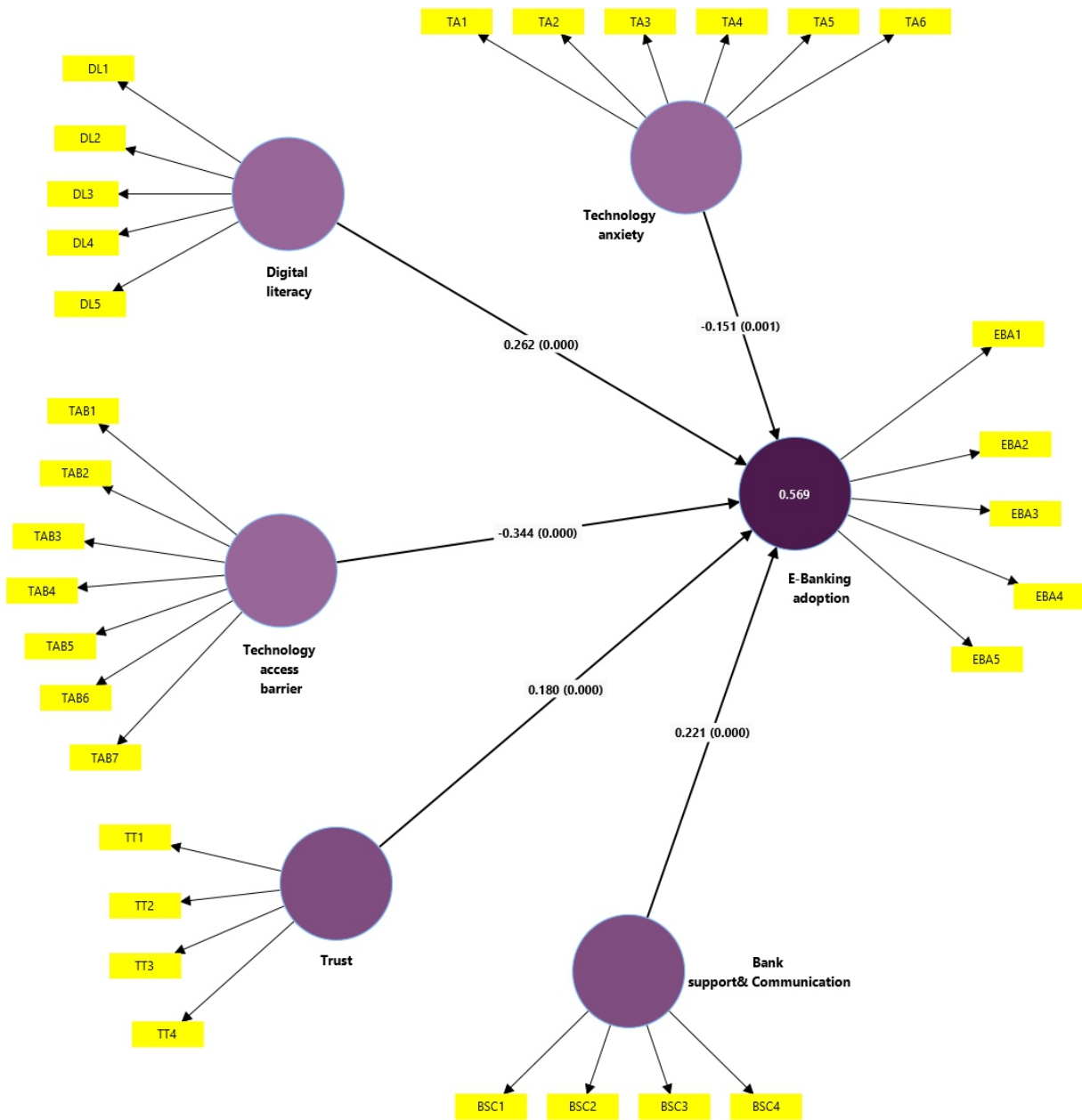
Trust in Technology showed a significant positive relationship with e-banking adoption ($\beta = 0.180$, $T = 4.233$, $P < 0.001$), confirming H4. Lastly, Bank Support and Communication had a significant positive effect on adoption behavior ($\beta = 0.221$, $T = 5.016$, $P < 0.001$), indicating support for H5.

These findings confirm that all five hypothesized paths are statistically significant and align with theoretical expectations regarding user perceptions and adoption of e-banking services in public sector banks.

Table 6. DHypothesis testing using path coefficients

	Coefficient (β)	T statistics	P values Result
Technology anxiety -> E-Banking adoption	-0.151	3.372	0.001H1 significant
Digital literacy -> E-Banking adoption	0.262	7.084	0H2 significant
Technology access barrier --> E-Banking adoption	-0.344	8.508	0H3 significant
Trust in technology-> E-Banking adoption	0.18	4.233	0H4 significant
Bank support& Communication -> E-Banking adoption	0.221	5.016	0H5 significant

Figure 1: Structural model for E-banking adoption



Model outcome:

The coefficient of determination i.e. R-square value for E-Banking Adoption was **0.569**, and the adjusted R-square was **0.563**. This indicates that the independent variables (Technology Anxiety, Digital Literacy, Technology Access Barrier, Trust in Technology, and Bank Support & Communication) collectively explain **56.9%** of the variance in E-Banking Service Adoption, which is considered substantial [42]. The predictive relevance (Q^2) of the model for E-Banking Adoption was also positive **0.488**, suggesting that the model has good out-of-sample predictive power.

Effect Size (f^2):

The effect size analysis revealed that Technology Access Barrier had the strongest influence on e-banking adoption with an f^2 value of **0.234**, indicating a large practical effect. Digital Literacy demonstrated a moderate effect (0.136), while Bank Support and Communication (0.077), Trust in Technology (0.052), and Technology Anxiety (0.047) showed small but meaningful effects. These interpretations align with Cohen's [47] guidelines, where f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effect sizes, respectively.

Table 7. F square values

	E-Banking adoption
Bank support & communication	0.077
Digital literacy	0.136
Technology access barrier	0.234
Technology anxiety	0.047
Trust in technology	0.052

Cluster Analysis Results- Two Step Cluster Summary

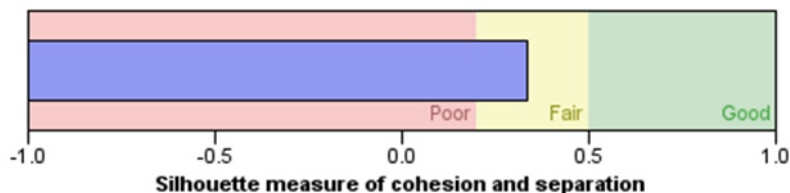
The Two-Step Cluster Analysis initially revealed a three-cluster solution, determined using Schwarz's Bayesian Information Criterion (BIC) and log-likelihood methods. The silhouette score

(~0.4) indicated fair cluster quality, suggesting moderate separation among user groups. Though some overlap exists, the clusters were sufficiently distinct to proceed with K-Means clustering for refined segmentation.

Model Summary

Algorithm	TwoStep
Inputs	6
Clusters	3

Cluster Quality



Final Cluster Profiles (K-Means Results)

The cluster analysis successfully classified the sample (N = 367) into three distinct user segments based on six key dimensions: bank support & communication, digital literacy, e-banking adoption, technology access barrier, technology anxiety, and trust. The results of the ANOVA tests (table 9) revealed statistically significant differences across all variables ($p < .001$), reinforcing the robustness of the cluster solution.

- Cluster 1: Willing but Cautious Users** (n = 104). This segment showed moderate agreement with bank support and digital trust, but also higher technology-related barriers and anxiety. Their digital literacy was neutral, and e-banking adoption was low despite a fair level of trust. These users appear open to adoption but are inhibited by external barriers and confidence issues.

- Cluster 2: Digital Champions** (n = 122). Users in this group displayed strong agreement across all positive factors, including high levels of bank support, digital literacy, trust, and e-banking adoption. They also reported the lowest technology anxiety and access barriers, positioning them as the most empowered and digitally ready cluster.

- Cluster 3: Disengaged Skeptics** (n = 141). This group reflected the lowest trust and lowest e-banking adoption, coupled with negative perceptions of bank communication and digital literacy. Although their anxiety and barrier scores were moderate, their overall profile suggests detachment and skepticism, making them the most resistant segment.

Table 8. Final Cluster Centres

	Cluster		
	1	2	3
Bank support & Communication	0.41	0.62	-0.83
Digital literacy	-0.01	0.65	-0.56
E-Banking adoption	-0.17	1.08	-0.81
Technology access barrier	0.55	-0.95	0.41
Technology anxiety	0.57	-0.77	0.24
Trust	0.57	0.56	-0.91

Table 9. ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Bank support & Communication	80.934	2	0.564	364	143.619	<.001
Digital literacy	47.868	2	0.745	364	64.232	<.001
E-Banking adoption	118.237	2	0.359	364	329.647	<.001
Technology access barrier	82.907	2	0.553	364	149.994	<.001
Technology anxiety	56.887	2	0.696	364	81.76	<.001
Trust	94.075	2	0.491	364	191.433	<.001

Discussion

This study investigated the influence of key enablers and barriers—namely technology anxiety, digital literacy, access to technology, trust in technology, and bank support and communication—on the adoption of e-banking services among public sector bank customers in India. The findings offer robust insights into the behavioral and infrastructural determinants that shape digital banking adoption in this vital segment.

Impact of Technology Anxiety on E-Banking Adoption

The findings confirm that technology anxiety is an important barrier to e-banking adoption. This is consistent with previous research that suggests that fear, distrust, and dissatisfaction with digital media can inhibit technology use, particularly within financial contexts [17,21]. The psychological barrier described above becomes even more important in the context of public sector banking, because a relatively large group of users is older and less tech-savvy [20, 22]. The point is that alleviating tech stress with easy interfaces, training modules and empathetic user support, translates directly into better adoption.

Role of Digital Literacy

Digital literacy emerged as a strong positive influence on e-banking adoption. Users with the skills and confidence to

navigate online platforms are more likely to perceive digital banking as accessible and beneficial. This finding supports earlier literature emphasizing the importance of digital competence in technology acceptance [23, 26, 48]. For public sector banks, this underlines the strategic value of literacy campaigns and targeted user education—particularly in semi-urban and rural markets.

Influence of Technology Access Barriers

The study confirmed that limited access to necessary technology—such as internet connectivity and suitable devices—remains a key barrier to e-banking adoption. This reflects the continuing digital divide in India, especially in underserved regions [27, 28]. Customers who are otherwise willing and digitally capable may still be excluded if basic infrastructure is lacking. Public sector banks, often instrumental in driving financial inclusion, must work in tandem with policy-makers and service providers to ensure broader access to the digital ecosystem.

Trust in Technology

Trust in technology plays a crucial role in facilitating e-banking adoption. Users are more inclined to adopt digital services when they believe their personal and financial data are secure, and

when systems are perceived as reliable [29, 32, 49, 50]. For public sector banks, maintaining robust cybersecurity frameworks and communicating these safeguards effectively to customers is essential. Transparency in handling data and transactions can reinforce trust, particularly among first-time users and skeptics.

Bank Support and Communication

Effective bank support and communication significantly enhance digital adoption. Clear instructions, responsive grievance redressal, and proactive communication about new features reduce user uncertainty and build confidence [33, 40]. Public sector banks, often perceived as bureaucratic, must focus on delivering consistent and user-centric communication to aid the transition from traditional to digital services.

Customer Segmentation Insights from Cluster Analysis

The cluster analysis provided further depth by identifying three distinct customer segments:

- **Digital Champions** are confident, digitally literate users with high trust and adoption levels. They represent early adopters and brand advocates.
- **Willing but Cautious Users** possess moderate levels of trust and support but are held back by technology anxiety and limited access. With proper support, they can transition to regular users.
- **Disengaged Skeptics** exhibit the most resistance, with low trust, low adoption, and poor perceptions of digital communication and literacy.

Implications

Managerial Implications

The findings of this study offer several actionable managerial implications for public sector banks (PSBs) aiming to enhance e-banking service adoption among their diverse customer base in India.

PSBs must prioritize addressing fundamental infrastructural gaps, as the Technology Access Barrier emerged as the most significant impediment to e-banking adoption. This involves advocating for improved internet connectivity and exploring partnerships to facilitate access to affordable, compatible devices for their customers. To leverage the strong positive influence of

Digital Literacy, PSBs should develop comprehensive and continuous digital education programs, simplifying complex e-banking functionalities through tailored training and easy-to-understand guides. To mitigate Technology Anxiety, banks

should focus on designing highly intuitive and user-friendly e-banking interfaces, implementing simplified onboarding processes, and providing reassuring communication about ease and safety.

The positive effect of Trust in Technology emphasizes the importance of maintaining robust security protocols and transparent communication about data protection and fraud prevention. Finally, the significant influence of

Bank Support and Communication indicates that human interaction remains crucial. PSBs should ensure readily available, multi-channel customer support and personalized guidance, particularly for customers transitioning from traditional banking.

The cluster analysis further highlights the need for differentiated strategies: reinforcing positive experiences for "Digital Champions," providing specific support to overcome anxiety and access barriers for "Willing but Cautious Users," and initiating fundamental trust-building and literacy programs for "Disengaged Skeptics."

Theoretical Implications

This research is highly relevant for the extant body of literature on technology adoption in banking, and for public sector banks in developing countries, in particular. Through the empirical confirmation of the negative impacts of Technology Anxiety on e-banking adoption, the study extends the classical TAM, arguing that psychological barriers should be explicitly included in the future TAM like models and that psychological barriers should be directly measured as well as impediments to adoption. In addition, the study extends the theory of Diffusion of Innovations (DOI) by showing a fine-grained effect of Digital Literacy and Access to Technology and that the impact of Digital Literacy and Access to Technology are intertwined, as it reveals that individual skill and context are necessary for innovation diffusion, especially in tackling the "digital divide." This study further supports the relevance of Trust Theory and Service Quality theories within the e-banking context and that these two theories are still relevant in building users trust and encouraging their usage of online financial services. Lastly, the two-step procedure using PLS-SEM and cluster analysis makes a material methodological contribution in the context of a better understanding of the drivers and barriers of adoption among heterogeneous customer segments, paving the way for other studies in technology adoption research.

Limitations and Future Research Directions

This study, while insightful, presents certain limitations that warrant attention in future research. The use of convenience

sampling restricts the generalizability of findings; future studies could adopt probability sampling to improve external validity. The cross-sectional design captures behaviour at a single point, limiting causal inferences. A longitudinal approach would allow exploration of how user perceptions and adoption evolve over time.

The model focused on selected antecedents of e-banking adoption. Future research may incorporate additional constructs such as social influence, perceived compatibility, or regulatory support to deepen theoretical understanding. Examining the moderating effects of demographics like age, location, or digital exposure could also yield valuable segment-level insights.

Lastly, this study concentrated solely on public sector banks. Comparative research involving private banks may highlight sector-specific drivers and barriers. Qualitative approaches, such as interviews or focus groups, could further enrich these findings by uncovering user motivations, concerns, and contextual nuances in adopting e-banking services.

Abbreviations

PSBs : Public Sector Banks, e-Banking : Electronic Banking, DOI: Diffusion of Innovations , TAM: Technology adoption model

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Author Contributions

Each researcher was equally involved in generating research ideas, analysing the data, participating in surveys, and writing the article that made this research possible.

Conflict of Interest

The authors declare that they have no conflict of interest that could have appeared to influence the work reported in this paper, whether financial or of any other nature.

Ethics Approval

This study was conducted following ethical standards, with approval and consent obtained from all individual participants included in the study.

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Beyond Enrolment: A Structural Model of Psychological and Perceptual Drivers of NPS Acceptance in India

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Abstract

The National Pension System (NPS) is a unique structural transformation within the Indian social security. The psychological and perceptual predictors of NPS acceptance are discussed in the paper, which is a significant gap in the literature. The model of employee satisfaction that we test with the assistance of the Expectancy-Confirmation Theory and the Theory of Planned Behaviour is the association between the relation between multifocal antecedents, such as awareness, the attractiveness of the scheme, institutional trust, and risk perception and the overall perception of the scheme. According to the outcome of our data analysis of 370 employees of the government we have discovered that awareness, institutional trust and attractiveness of the scheme are important determinants of satisfaction and risk perception is a great demeriting factor. More importantly, satisfaction as an intermediating variable enters the picture and causes the effects of these variables to be channelled towards a positive overall attitude to the NPS. The research gives a good roadmap to policy makers: empowerment of financial literacy, credibility via creation of transparency, and risk communication as the tools of creating a truly satisfied and an active base of subscribers will make the NPS successful over the long run.

Keywords: National Pension System, Expectancy-Confirmation Theory, Theory of Planned Behaviour and Financial literacy.

Introduction

In the evolving landscape of India's economic narrative, a quiet but profound challenge looms: securing the financial future of its aging populace. The increase in life expectancy, narrowing household safety nets, and the uncertain economic future add up to the fact that individuals have become increasingly uncertain about their years of retirement (Etgeton et al., 2023; Silva et al., 2023; Das, 2025). The Government of India addressed retirement funding challenges by introducing the National Pension System (NPS) in 2004, marking a significant shift from the traditional defined-benefit model to a defined-contribution framework (Ministry of Finance, 2025; Mukul & Nandy, 2006). Unlike conventional pension schemes, the NPS links retirement wealth to individual contributions and the performance of financial markets, with the Pension Fund Regulatory and Development Authority (PFRDA) serving as the scheme's regulatory custodian. Over the past two decades, the

NPS has expanded rapidly, now covering over 1.65 crore private subscribers and managing assets of more than ₹14.43 lakh crore by end-March 2025 (PIB, 2025). The introduction of new schemes, such as NPS Vatsalya for minors, has further broadened its reach, though challenges remain in converting government employees to new models like the Unified Pension Scheme (UPS). According to a recent RTI data, only a small fraction of government employees (approximately 1.35%) has opted for the UPS as of July 2025, suggesting a reluctance to switch from the existing NPS framework despite the new scheme's availability (Business Today, 2025).

The scheme has a paradox in terms of its growth, though it is impressive. There is large enrolment, but with a low level of active participation. Large numbers of subscribers contribute the minimum amount, are not willing to make voluntary top-

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ups, and have reservations regarding the reliability of the scheme (Yadav and Pathak, 2016; Gupta et al., 2017; Sane and Thomas, 2014). Past research has argued that the issue appears not to be in the official design of the system but rather the attitude and relations of employees with the system (Kim, 2024). Lack of understanding of rules, the confusion with the previous schemes including General Provident Fund (GPF) and Employees' Provident Fund (EPF), poor trust towards fund managers, and fears of market fluctuations are some of the typical obstacles to complete adoption (Pushpa, 2021; Poongothai and Jayanthi, 2020; Shaikh and Jabeen, 2019). Previous studies on pensions and welfare schemes tend to indicate the same pattern policy frameworks can be technical-sound yet fail to achieve their intended goal when beneficiaries have issues with the lack of awareness, mistrust, or procedural complexity (Segbenya et al., 2023; Que and Dai, 2024; Asri, 2018; Narayana, 2019).

The literature about NPS is however fragmented. It has extensively concentrated on the individual dimensions of transparency, risk perception, or knowledge but rarely considers the aggregate effects of these dimensions in influencing the overall outcome of the scheme among employees (Deeti, 2023; Yoganandham, 2024). Satisfaction is one such variable that has been largely overlooked considering that, as it is argued under Expectancy-Confirmation Theory (Oliver, 1980), the concept has a central role in connecting expectations to the following judgments and actions. Moreover, satisfaction can be viewed as a mechanism where attitudes and perceived control translate into continued participation as predicted by the Theory of Planned Behaviour (Ajzen, 1991). Thus, an important knowledge gap exists with respect to the role of these different psychological and perceptual inputs for determining employee satisfaction, its effect on overall judgment about their NPS. The current research thus seeks to address this gap by building and testing an integrated model that encompass these factors.

Research Objectives

1. To study the determinants of employees' satisfaction towards National Pension System.
2. To examine satisfaction as a mediating variable in the formation of the employees' overall perception towards NPS.

Literature Review

Awareness of NPS

Awareness is a measure that indicates the degree of an employee's knowledge about NPS rules, details and process including contribution norms, withdrawal benefits and tax

benefit (Poongothai and Jayanthi, 2020). The low level of awareness is also recognized as the key barrier in pension literature (Kaur, 2022; Kumar et al., 2020; Pushpa, 2021). According to Indian research, numerous governmental workers mix the NPS with legacy plans like the GPF or EPF and thus have misunderstandings and lower motivation (Shukla et al., 2023). This difficulty is reflected in international studies: it has been found by surveys in developing economies that low levels of literacy regarding pension rules are closely associated with poor rate of enrollment and poor voluntary contributions (Segbenya et al., 2023; Que and Dai, 2024; Tenhunen and Kuivalainen, 2024).

The awareness is important since it is the gateway to the active involvement (Hooda and Chhikara, 2018). With the knowledge of the scheme features, subscribers are in a better position to assess the benefits, get confidence in the scheme workings, and even perceive the need to make the contributions that exceed the statutory requirements (Singh & Kumar, 2015; Yadav and Pathak, 2016). Additionally, peer influence can be created by knowledge diffusion using informed employees, thus extending positive perceptions of the NPS (Sinha et al., 2014). Through this, awareness represents a pre-requisite to satisfaction and positive long run assessments.

Scheme Attractiveness

The concept of scheme attractiveness also refers to the perceived attractiveness of the NPS, including benefits, flexibility, expected returns, and ease of interaction (Poongothai and Jayanthi, 2020b). In the financial services industry, research shows that products that are perceived to be transparent, cost-efficient, and customizable do create more positive appraisals (Lee et al., 2017; Zhao et al., 2015). Within the Indian context, the subscribers are more committed to the NPS when its growth potential in the long run and investment options are well explained (Hooda & Chhikara, 2018). On the other hand, when procedures are overly complicated and are not well reported, perceived attractiveness is less and will deter participation (Narayana, 2019; Asri, 2018).

Attractiveness matters because it shapes the initial attitudinal stance toward the scheme. When employees perceive the NPS as offering genuine value, they are more inclined to engage actively and to evaluate its performance positively (Pande, 2013; Das & Das, 2023; Murari, 2022). Such perceptions enhance satisfaction, which in turn strengthens overall confidence in the system.

Trust in NPS

Trust in the NPS reflects employees' confidence in the competence and integrity of its institutional actors, including

the PFRDA and fund managers (Kwon, 2012; Lee et al., 2017). Pension research consistently identifies trust as a determinant of participation: when institutional credibility is high, employees are more willing to commit funds and sustain contributions (Lee et al., 2018; Yang et al., 2024; Long et al., 2024). International evidence reinforces this—schemes with transparent governance and reliable fund management report stronger subscriber loyalty, whereas institutional distrust has been shown to depress participation rates even where benefits are attractive (Miti et al., 2023; Que & Dai, 2024).

Trust is especially salient for a long-term, market-linked product like the NPS. Confidence that contributions will be managed responsibly not only reduces perceived risk but also strengthens satisfaction with the system (Tenhunen & Kuivalainen, 2024; Zhao et al., 2015). Thus, institutional trust serves as both a prerequisite and a reinforcement mechanism for favorable perceptions of the NPS.

Risk Perception

Risk perception captures employees' subjective assessment of uncertainty associated with market-linked returns under the NPS (Lindell & Mitchell, 2009). Studies show that individuals accustomed to guaranteed returns are often reluctant to embrace market-based pension systems, particularly when volatility is poorly explained (Alhassan et al., 2017; Boyle et al., 2012; Fultz, 2012). Comparative evidence from European and Asian reforms demonstrates that heightened perceptions of risk have led to reversals or reduced participation when communication and safeguards were inadequate (Deeti, 2023; Kim, 2024; Lin et al., 2024). In the Indian case, concerns about return uncertainty and capital safety are frequently cited as reasons for minimal voluntary top-ups (Shaikh & Jabeen, 2019; Murari, 2022).

Perceived risk directly influences satisfaction: when volatility is salient and poorly managed, satisfaction declines, eroding overall confidence in the scheme (Khatri et al., 2018). Conversely, effective communication and transparent disclosure can mitigate risk perceptions, stabilize satisfaction and enhance positive evaluations (Turner & Klein, 2021).

Satisfaction and Perception

Satisfaction in service research is generally understood as the evaluative judgment formed when performance outcomes meet or exceed prior expectations (Oliver, 1980). In the context of pension systems, it represents not only functional adequacy but also the confidence and reassurance employees derive from participation (KC & PA, 2024; Kumar & Mahalakshmi, 2023). Empirical studies on the National Pension System (NPS) suggest

that subscribers express greater satisfaction when features such as fund diversification, procedural clarity, and timely communication are present (Panigrahi, 2024; Panigrahi, 2025; Shabana et al., 2024). Comparable international findings indicate that insufficient pension income and administrative inefficiencies reduce satisfaction, thereby affecting both financial security and perceived well-being (Asri, 2018; Ongoh et al., 2023).

Satisfaction also plays a formative role in shaping overall perceptions of pension schemes. Evidence shows that satisfied subscribers are more likely to sustain contributions, hold favorable views of the program, and recommend it to peers, thereby reinforcing scheme legitimacy (Panigrahi, 2025; Shabana et al., 2024). Within the NPS, satisfaction thus functions as a pivotal psychological state linking operational attributes to long-term acceptance and positive perception.

Theoretical Background and Hypotheses Development

Expectancy–Confirmation Theory

The ECT, originally proposed in the consumer behaviour literature (Oliver, 1980) states that satisfaction is a function of expected performance versus actual performance. Service encounters are brought in with expectations and here when the performance fulfills (confirmation) or exceeds expectations, satisfaction results as opposed to being disappointed (disconfirmation). The appraisal system has been applied successfully in quality of services, technology adoption and financial decision-making (Zhao et al., 2015; Lee et al., 2017).

ECT offers a useful perspective for interpreting employee satisfaction in the NPS. Employees bring a set of beliefs about the transparency, risk-return trade-offs, and accessibility that should characterize such a scheme (Turner & Klein, 2021; Fultz, 2012). as well their perception of the credibility of the formal institution. Success comes when their expectations—of clear communication, dependable leadership and excellent investment choices—are met (or exceeded). Contrary, incomplete or complex information as well as perceived risks may decrease satisfaction (Khatri et al., 2018; Asri, 2018). On this basis, the following hypotheses are proposed:

H1: *Employee satisfaction increases with higher awareness of the NPS.*

H2: *Employee satisfaction rises as the perceived attractiveness of the NPS improves.*

H3: *Employee satisfaction increases with higher trust in the NPS.*

H4: *Employee satisfaction decreases when risk perception associated with the NPS is high.*

Theory of Planned Behaviour

The TPB theory (Ajzen, 1991) is an extension of the theory of reasoned action which acknowledges that behavioural intentions are determined by attitudes, subjective norms, and perceived behavioural control. Attitude can be defined as the judgment of a person towards a behavior, social pressures are represented by subjective norms and perceived domination is represented by the ease or difficulty of performing the behavior. All these contribute to explaining not only intentions but also continuous engagement in behavior (Long et al., 2024; Rogers, 2003).

The notion of satisfaction can be considered the key attitudinal outcome, which expresses the judgment of the employees concerning their experiences with the scheme in the framework of the NPS. A positive overall perceptions and continued participation is more likely to be reinforced when a satisfied subscriber recommends the scheme to friends and colleagues, potentially increasing the scheme, which enhances participation (Panigrahi, 2025; Shabana et al., 2024). In this context, satisfaction sums up the impacts of awareness, attractiveness, trust, and risk perception and sends them to more general evaluations and behavioural tendencies.

H5: Higher employee satisfaction with the NPS leads to a more favorable overall perception of the scheme.

H6: Satisfaction serves as a mediator between its antecedents—awareness, perceived scheme attractiveness, trust, and risk perception—and employees' overall perception of the NPS.

Combined, ECT and TPB provide a strong model of assessing how employees were responding to the NPS. ECT is a cognitive process that describes the way in which expectations and experiences lead to satisfaction whereas TPB is a process that describes the way in which satisfaction leads to attitudes, perceptions and behavioural intentions. Assimilation of these views allows to conceptualise such a thing as satisfaction as an evaluative product (ECT) and as a motivator of the general perception and commitment (TPB). Such a two-sided view places the concept of satisfaction in the mediating role, where the awareness, attractiveness, trust, and risk perception can affect the overall ratings of the NPS among employees.

Research Methodology

This study utilized a quantitative, cross-sectional survey research design to investigate the impact of employee's happiness with NPS on their perception of NPS. The source of data was government employees with at least 2 years' experience under the NPS as they should have been well acquainted with the scheme. Purposive sampling strategy was

used and total of 370 valid responses were achieved by using online and offline distribution. The sample population was also demographically balanced and represented by a difference in age, gender, income, and job groups, which contributes to the increased representativeness of the findings (Patel, 2025). The participation was voluntary, and the confidentiality was assured to reduce bias.

Applying a five-point Likert scale tailored to the pension context, previously validated measures were used to assess construct awareness, scheme attractiveness, trust, risk perception, scheme sentiment, and general perception. The awareness of NPS was based on the studies by Yadav and Pathak (2016) and Kumar et al. (2020). Scheme attractiveness was modified according to Poongothai and Jayanthi (2020a) and Hooda and Chhikara (2018). The adaptation of institutional trust was done to Lee et al. (2018) and Kwon (2012). The perception of risks was modified to match Shaikh and Jabeen (2019) and Lindell and Mitchell (2009). NPS satisfaction has been modified after Oliver (1980) and KC & PA (2024). Lastly, the perception of NPS was modified based on Panigrahi (2025) and Shabana et al. (2024). The instrument has been revised with subject experts and pilot-tested and then finally administered to improve its content validity.

Structural equation modelling (SEM) was employed to perform data analysis because it was impossible to assess measurement and structural parts independently (Hair et al., 2018; Hair et al., 2019). To maintain the assurance of the appropriate psychometric properties in the measurement model, the test was conducted on the basis of the reliability and validity with the help of a confirmatory factor analysis. To confirm the hypothesized relationship between independent and dependent variables, this structural model was then estimated. To test the mediation effects of satisfaction, we used a bootstrapping method to test 5,000 resamples. The findings indicated statistical significant and strong estimates of the indirect effects.

Results

Demographic details: The survey included 370 respondents, of which a large majority were male (81.6%). Most participants were in the 36–45 years age group (45.4%), reflecting a predominantly mid-career segment. A considerable share (90.3%) worked in state government departments, with 38.4% having 3–7 years of service. Pension contributions varied, but one-third (33.2%) contributed between ₹10,001–₹15,000 monthly. Regarding their perception of NPS, the majority (81.3%) maintained a neutral stance, while 11.1% viewed it positively and 7.6% expressed unfavorable opinions.

Table 1. Sample Details (N=370)

Variable	Category	Frequency (N)	Percentage (%)
Gender	Female	68	18.40%
	Male	302	81.60%
Age (years)	Up to 35	121	32.70%
	36–45	168	45.40%
	46–55	64	17.30%
	Above 55	17	4.60%
Designation Level	Senior Officers	132	35.70%
	Mid-Level Executives	96	26.00%
	Support/Administrative Staff	118	31.90%
	Others/Unspecified	24	6.50%
Employment Type	State Government	334	90.30%
	Central Government	23	6.20%
	Not Specified	13	3.50%
Years of Service (years)	Less than 3	39	10.50%
	3–7	142	38.40%
	8–15	121	32.70%
	More than 15	55	14.90%
	Not Specified	13	3.50%
Monthly NPS Contribution (₹)	Up to ₹7,500	61	16.50%
	₹7,501–₹10,000	79	21.40%
	₹10,001–₹15,000	123	33.20%
	Above ₹15,000	97	26.20%
	Not Specified	10	2.70%
General Opinion on NPS	Favourable	41	11.10%
	Unfavourable	28	7.60%
	Neutral/No clear view	301	81.30%

Measurement model

The measurement model was evaluated to confirm the reliability and validity of the six latent constructs. Indicator reliability was confirmed as all item loadings in the outer model exceeded the recommended threshold of 0.70 (Chin, 1998; Henseler et al., 2009). Internal consistency was also strong, with Cronbach's alpha, and composite reliability (CR) values for all constructs surpassing the threshold of 0.70. Furthermore, convergent validity was established, as the average variance

extracted (AVE) for each construct was well above 0.50, demonstrating that the indicators adequately explained the variance of their corresponding latent constructs (Fornell & Larcker, 1981; Hair et al., 2016). Finally, discriminant validity was confirmed using the Fornell-Larcker criterion, as the square root of each construct's AVE was greater than its highest correlation with any other construct (Fornell & Larcker, 1981; Hair et al., 2017).

Table 2. Reliability and validity of constructs used in study

Construct	Measurement items	Loadings	Alpha	CR	AVE
Awareness	I am familiar with the rules and regulations regarding contributions to NPS.	0.962	0.927	0.954	0.873
	I understand how NPS provides tax-related advantages.	0.935			
	I know the conditions related to withdrawal and exit from NPS.	0.904			
Source Attractiveness	NPS provides long-term returns that are appealing compared to other options.	0.881	0.915	0.937	0.748
	The policies and guidelines of NPS are presented in a clear manner.	0.826			
	NPS allows flexibility in investment choices.	0.798			
	The fee and cost structure in NPS is reasonable.	0.915			
	The scheme is designed to address employees' retirement security needs.	0.9			
Institutional Trust	I have confidence in the government's ability to manage NPS effectively.	0.874	0.931	0.951	0.829
	I believe NPS operations are transparent.	0.913			
	I trust the fund managers who oversee NPS investments.	0.886			
	I feel assured that my contributions in NPS are safe.	0.912			
Risk Aversion	I am worried about variations in the returns provided by the NPS.	0.899	0.904	0.94	0.839
	I perceive NPS investments as carrying substantial risk for retirement planning.	0.902			
	I am concerned about possible financial losses in NPS resulting from market fluctuations.	0.946			
Satisfaction	I am pleased with the overall outcomes of my NPS investments.	0.856	0.888	0.922	0.749
	NPS fulfils my expectations as a retirement planning tool.	0.836			
	The NPS system and services are convenient to use.	0.866			
	Overall, I am pleased with my experience with NPS.	0.901			
Perception	My overall perception of NPS is favourable.	0.91	0.919	0.943	0.804
	I consider NPS to be a reliable and dependable pension scheme.	0.92			
	I would encourage my peers or colleagues to opt for NPS.	0.925			
	I believe NPS is one of the most suitable pension schemes for employees.	0.886			

Table 3. Discriminant validity: Fornell Larcker

	Aware	Trust	Perception	Risk Aversion	Satisfaction	Scheme Attractiveness
Awareness	0.934					
Trust	0.368	0.91				
Perception	0.426	0.692	0.897			
Risk Aversion	-0.257	-0.53	-0.549	0.916		
Satisfaction	0.534	0.786	0.874	-0.597	0.865	
Scheme Attractiveness	0.359	0.756	0.718	-0.592	0.763	0.865

Structural Model and Hypotheses Testing

The structural model was evaluated to assess path coefficients, and predictive capability. Hypotheses were tested using a bootstrap approach with 5,000 resamples. As shown in Table 4, Employee Awareness had a positive and significant impact on Satisfaction ($\beta = 0.247, t = 10.148, p < 0.05$), supporting H1. Perceived Scheme Attractiveness also contributed positively to Satisfaction ($\beta = 0.278, t = 5.467, p < 0.05$), providing evidence for H2. Similarly, Institutional Trust emerged as a strong determinant of Satisfaction ($\beta = 0.402, t = 8.494, p < 0.05$), confirming H3. In contrast, Risk Aversion showed a significant negative relationship with Satisfaction ($\beta = -0.156, t = 3.693, p < 0.05$), validating H4. Finally, Satisfaction exerted a strong positive effect on employees' Perception of the NPS ($\beta = 0.832, t = 17.034, p < 0.05$), thereby supporting H5.

Mediation analysis (table 5) offered deeper insights into the mechanism underlying these relationships. Satisfaction partially mediated the link between Awareness and Perception (0.205, $p < 0.05$), Trust and Perception ($\beta = 0.334, p < 0.05$), as well as Scheme Attractiveness and Perception (0.232, $p < 0.05$), suggesting that these antecedents not only shape satisfaction directly but also foster favorable perceptions indirectly. Likewise, Satisfaction partially mediated the negative pathway from Risk Aversion to Perception ($-0.130, p < 0.05$), indicating that concerns about risk reduce satisfaction, which in turn weakens overall perception of the scheme. Collectively, these findings provide robust empirical support for H6.

The model demonstrated strong explanatory power, with $R^2 = 0.753$ for Satisfaction and $R^2 = 0.773$ for Perception toward NPS, indicating that the constructs explained a substantial proportion of variance in employees' evaluation of the scheme.

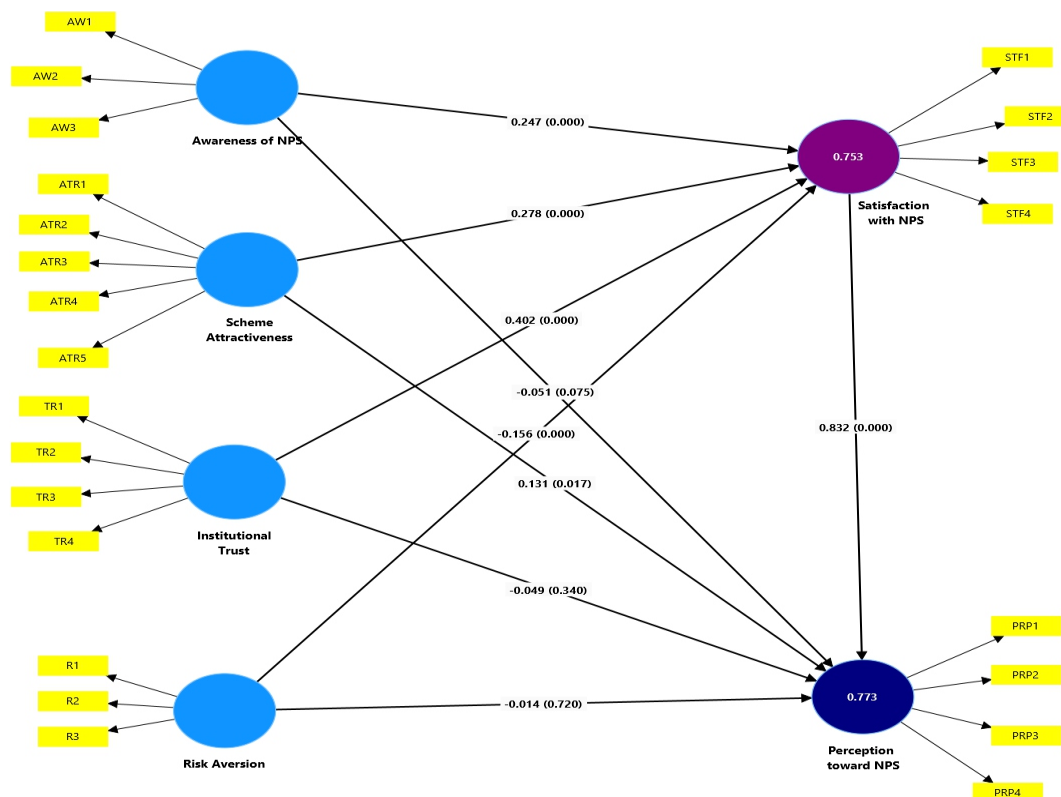


Table 4. Results for Direct effects

	Coefficient	P values	T	Decision
Awareness --> Satisfaction	0.247	0	10.148	H1 accepted
Scheme attractiveness --> Satisfaction	0.278	0	5.467	H2 accepted
Trust --> Satisfaction	0.402	0	8.494	H3 accepted
Risk aversion --> Satisfaction	-0.156	0	3.693	H4 accepted
Satisfaction --> Perception	0.832	0	17.034	H5 accepted

Table 5. Results for mediation effect

	Specific indirect effect	2.50%	97.50%	P values	Decision
Employee awareness -> Satisfaction -> Perception of the scheme	0.205	-0.197	-0.058	0	Partial
Perceived scheme appeal -> Satisfaction -> Perception of the scheme	0.232	0.16	0.255	0	Partial
Employee trust -> Satisfaction -> Perception of the scheme	0.334	0.148	0.319	0	Partial
Employee risk aversion -> Satisfaction -> Perception of the scheme	-0.13	0.254	0.431	0	Partial

Discussion

Although the NPS has become a significant policy tool in India, scholarly discussions have largely concentrated on its operational and structural dimensions (Deeti, 2023; Pande, 2013). The intellectual, empirical, and theoretical underpinnings of the psychological processes that motivate subscriber behaviour remain inadequate. We fill this void in the literature with our work, which offers important theoretical and practical advances. In particular, the findings corroborate the literature, which demonstrates that important psychological and perceptual elements substantially impact employees' views and actions about pension systems. The positive and significant influence of awareness (H1) on satisfaction is consistent with findings that knowledge about pension rules is a critical prerequisite for engagement (Kumar et al., 2020; Pushpa, 2021; Segbenya et al., 2023). Similarly, our results confirm the pivotal role of scheme attractiveness (H2) and institutional trust (H3), aligning with established research that views confidence in governance and the perceived appeal of a scheme as crucial drivers of participation and positive evaluations (Lee et al., 2018; Yang et al., 2024; Miti et al., 2023; Hooda & Chhikara, 2018; Narayana, 2019). With these inferences, the negative effect of risk perception on satisfaction (H4) is consistent with findings of studies on risk and financial decision-making noting

that workers who have been accustomed to defined-benefit plans are responsive to market shocks, which tend to erode satisfaction (Alhassan et al., 2017; Shaikh & Jabeen, 2019; Murari, 2022).

Our findings significantly extend the literature by providing a critical mediating mechanism through which these antecedents affect overall perception. Prior research often treated these factors as direct drivers of participation or perceptions (Deeti, 2023; Pande, 2013). Our study, however, adds a layer of theoretical depth by showing how employee satisfaction acts as a pivotal psychological bridge that translates these antecedents into a favorable overall perception of the NPS. This finding is a key theoretical contribution, as it adds to Oliver's (1980) work by demonstrating that satisfaction is not merely an outcome but a central mechanism for reinforcing positive attitudes and behavioral intentions in the context of a long-term financial product. This mediation effect confirms that efforts to improve awareness, build trust, and enhance scheme attractiveness will not only make employees more satisfied but will also indirectly strengthen their long-term favorable perceptions of the NPS (Panigrahi, 2025; Shabana et al., 2024).

The model's strong predictive power, evidenced by high R² values for both satisfaction and perception, confirms that our

integrated framework accurately captures the key dynamics of subscriber behavior. By establishing satisfaction as a critical pathway for the influence of its antecedents, our study provides a clear roadmap for policymakers. To foster deeper engagement, the PFRDA and other stakeholders should focus on targeted campaigns to enhance financial literacy, improve transparency in fund management, and address employees' risk concerns through clear communication to stabilize satisfaction and build long-term confidence.

Theoretical Implications

This study integrates two important theoretical frameworks, ECT and TPB, and provides numerous important theoretical advances as a result. This unified framework advances the understanding of pension behavior by establishing satisfaction as a central mechanism that bridges cognitive antecedents and behavioral outcomes. Our findings empirically demonstrate that satisfaction is a core psychological mechanism, serving as a conduit for the effect of awareness, scheme attractiveness, trust and perceived risk on an employee's global view of the NPS. This is a contribution to the ECT by illustrating how confirmation of expectations has an immediate impact on satisfaction, which in turn influences attitudes and intentions more broadly as assumed by TPB. Our study contributes by confirming this interplay, thereby providing a more complex subscribers' psychology model to be further analyzed.

Implications for Policy and Practice

The findings of this study have several implications for the policy makers, funds managers and the regulators of the NPS.

Extending Financial Literacy beyond Awareness: The information focused on awareness was found to be a strong predictor of satisfaction, suggesting that communication cannot remain confined to generic marketing or technical newsletters. What is required are appropriately standardised and contextually rooted financial literacy interventions to demystify the NPS. These can range from the tax benefits, how to exit the investment or decide of what asset classes we are investing in. The PFRDA and fund managers can stimulate the informed decision-making among the subscribers by empowering them with the subtle knowledge that consequently facilitates the increase in their level of satisfaction and confidence in the system.

Embedding Trust through Governance and Transparency: The high level of institutional trust is perhaps explained by the urgent demand for transparent details about fund performance and administrative practice. Trustworthiness can be

strengthened by providing and updating on investment strategy easily accessible reporting dashboards and grievance redressal. This kind of actions will also keep the employees confident that their integral is being a responsibility and stewardship manner, making them feel secure with an otherwise fragile system to market conditions.

Restructuring Risk as Controllable, Not Preventive: Even though a market-linked system of pensions is risky, its perception tends to exert emotions of anxiety on its participants. The findings reveal that risk perception is unmanaged, and this undermines satisfaction. Rather than avoiding this issue, administrators must take the initiative to reformulate risk by communicating. Clear communication of the benefits of diversification, long-term returns and past resilience in moments of diversification underperformance should allow staff to regard volatility as a fact of life in retirement planning that must be addressed rather than as a threat to their retirement pot.

Strategic Lever of Positioning Satisfaction: The best lesson learnt in this study perhaps is that satisfaction is not just an attitudinal effect but a mediating process that directs awareness, trust and attractiveness into positive overall perceptions. This implies that improvement of satisfaction at every point of contact, such as the smooth enrolment, clear service provision, or the smooth process of leaving will result in a vicious cycle. Satisfied subscriber who feels involved and participate on a regular basis, moreover, has the role of promoter of the scheme; therefore to increase its credibility and social acceptability.

Demerits and direction for future research

This research is not devoid of limitations. Its cross-sectional study limits causal interpretation, which implies the usefulness of longitudinal research to determine the way awareness, satisfaction and perceptions change over time. The exclusive focus on government employees also limits generalizability; extending the model to private-sector workers, the self-employed, or the informal workforce would provide broader insights. Finally, while the model explained substantial variance, additional factors—such as demographics, financial literacy, or peer influence—could further enrich understanding of subscriber behavior.

Conclusion

The National Pension System serves as the backbone of India's retirement security system. This research shows that awareness, trust, scheme attractiveness and risk perception

have impact on satisfaction that mediates beliefs about the NPS. The results contribute to theory by combining psychological/perceptual drivers into a cohesive model and provide practical implications in suggesting that improving Financial Literacy, increasing Transparency, and recasting Risk Communication can strengthen Satisfaction & Confidence.

Meanwhile, the launch of the Unified Pension Scheme (UPS) is part of an ongoing tussle between guaranteed defined-benefit plans and market-based defined-contribution schemes such as the NPS. While UPS has been positioned as an alternative, the negligible opt-in rate among government employees (about 1.35% as of July 2025) suggests that NPS remains the dominant retirement framework. This reinforces the need to address satisfaction drivers within the NPS itself, as employees appear hesitant to abandon it despite policy innovations. In the end, building true participation — and not just covering individuals — remains critical to the long-term success of India's pension framework, whether through NPS or alongside UPS.

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Impact of Surrogate Advertisement on the Buying Behaviour of Alcoholic Beverage Consumer

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Abstract

*Surrogate advertising involves replicating the brand image of one product to sell another product under the same brand. This study **focuses** on how consumers in Agartala perceive and react to surrogate advertising. Understanding the consumer thought process through research into their perspectives and attitudes is important, as it enables sellers to offer products that align with customer tastes and preferences. The **methodology** includes the Chi-square test, factor analysis, and percentage analysis for sampling and performance evaluation. The **findings** reveal a strong correlation between consumer perception formation and surrogate advertising. The study **concludes** that psychological variables, advertising, and consumption are the three key aspects influencing customer decisions to buy alcoholic beverages.*

Keywords: Surrogate advertising, perception, attitude, consumer buying, psychological factor, promotional tool.

Introduction

Advertising serves as a crucial communication tool between companies and their consumers. It involves messages paid for by advertisers, designed to inform or influence the recipients (Panvelkar, 2018). Through advertisements, companies attempt to forge connections with consumers by promoting their products or services. This strategy is vital for companies to thrive in the market, as it helps them expand their reach to a broader audience, thereby increasing consumer awareness of their offerings.

Advertising serves as a means of communication where producers deliver messages to users of products or services to create awareness and boost sales. In today's competitive economy, companies face intense market competition and employ various strategies to stay ahead. Advertising is one such critical strategy used to compete effectively. It informs potential customers about products or services and sometimes generates curiosity, leading to purchases. There are various types of advertising, including print advertising, television advertising, social media advertising, display advertising, outdoor advertising, moment marketing, guerrilla advertising, and surrogate advertising (Indeed, 2022). In India, government regulations prohibit direct advertising of certain products and

services, such as tobacco, alcoholic beverages, and population control products. Consequently, companies adopt alternative strategies, like surrogate advertising, to reach consumers indirectly and market these products.

Surrogate advertising represents a contemporary ethical concern within the Indian advertising landscape. This controversial business strategy aggressively promotes products by closely imitating the brand image of another product under the same brand name. Such advertisements often lead consumers to associate the advertised products with restricted items, thereby implicitly promoting these forbidden goods and influencing consumer behavior (Rajpal and Nayak, 2015). In instances where government regulations prohibit the advertising of harmful substances like alcohol, cigarettes, pan masala, tobacco, and similar products, companies face significant challenges in conveying their marketing messages to potential consumers. This restriction hampers the effective communication of product information, leading to reduced consumer awareness and negatively impacting sales.

Surrogate advertising is a promotional tactic that imitates the branding of a particular product to promote a different product

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sharing the same brand name (Raut, 2017). This strategy becomes crucial when a company is prohibited from directly advertising its products. Instead of promoting the actual restricted product, the company focuses on promoting the brand name associated with it, bypassing direct advertisement restrictions in mainstream media.

The primary goal of advertising is to enhance the demand for a product or service while informing the public about its advantages. It is a powerful strategy to convince the intended audience of a product's or service's value while gaining significant visibility. Advertising targets two distinct audiences: consumers and businesses. It is essential for establishing a brand's position in the minds of consumers. In India, an ongoing ethical concern in advertising is the practice of surrogate advertising. It is generally prohibited unless used to promote products such as alcohol or tobacco, which cannot be advertised directly. Surrogate advertising involves extensively duplicating a product's brand image to promote a different product under the same brand (Agarwal, 2018). This practice remains contentious, highlighting the ethical challenges within the advertising industry.

According to a report by the Indian Council for Research on International Economic Relations (ICRIER), India is witnessing rapid growth in the alcoholic beverage sector, with an estimated market value of \$52.5 billion (approximately Rs 3.9 lakh crore). The market is projected to grow at a compound annual growth rate (CAGR) of six point eight percent until 2023, supporting around 1.5 million jobs (Business Standard, 2022). To maintain a competitive edge in this expanding market, companies often resort to surrogate advertising to indirectly promote their brand and products. This strategy enhances consumer brand awareness and facilitates brand recall, helping to establish a favorable perception of the brand in consumers' minds. Consequently, if consumers respond positively to the brand message communicated indirectly—due to restrictions on direct advertising of the main product—they may prefer this brand over others.

The term "surrogate" refers to a replacement or alternative. In advertising, surrogate commercials function similarly to surrogate motherhood by upholding the reputation of products whose direct marketing is banned. Tobacco and alcoholic beverage companies often use this strategy, promoting non-alcoholic or innocuous items under the same brand name to circumvent advertising restrictions (Rajpal and Nayak, 2015). In surrogate advertising, the original product is substituted with another product, allowing the corporation to promote its brand in mainstream media and indirectly boost the sales of the restricted product.

Importance of Surrogate Advertising

Here some of the most important factors are mentioned below that shows the importance of surrogate advertisement for the company (Bhatt, 2022). The most important factor of a surrogate advertisement is brand-recall where company do the advertisement of a product which is different from tobacco or liquor so as to promote the brand and which will help the customer to identify that product which is a tobacco or liquor product (Somani, 2021). Market opportunity is one of the important factors that makes the company to use Surrogate advertisement. Directly or indirectly helps to increase the sales of the company which eventually helps the company to grab the market share (Indeed, 2021). Brand differentiation is also another factor that makes the company to use the surrogate advertising tactics to differentiate its product from its competitors (LEE Frederiksen, 2022). The act of designing the company's offering and image to occupy a distinctive place in the mind of the target market so it can be used as a tool for brand positioning (Marion, 2022). It helps companies to generate revenue from banned products. It keeps on reminding consumers about the banned products indirectly.

Objectives of the study

The main purpose of this study is to examine the effect of surrogate advertising on consumers buying behaviour. In order to achieve the main purpose, the following objective are forth for the study:

1. To study the effect of surrogate advertising on the buying behaviour of alcohol products.
2. To study the formation of attitude and perception of consumer buying behaviour of alcohol product
3. To study the factors involve in the formation of consumer decision making

Hypothesis

From extensive literature survey a good number of research questions have been identified which aided in planning of research objectives of this present study. From the research objectives the following hypotheses are articulated:

H₁: There is an association between surrogate advertising and consumer perception

H₂: There is an association between surrogate advertising and consumer attitude

H₃: There is an association between surrogate advertising and consumer learning

Scope and Importance of the Study

This research explores consumer perception and attitudes towards surrogate advertising in Agartala. Understanding the

consumer thought process through their perceptions and attitudes is crucial, as it can help sellers enhance productivity by aligning their strategies with consumer tastes and preferences.

Review of Literature and Research Gap

Surrogate advertisements have been found to negatively impact the buying behavior of people in Surat (Bhathena, 2018). Agarwal (2018) noted that surveys indicate youth are motivated to consume the actual products being indirectly advertised. Research by Dhandapani et al. (2019) concluded that surrogate commercials significantly influence consumer recall of liquor brands and increase the likelihood of purchasing alcohol. Data from Dodrajka (2011) highlighted a rise in the consumer base for alcohol between 1994 and 2003. In India, Roy (2020) stated that surrogate advertisements have had a favorable impact on consumer reactions. These ads are highly valued in media, especially on TV, with many consumers choosing brands based on surrogate advertising. Many people believe these advertisements effectively increase brand awareness and offer financial benefits. Consequently, most users do not oppose surrogate advertisements. Goyal (2009) argued that if selling alcohol and tobacco is legal in India, advertising them should also be legal to ensure a level playing field, as banning advertisements could negatively affect government revenues. Panvelkar (2018) stated that surrogate advertising profoundly impacts the attitudes of the target audience, making it a beneficial strategy for marketers. The research's primary data showed that most respondents are familiar with surrogate ads, which businesses use due to the government's ban on direct sales of alcohol and tobacco products. The findings suggest that the implementation of banning alcohol sales to minors is inadequate (Schofield et al., 1994). Singh (2019) highlighted that producers and sellers counter the ban on alcohol advertisements by promoting the brand through other products.

Research Gap

While there are several research papers on surrogate advertising, only a limited number focus on the relationship between consumer attitudes and perceptions and their responses to such advertising. This research paper aims to explore consumer attitudes and perceptions regarding surrogate advertising, particularly examining the perspectives of different age groups. Understanding these views will help explain how surrogate advertising affects consumer buying behavior. Although considerable research on surrogate advertising has been conducted in other states of India, there is a scarcity of studies in Tripura. Addressing this gap, this study will investigate the perceptions and buying behaviors of consumers in Tripura. The findings will provide valuable insights for other researchers into the consumer perspectives in this region.

Methodology

This study is conducted using exploratory research methods in Agartala, the capital of Tripura, a small North east state in India and aimed to study the customers of alcoholic products. Both primary data and secondary sources of information were utilised to gather data. A structured questionnaire was utilised to gather the data. This research employs convenience sampling, where units are chosen for the sample based on their ease of accessibility to the researcher, primarily owing to their geographical location. This allows for the selection of a consistent group of respondents. Thus, for this study, a total of 5 alcohol beverage establishments were chosen as the sample, and the respondents were questioned in these locations. Sample size: The survey included a total of 150 respondents, with 30 respondents being interviewed from each of the 5 stores. Stalls are situated in the locations of *Battala, Drop Gate, and Lake Chowmuhani. (local places)* Among these localities, three stalls are specifically placed in Battala. This research utilised percentage analysis, factor analysis, and chi-square test. Using the statistical software SPSS for data analysis

Analysis and Interpretation

It involves with the interpretation of data gathered through the use of analytical and logical reasoning determines patterns, relationships or trends. The data are collected through questionnaire in order to analyse the data.

Table No. 1. Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
0.932	20

Table no. 1 state that the Cronbach's Alpha is 0.932 which is deemed to be excellent. Thus, it can be stated that this survey results are suitable to conduct the test.

Table No. 2 Profession of the Respondents

Profession	
Profession	
Student	22
Govt. Job	19
Private job	63
Self employed	46

Source: Author's compilation

In terms of profession (table no. 2) show the different profession of the respondents and it also shows the diversity in profession, where 14 percent were student, 13 percent were in Govt. jobs and 31 percent were involved in private jobs and rest 42 percent of the respondents were found self-employed. The majority of the respondents have been found self-employed. Hence it can be ascertained that the most of the consumers of alcohol beverages belong the private sector.

Table No. 3 Gender of the Respondents

Gender	
Male	150
Female	0
others	0

Source: Author's compilation

Table (No.3) shows the Gender of the respondents. There were three category of gender that is male, female and others but in this survey only male gender participated. Hence it can be

ascertained that the most consumers of alcohol beverages were purchased by the male.

Table No. 4 Age Intervals of respondents

Gender	
Age Group	Age Intervals
Baby	0-2
Young Adult	3-12
	13-19
	20-29
	30-39
Middle aged Adult	40-49
	50-59
Old Adult	60-69
	70-79
	80-89
	90-99

Source: https://www.researchgate.net/figure/Age-intervals-and-age-groups_tbl1_228404297

From the survey it can be seen that the age intervals were divided in to three categories (Table no. 4) Young adult [21-39], Middle aged adult [40-59] and old adults [60-99] and it has been

found that 42 percent were young adult and 58 percent were middle age adults. Hence it can be understood that middle age adult purchase alcoholic beverages more than the young adult.

Table No.5 Impact and Influence of Alcoholic beverages Advertisement on Perception formation of Consumers

		Crosstab : Perception					Crosstab : Advertisement					
		Ads of non-alcoholic products of an alcohol brands attracts me to buy those products					Total	Getting influenced by these ads				Total
		Strongly Agree	Neutral	Disagree	Strongly disagree	Strongly Agree		Neutral	Disagree	Strongly disagree		
YES	Count	3	0	0	1	4	3	0	0	1	4	
	Expected Count	0.1	0.7	2.1	1.1	4	0.1	0.8	2.1	1	4	
NO	Count	0	26	75	42	143	0	28	77	38	143	
	Expected Count	2.9	25.7	73.4	41	143	2.9	27.6	75.3	37.2	143	
Some-times	Count	0	1	2	0	3	0	1	2	0	3	
	Expected Count	0.1	0.5	1.5	0.9	3	0.1	0.6	1.6	0.8	3	
Total	Count	3	27	77	43	150	3	29	79	39	150	
	Expected Count	3	27	77	43	150	3	29	79	39	150	

Chi-Square Tests on Perception				Chi-Square Tests on Advertisement		
	Value	df	Asymp. Sig. (2-sided)	Value	df	Asymp. Sig. (2-sided)
Pearson Chi- Square	113.743 ^a	6	0	113.638 ^a	6	0
Likelihood Ratio	29.532	6	0	29.48	6	0
Linear-by-Linear Association	10.944	1	0.001	11.011	1	0.001
N of Valid Cases	150			150		
a. 9 cells (75.0 percent) have expected count less than 5. The minimum expected count is .06.						

Source: Author's compilation

The calculated value (0.000) is lesser than the P(0.05) value, so null hypothesis has been rejected (Table no.5). Thus, it can be stated that there is an association between surrogate advertising and consumer perception. Hence it means that the ads which the viewers encounter form a strong perception in their mind. Thus, there is a significant relationship between consumer formation of perception and advertisements which shows the impact of advertisement on consumers of alcoholic beverages to purchase alcoholic beverages. In case of

advertisement, the calculated value (0.000) is lesser than the P (0.05) value, so the null hypothesis has been rejected (Table no. 5). Thus, there is an association between surrogate advertising and consumer perception. Hence it can be understood that ads form a strong perception in the mind of the customers as it is evident that there is a significant relationship between consumer perception and advertisements which shows that the consumer gets influence by these ads.

Table No.6 Ads forms an impression on the mind of buyers and Brand awareness

		Crosstab :Ads forms an impression					Crosstab: Brand awareness				
		Advt. forms an impression in the mind of a buyers				Total	Brand awareness creates awareness of the product of alcoholic brands				Total
		Strongly Agree	Neutral	Disagree	Strongly disagree		Strongly Agree	Neutral	Disagree	Strongly disagree	
YES	Count	3	0	0	1	4	3	0	0	1	4
	Expected Count	0.1	0.7	2.1	1.1	4	0.1	1	1.8	1.1	4
NO	Count	0	25	76	42	143	1	37	66	39	143
	Expected Count	2.9	24.8	74.4	41	143	3.8	36.2	64.8	38.1	143
Some-times	Count	0	1	2	0	3	0	1	2	0	3
	Expected Count	0.1	0.5	1.6	0.9	3	0.1	0.8	1.4	0.8	3
Total	Count	3	26	78	43	150	4	38	68	40	150
	Expected Count	3	26	78	43	150	4	38	68	40	150

Chi-Square Tests: forms an impression				Chi-Square Tests :Brand awareness		
	Value	df	Asymp. Sig. (2-sided)	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	113.782 ^a	6	0	84.702 ^a	6	0
Likelihood Ratio	29.556	6	0	24.989	6	0
Linear-by-Linear Association	11.091	1	0.001	9.037	1	0.003
N of Valid Cases	150			150		
a. 9 cells (75.0 percent) have expected count less than 5. The minimum expected count is .06.						

Source: Author's compilation

The calculated value (0.000) is lesser than the P (0.05) value (table no.6), so null hypothesis has been rejected. Thus, there is an association between showing Ads and how it forms an impression in the mind of buyer. Hence it can be understood that ads form a strong impression about a particular brand in the mind of the customers as it is evident that there is a significant relationship between advertisements and its effect on impression formation which means that that the consumer gets influence by these ads. Thus, Ads forms an impression on the mind of buyers.

In terms of brand awareness, the calculated value (0.000) is lesser than the P(0.05) value, so null hypothesis has been rejected (Table no.6). Thus, there is an association between surrogate advertising and consumer perception. Hence it can be understood that ads form a strong perception in the mind of the customers as it is evident that there is a significant relationship between consumer perception and advertisements which shows that the consumer gets influence by these ads. Thus, Ads helps to create brand awareness among the potential customers.

Table No.7 Brand recall and Learning about the brands

		Crosstab: Recall					Crosstab: Learning				
		Ads of non-alcoholic products of an alcohol brands helps to recall the alcohol brand while purchasing alcoholic beverages				Total	Awareness about the brands of alcohol easily due to these ads				Total
		Strongly Agree	Neutral	Disagree	Strongly disagree		Strongly Agree	Neutral	Disagree	Strongly disagree	
. YES	Count	3	0	0	1	4	3	0	0	1	4
	Expected Count	0.1	0.7	1.9	1.2	4	0.1	0.8	1.8	1.3	4
NO	Count	0	27	71	45	143	0	30	67	46	143
	Expected Count	2.9	26.7	69.6	43.9	143	2.9	29.6	65.8	44.8	143
Some-times	Count	0	1	2	0	3	0	1	2	0	3
	Expected Count	0.1	0.6	1.5	0.9	3	0.1	0.6	1.4	0.9	3
Total	Count	3	28	73	46	150	3	31	69	47	150
	Expected Count	3	28	73	46	150	3	31	69	47	150

Chi-Square Tests: Recall				Chi-Square Tests: Learning		
	Value	df	Asymp. Sig. (2-sided)	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	113.782 ^a	6	0	113.730 ^a	6	0
Likelihood Ratio	29.537	6	0	29.515	6	0
Linear-by-Linear Association	10.571	1	0.001	10.107	1	0.001
N of Valid Cases	150			150		
a. 9 cells (75.0 percent) have expected count less than 5. The minimum expected count is .06.						

Source: Author's compilation

In terms of recall of brands, the calculated value (0.000) is lesser than the P(0.05) value, so null hypothesis has been rejected (Table no.7). Thus, there is an association between surrogate advertising and consumer Learning. Hence it can be understood that ads form a strong knowledge in the mind of the customers

as it is evident that there is a significant relationship between consumer learning and advertisements which shows that the consumer gets influence by these ads. Thus, these ads help to recall the brand.

In terms of learning and advertisements which shows that the consumer gets influence by these ads. Thus, these ads help to identify the brand. The calculated value (0.000) is lesser than the P(0.05) value, so null hypothesis has been rejected (Table no.7). Thus, there is an association between surrogate

advertising and consumer Learning. Hence it can be understood that ads form a strong knowledge in the mind of the customers as it is evident that there is a significant relationship between consumer learning and advertisements which shows that the consumer gets influence by these ads.

Table No. 8 Positive Impression and Brand Influences

Attitude		Crosstab: positive impression				Cross tab: Brands influences				Total
		Ads of non-alcoholic products of an alcohol brands form a positive impression on me				Does ads of non-alcoholic products of an alcohol brands influences you to change your views on a particular product				
		Strongly Agree	Neutral	Disagree	Strongly disagree	Strongly Agree	Neutral	Disagree	Strongly disagree	
YES	Count	3	0	0	1	3	0	0	1	4
	Expected Count	0.1	0.8	2	1.1	0.1	0.8	2.1	1	4
NO	Count	0	28	74	41	0	29	76	38	143
	Expected Count	2.9	27.6	72.5	40	2.9	29.6	73.4	37.2	143
Some-times	Count	0	1	2	0	0	2	1	0	3
	Expected Count	0.1	0.6	1.5	0.8	0.1	0.6	1.5	0.8	3
Total	Count	3	29	76	42	3	31	77	39	150
	Expected Count	3	29	76	42	3	31	77	39	150

Chi-Square: positive impression				Chi-Square: Brands influences		
	Value	df	Asymp. Sig. (2-sided)	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	113.669 ^a	6	0	116.543 ^a	6	0
Likelihood Ratio	29.487	6	0	31.328	6	0
Linear-by-Linear Association	10.746	1	0.001	7.89	1	0.005
N of Valid Cases	150			150		
a. 9 cells (75.0 percent) have expected count less than 5. The minimum expected count is .06.						

Source: Author's compilation

In the above table the calculated value (0.000) is lesser than the P(0.05) value, so null hypothesis has been rejected. Thus, there is an association between surrogate advertising and consumer attitude. Hence it can be understood that ads form a strong response by the customers as it is evident that there is a significant relationship between consumer attitude and advertisements. The calculated value (0.000) is lesser than the P

(0.05) value, so null hypothesis has been rejected. Thus, there is an association between surrogate advertising and consumer attitude. Hence it can be understood that ads form a strong response by the customers as it is evident that there is a significant relationship between consumer attitude and advertisements.

Table No.9 Ads consumer to buy a particular product over another product

Crosstab: Ads help to differentiate over another product							Crosstab: Buying decision based on ads				
		Does ads of non-alcoholic products of an alcohol brands makes you to buy a particular product over another product				Total	Buying decision based on these ads				Total
		Strongly Agree	Neutral	Disagree	Strongly disagree		Strongly Agree	Neutral	Disagree	Strongly disagree	
YES	Count	3	0	0	1	4	3	0	0	1	4
	Expected Count	0.1	0.9	1.9	1.1	4	0.1	0.8	2.1	1	4
NO	Count	0	33	70	40	143	0	29	76	38	143
	Expected Count	2.9	32.4	68.6	39.1	143	2.9	29.6	73.4	37.2	143
Some-times	Count	0	1	2	0	3	0	2	1	0	3
	Expected Count	0.1	0.7	1.4	0.8	3	0.1	0.6	1.5	0.8	3
Total	Count	3	34	72	41	150	3	31	77	39	150
	Expected Count	3	34	72	41	150	3	31	77	39	150

Chi-Square Tests						
	Value	df	Asymp. Sig. (2-sided)	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	113.582 ^a	6	0	116.543 ^a	6	0
Likelihood Ratio	29.431	6	0	31.3	6	0
Linear-by-Linear Association	10.199	1	0.001	7.89	1	0.005
N of Valid Cases	150			150		

a. 9 cells (75.0 percent) have expected count less than 5. The minimum expected count is .06.

Source: Author's compilation

The calculated value (0.000) is lesser than the P (0.05) value, so null hypothesis has been rejected (Table no.9) Thus, there is an association between surrogate advertising and consumer attitude. Hence it can be understood that ads form a strong response by the customers as it is evident that there is a significant relationship between consumer attitude and advertisements. Thus, it helps the consumer to differentiate over another product because of the impact of these effective

ads. In terms of buying decision based on ads, the calculated value (0.000) is lesser than the P(0.05) value, so null hypothesis has been rejected. Thus, there is an association between surrogate advertising and consumer attitude. Hence it can be understood that ads form a strong response by the customers as it is evident that there is a significant relationship between consumer attitude and advertisements.

Table No.10 Income has a key role to purchase any alcoholic beverages

Income has a key role to purchase any alcoholic beverages	
Strongly Agree	3
Agree	1
Neutral	34
Disagree	75
Strongly disagree	37

From table no.10, it is found that income 75 percent of the respondent believe that income does not play a direct role to purchase the alcoholic beverages where as two point three percent of the respondents were neutral and two percent of the

respondent agreed that income has a significant role while purchasing alcoholic beverages. So to purchase income does not play any important role.

Table No.11 Decision of buying alcohol beverages based on

Decision of buying alcohol beverages based on	
Ads	3
Under friends influence	101
Under the influence of family group	16
Any other reason	30

Source: Author's compilation

From this survey it is found (table no.11) that two percent of the respondents buy alcoholic beverages after seeing surrogate ads while 78 percent of the respondents purchase alcoholic beverages based on word of mouth and remaining 20 percent purchase based on other reason (taste, price and to explore). Hence it can be understood that while purchasing alcoholic beverages customer prefer word of mouth thus they form the

buying decision based on the others experience here 78 percent made their buying decision based on word of mouth; 67 percent respondents made the purchasing decision under friends influence where 11 percent made their buying decision based on family group. Only two percent of the respondent made their purchase based on ads.

Table No.12 KMO and Bartlett's Test

KMO and Bartlett's Test ^a		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.922
Bartlett's Test of Sphericity	Approx. Chi-Square	2947.071
	df	136
	Sig.	0
a. Based on correlations		

KMO (table no.12) values between 0.8 and 1 indicate the sampling is adequate here the value is .92 which shows a acceptable value to conduct the factor analysis test Consequently, the diversity in consumer buying decision, three components have been found. These three factors are the same

ones that the factor analysis identified as being important. The cumulative percentage of the extracted sum of squared loadings with these three components, as shown in Table 13, was 83.46 percent.

Table No.13 Total Variance Explained

Total Variance Explained									
Component	Initial Eigenvalues ^a			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	Percent of Variance	Cumulative percent	Total	Percent of Variance	Cumulative percent	Total	Percent of Variance	Cumulative percent
1	6.772	69.207	69.207	6.772	69.207	69.207	6.339	64.787	64.787
2	0.774	7.908	77.115	0.774	7.908	77.115	1.059	10.82	75.607
3	0.621	6.349	83.464	0.621	6.349	83.464	0.769	7.857	83.464
4	0.283	2.887	86.351						
5	0.26	2.654	89.005						
6	0.225	2.299	91.304						
7	0.161	1.649	92.952						
8	0.138	1.41	94.363						
9	0.125	1.278	95.64						
10	0.113	1.158	96.799						

11	0.081	0.823	97.622						
12	0.064	0.651	98.273						
13	0.055	0.561	98.834						
14	0.043	0.437	99.271						
15	0.039	0.4	99.672						
16	0.026	0.261	99.933						
17	0.007	0.067	100						

In order to perform factor analyses the 14 variables once more, Rotated Component Matrix was used, as shown in table 21 for consumer buying decision. It shows that the customer perception matrix has 3 principal components, the first of which

is made up of 12 variables. The second component also has 1 variable. The third and fourth factors, meanwhile, each have 1 variable that affect how customers see them.

Table No.14 Rotated Component Matrix

Components	Component		
	1	2	3
Ads of non-alcoholic products of a alcohol brands attracts me to buy those products	0.709		
It creates awareness of the product of alcoholic brands	0.767		
Ads of non-alcoholic products of a alcohol brands helps to recall the alcohol brand while purchasing alcoholic beverages	0.749		
Identify the liquor brands after watching ads of non-alcoholic products of a alcohol brands	0.686		
Remember the brands of alcohol easily due to these ads	0.705		
Non-alcoholic products of a alcohol brands makes you to buy a particular product over another product	0.727		
Buying decision based on these ads	0.713		
Influence by Surrogate ads	0.707		
Ads forms an impression in the mind of a buyers	0.735		
Ads of non-alcoholic products of a alcohol brands form a positive impression on me	0.732		
Non-alcoholic products of a alcohol brands influences you to change your views on a particular product	0.722		
Buying decision based on these ads	0.748		
Decision of buying alcohol beverages based on Ads, words of mouth and other reason		0.812	

Table No.15 Factor Analysis

PRINCIPLE FACTORS	ATTRIBUTES	FACTOR
		SCORE
Psychological Factor	Ads of non-alcoholic products of a alcohol brands attracts me to buy those products	0.709
	It creates awareness of the product of alcoholic brands	0.767
	Ads of non-alcoholic products of a alcohol brands helps to recall the alcohol brand while purchasing alcoholic beverages	0.749
	Identify the liquor brands after watching ads of non-alcoholic products of a alcohol brands	0.686
	Remember the brands of alcohol easily due to these ads	0.705

	Non-alcoholic products of a alcohol brands makes you to buy a particular product over another product	0.727
	Buying decision based on these ads	0.713
	Influence by Surrogate ads	0.707
	Ads forms an impression in the mind of a buyers	0.735
	Ads of non-alcoholic products of a alcohol brands form a positive impression on me	0.732
	Non-alcoholic products of a alcohol brands influences you to change your views on a particular product	0.722
	Buying decision based on these ads	0.748
PRINCIPLE FACTORS	ATTRIBUTES	FACTOR SCORE
Promotional tools	Decision of buying alcohol beverages based on Ads, words of mouth and other reason	0.812

From the above Table no.15 it can be observed that the two principle factors are Psychological factors and Promotional tools. From the first factor it has been seen that psychology plays an important role to make the consumer to choose the product in other words it can be said that consumer make their decision based on perception, attitude and learning. The second factor suggests that the consumer decision were also being influenced by promotional tools.

Results and Discussion

From this study it is found that consumer purchase alcoholic beverages based on surrogate ads but it is seen that only limited consumer purchase after seeing these ads and most of the consumer make their buying decision based on the word of mouth so from this study it shows quality and taste is the key to make the consumer to purchase their product. The study shows that there is an association between surrogate advertising and consumer perception& there is also an association between surrogate advertising and consumer attitude which shows the formation of perception and attitude of the consumer. The consumer after seeing the ads can interpret the message of the ads and forms an attitude related to the product. Thus, these ads are important to promote the brands. The study shows that there is an association between surrogate advertising and consumer Learning. Hence it can be understood that ads form a strong knowledge in the mind of the customers as it is evident that there is a significant relationship between consumer Learning and advertisements which shows that the consumer gets influence by these ads. Thus, these ads help to identify the brand. It is found that income 75 percent of the respondent

believe that income does not play a direct role to purchase the alcoholic beverages where as 23 percent of the respondents were neutral and two percent of the respondent agreed that income has a significant role while purchasing alcoholic beverages. So, to purchase income does not play any important role it can be observed that the three principal factors are psychological factors, promotional tools and consumption. from the first factor it has been seen that psychology plays an important role to make the consumer to choose the product in other words it can be said that consumer make their decision based on perception, attitude and learning. The second factor suggests that the consumer decision were also being influenced by promotional tools and the last principle factor is consumption which refers to the consumer taste and buying behaviour.

Conclusion

This research aimed to identify the effectiveness of surrogate advertising for companies as well as for the young researcher to understand the consumer perception and attitude towards the surrogate advertising and formation of consumer learning and independent variable role on the purchasing behaviour of the alcoholic beverages' consumer. Based on a quantitative and qualitative analysis, it can be concluded that surrogate advertising is important because it helps the potential consumer to make aware of the brand by educating the customer. From this study it is seen that surrogate ads helps the company to sell their product. Thus, this research paper will help the other researcher to find the factors that is responsible for the consumer buying behaviour based on perception and attitude.

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Public Investment vs. Tourist Inflow: An ARIMA Forecasting Study of Tourism Trends in Himachal Pradesh

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Abstract

Tourism remains a cornerstone of Himachal Pradesh's economy, contributing significantly to employment generation and regional development. In recent years, the government of Himachal Pradesh has enhanced its commitment by increasing its investment in the tourism sector, aiming to revive and modernize the industry through enhanced infrastructure and promotional initiatives. This study employs the Auto Regressive Integrated Moving Average (ARIMA) model to forecast and analyze the trends in government expenditure on tourism and tourist arrivals in Himachal Pradesh from 2005 to 2024. The time-series data were processed for stationarity through differencing, and the parameters were selected through autocorrelation and partial autocorrelation analyses. Forecast accuracy was validated using statistical measures such as RMSE, MAE, and MAPE. The results reveal a steady increase in government spending on tourism, reflecting strong fiscal commitment toward sectorial revitalization; however, tourist arrivals exhibit a declining trend, suggesting limited responsiveness to these fiscal efforts. This divergence underscores the need for more targeted and experience-oriented tourism strategies that translate budgetary allocations into tangible growth in visitor inflow and sustainable tourism outcomes.

Keywords: *Tourism Forecasting, ARIMA Model, Time-Series Analysis, Government Expenditure, Tourist Arrivals, Himachal Pradesh Tourism*

Introduction

The tourism and hospitality sector forms a cornerstone of regional economic growth in India, especially in states endowed with rich natural beauty, cultural heritage, and diverse climatic conditions. Among these, Himachal Pradesh, nestled in the western Himalayas, stands out as one of the country's most sought-after travel destinations. Its breathtaking landscapes, snow-clad mountains, serene valleys, and colonial-era hill towns attract millions of domestic and international tourists annually (Kumar & Raj, 2019). This consistent tourist inflow has historically contributed to employment generation, local entrepreneurship, and infrastructure development, making tourism a key driver of the state's Gross State Domestic Product (GSDP) (Jreat, 2004).

Recognizing this significance, the Government of Himachal Pradesh has progressively increased its budgetary allocation

toward tourism development. These allocations encompass a range of initiatives including infrastructure improvement, destination promotion, heritage conservation, capacity building, and the development of eco and adventure tourism circuits (Sharma & Kaur, 2025). However, despite the steady rise in government expenditure on tourism, recent years have witnessed a concerning decline in tourist arrivals (Bhardwaj et al., 2019). This divergence between fiscal investment and actual tourism performance brings into focus the critical concerns regarding effectiveness of expenditure, demand responsiveness, and policy outcomes.

Government expenditure on tourism is often treated as a proxy for development intent and institutional commitment to the sector. It reflects the state's prioritization of tourism as a growth engine and a contributor to employment and regional equity

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(Kumar & Sharma, 2022). Conversely, tourist arrivals represent the realized demand and serve as a barometer of the sector's actual health and global competitiveness. When public expenditure trends upwards while arrivals fall, it indicates structural challenges such as destination fatigue, limited marketing effectiveness, or external shocks like global economic downturns and post-pandemic behavioral changes in travel (Sharma & Kaur, 2025). Understanding and forecasting these two contrasting trends are therefore essential for policy evaluation, future planning, and investment decisions.

In this context, the present study applies the AutoRegressive Integrated Moving Average (ARIMA) model to forecast trends in government tourism expenditure and tourist arrivals in Himachal Pradesh for the period 2013–2024 & 2008–2024, respectively. The ARIMA model, a robust and widely used time-series forecasting method, is particularly suitable for short to medium-term prediction where historical data exhibit autocorrelation and trend persistence (Manisha & Singh, 2024). By analyzing past fiscal and demand data, this study identifies the degree to which current expenditure patterns are aligned with tourism demand and provides quantitative projections that can guide future budget planning and marketing strategies.

While several studies in tourism economics focus on forecasting tourist arrivals, relatively few have examined fiscal expenditure patterns or analyzed the disparity between investment and visitor response. This research therefore fills an important gap in the literature by jointly modeling two critical but often disconnected dimensions of tourism development, supply-side government spending and demand-side tourist arrivals. The dual analysis enables a more holistic understanding of how effectively financial inputs are translating into tourism outcomes.

The importance of such analysis has grown in the post-pandemic era, where the tourism sector faces new challenges related to traveler preferences, environmental sustainability, and digital transformation. Despite disruptions in tourist flows during and after COVID-19, governments have continued to increase tourism-related funding as part of revival and resilience strategies. Himachal Pradesh's recent budgets reflect this trend, emphasizing diversification of tourism offerings, rural and homestay development, and digital marketing initiatives (Attri & Kaushal, 2019). Yet, the expected rebound in arrivals remains inconsistent, highlighting the need for evidence-based evaluation of spending efficiency.

By employing ARIMA modeling, this study offers statistically validated forecasts of both government expenditure and tourist

inflow for the period 2025–2030. The findings are expected to inform policymakers, planners, and tourism boards about the alignment between investment levels and market response. Moreover, the analysis helps in shaping more demand-sensitive, sustainable, and outcome-oriented tourism policies that convert fiscal commitment into tangible sectoral growth.

In summary, this study moves beyond single-variable forecasting to present a comparative time-series analysis of expenditure and arrivals, underscoring the dynamic interaction between policy effort and tourism performance. By situating Himachal Pradesh as a case study, it contributes to broader debates on public investment efficiency and tourism sustainability in developing economies. The ARIMA-based approach adopted here provides a replicable methodological framework for other states and regions seeking to evaluate and forecast the effectiveness of government-led tourism initiatives.

Literature Review

Tourism is widely acknowledged as a multidimensional driver of economic growth, regional development, and employment generation, particularly in developing economies such as India (Naseem, 2021). Over the past few decades, scholars have explored tourism not only as a socio-economic phenomenon but also as a policy instrument for sustainable regional development. A considerable body of research has applied econometric and time-series techniques to understand tourism demand, fiscal expenditure, and their interrelationships. However, most existing literature tends to analyze either tourist arrivals or government spending in isolation, with limited attempts to assess their dynamic alignment. This section goes through the studies that are relevant to the use of the AutoRegressive Integrated Moving Average (ARIMA) model in tourism forecasting and examines prior research on public expenditure patterns, tourism performance, and the policy–performance gap.

Tourism has long been recognized as a vital contributor to regional and national economies. According to UNWTO (2022), the sector accounts for nearly 10% of global GDP and acts as a significant source of foreign currency revenue for developing nations. In India, the tourism and hospitality industry contributes significantly to GDP and employment, especially in states like Himachal Pradesh, Kerala, and Goa, where natural and cultural resources form the foundation of tourism-led growth. Bhatia, Roy & Yaja (2019) emphasized that tourism's multiplier effects extend beyond direct income generation to include indirect and induced benefits such as infrastructure improvement and service sector expansion. Similarly, Sharma &

Hasti (2024) noted that sustainable tourism development depends heavily on the synergy between public investment and private sector responsiveness.

Public expenditure plays a crucial role in facilitating tourism development through investment in infrastructure, marketing, training, and environmental conservation. Sinclair (1998) and Brida et al. (2016) found that higher levels of government spending on tourism-related infrastructure correlate positively with tourism competitiveness and visitor satisfaction. However, the efficiency of such spending depends on its alignment with actual market demand. Seetanah (2011) demonstrated that while government spending positively affects tourism receipts in small island economies, inefficient allocation can lead to fiscal imbalances and diminishing marginal returns. In the Indian context, Kumar & Sharma (2022) observed that several states allocate substantial funds to tourism, yet tourist arrivals do not always respond proportionately, indicating the presence of a policy performance gap.

Recent budget analyses of Himachal Pradesh reflect a consistent rise in tourism-related spending aimed at post-pandemic recovery, destination diversification, and capacity building. However, as Parashar & Indolia (2024) note, these fiscal efforts have not translated into proportional increases in tourist arrivals, suggesting a potential disconnect between expenditure intensity and tourism demand elasticity.

Forecasting is a critical tool in tourism planning and policy formulation. Accurate projections of tourist arrivals, expenditure, and infrastructure demand help policymakers allocate resources efficiently. Early studies such as Witt and Witt (1995) reviewed forecasting techniques in tourism, highlighting the superiority of time-series models in short-term prediction. Song and Li (2008) provided an extensive overview of econometric models used for tourism demand forecasting and concluded that ARIMA and its variants (SARIMA, ARIMAX) consistently outperform simple trend or exponential smoothing models when dealing with autocorrelated data.

Goh and Law (2002) applied ARIMA models to forecast Hong Kong's tourist arrivals and found that ARIMA models produced lower error margins compared to other univariate techniques. Similarly, Lim and McAleer (2001) examined international tourist arrivals to Australia and confirmed that ARIMA models provide reliable short-term forecasts with minimal structural bias. These studies collectively validate ARIMA's utility in contexts where data exhibit stable historical patterns but may lack explanatory variables.

In India, ARIMA-based forecasting has been increasingly employed in regional tourism research. Chandra & Kumari (2018) applied ARIMA modeling to predict foreign tourist arrivals to India and reported high forecast accuracy for short-term horizons. Madhulal, et al. (2024) conducted a similar analysis for Kerala, highlighting how time-series forecasting can aid in policy formulation and crisis management. For Himalayan states, Manisha & Singh (2024) analyzed seasonal tourism demand in Himachal Pradesh using ARIMA and found that the model effectively captured post-monsoon peaks and off-season troughs. These results reinforce the suitability of ARIMA for high-altitude regions such as Himachal Pradesh, where tourism trends exhibit pronounced time-based fluctuations.

However, most Indian studies focus solely on tourist arrivals or revenue forecasting, neglecting the role of public expenditure as a determinant of tourism sustainability. The present research extends this scope by incorporating both fiscal allocation and demand-side data within a forecasting framework.

Economic literature has long discussed the link between public spending and output efficiency. In the context of tourism, this relationship becomes complex because expenditures on promotion, infrastructure, and human resources may not yield immediate or linear outcomes. Hall (2008) argued that tourism policies often emphasize visibility and short-term targets rather than long-term capacity-building, leading to a mismatch between government efforts and visitor response. Similarly, Brau et al. (2011) highlighted that policy success in tourism should be measured not only by budgetary inputs but also by the degree of demand stimulation and sustainability outcomes achieved.

In the case of Himachal Pradesh, the government's rising tourism expenditure since 2015 through programs like "Nai Raahein Nai Manzilein" and eco-tourism circuit development reflects a proactive attempt to revive the sector after natural calamities and the COVID-19 slowdown (Sharma & Kaur, 2025). Yet, as the data indicate, tourist arrivals have not rebounded in proportion to fiscal growth. This suggests that while the supply-side commitment has intensified, the demand-side response remains subdued, emphasizing the need for strategic reorientation and targeted marketing.

A clear gap emerges in the literature concerning the joint forecasting of government expenditure and tourist arrivals at the state level. Most existing studies either analyze expenditure efficiency or employ ARIMA models for univariate forecasting of tourist arrivals. Very few attempt to compare and interpret the

divergence between fiscal commitment and tourism performance through a data-driven approach. This study addresses that gap by applying ARIMA modeling to two interrelated time-series, government expenditure on tourism and total tourist arrivals in Himachal Pradesh from 2013 to 2024.

By providing independent forecasts for both variables and comparing their trajectories, the study contributes to a nuanced understanding of fiscal responsiveness in tourism planning. The findings are expected to inform policymakers about the efficiency of tourism budgets and the need for more demand-sensitive interventions. Methodologically, the paper also enriches existing literature by demonstrating how ARIMA can be applied not only for demand prediction but also for budgetary trend analysis, thereby expanding its utility in public finance and tourism policy research.

Research Methodology

This study utilizes a quantitative time-series research design based on secondary data to examine long-term patterns in tourism expenditure and tourist arrivals in Himachal Pradesh for the period 2013-2024 & 2008-2024, respectively. The aim is to evaluate whether changes in visitor inflow correspond with fluctuations in overall tourism spending within the state. To provide policy-relevant insights, the study further generates forecasts for 2025–2030 using the ARIMA (AutoRegressive Integrated Moving Average) approach. This framework is well suited for exploring temporal relationships and producing data-driven projections.

All data used in this research were obtained from credible secondary sources to ensure reliability. The dataset and information was collected from the Himachal Pradesh Tourism Development Corporation (HPTDC) and the Department of Economics and Statistics, Government of Himachal Pradesh, both of which supply state-level statistics related to expenditure trends and tourism behavior. Selected rounds of the National Sample Survey Office (NSSO) were also referenced to understand broader economic and demographic factors influencing tourism spending.

Two major variables frame the analysis:

1. Total Tourism Expenditure (2013–2024): The expenditure represents the government spending on tourism-related infrastructure during 2013–2024.
2. Total Tourist Arrivals (Domestic + Foreign, 2008–2024): This includes the yearly count of visitors entering the state, representing overall tourism demand.

3.3 Research Tools and Analytical Techniques

The forecasting component of this study employs the ARIMA (p, d, q) model, widely recognized for its robustness in analyzing non-stationary time-series data. To determine the most appropriate model specifications, several diagnostic procedures were implemented:

- Autocorrelation Function (ACF)
- Partial Autocorrelation Function (PACF)
- Augmented Dickey–Fuller (ADF) Test for checking stationarity
- Ljung–Box Q Test for validating residual independence

On the basis of objectives of the study, two separate ARIMA models were developed:

- Model A: Forecasts annual tourism expenditure for 2025–2030.
- Model B: Forecasts total tourist arrivals for the same period.

IBM SPSS was used to conduct all statistical analyses and visualizations. Model adequacy was checked using evaluation criteria such as the Mean Absolute Percentage Error (MAPE) and the Akaike Information Criterion (AIC).

3.4 Justification for Using ARIMA

ARIMA is selected due to its suitability for forecasting time-series data where external predictors are either unavailable or too complex to incorporate reliably. Tourism expenditure, like tourist arrivals, is influenced by multiple unpredictable factors, including economic fluctuations, climatic conditions, geopolitical issues, and public health events, which complicate the construction of multivariate predictive models. ARIMA avoids these complexities by relying solely on patterns derived from the past values and the internal structure of the data (Chu, 2009).

Moreover, tourism datasets often exhibit seasonal effects, irregular fluctuations, and trend components. ARIMA models, and their seasonal variants when necessary, can effectively accommodate these features through differencing and autocorrelation modeling, making them highly appropriate for tourism-related forecasting (Petrevska, 2017).

The approach also incorporates systematic diagnostic checking examining residual behavior, fit statistics (AIC, BIC, MAPE), and autocorrelation patterns, which enhances the reliability of the forecasts (Kulendran & Wong, 2005). Given the long time span of available data (2013–2024) for expenditure and (2008-2024) for total tourist arrivals, ARIMA is particularly effective in producing short-term future estimates up to 2030, supporting evidence-based decision-making for tourism development and financial planning in Himachal Pradesh.

In summary, ARIMA offers a statistically rigorous and contextually relevant method for analyzing and forecasting both tourism expenditure and tourist arrivals, making it an appropriate choice for this research.

4. Results and Interpretations:

This study presents the results obtained through ARIMA modeling to forecast the Government of Himachal Pradesh's expenditure on tourism and total tourist arrivals for the period 2025–2030. The analysis provides insights into whether the government's increased spending is translating into a corresponding rise in tourism demand. The ARIMA models were

developed using annual time-series data, with parameters selected based on model fit diagnostics (AIC, BIC, and residual autocorrelation tests).

4.1 Forecast of Government Expenditure in Tourism

An assessment of future government expenditure provides a clearer understanding of how financial support for the tourism sector is likely to progress in the coming years. By examining past spending patterns and extending these trends forward, the forecast highlights whether investment in tourism is expected to increase, stabilize or decline. This projection also helps in evaluating how aligned government funding is with the evolving needs and growth potential of the tourism industry.

Table 4.1: Expenditure in Tourism (2013-2024)

Fiscal Year	Expenditure in Tourism(Rs.in Lakhs)	Growth in Tourism Allocation (%)
2013-14	2,820	58.87
2014-15	3,200	13.48
2015-16	4,325	35.16
2016-17	5,800	34.1
2017-18	8,904	53.52
2018-19	8,398	-5.68
2019-20	8,513	31.37
2020-21	6,343	17.09
2021-22	6,544	18.66
2022-23	9,657	35.37
2023-24	10,013	36.77

Source: Department of Tourism, Government of Himachal Pradesh, 2024

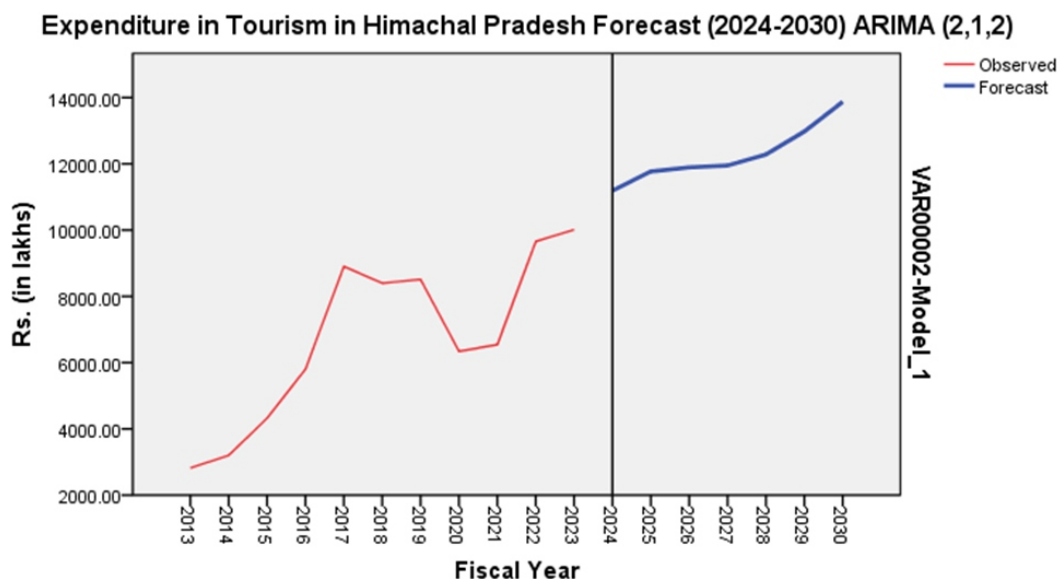


Figure 4.1 Expenditure in Tourism Forecast (2024-2030)

Table 4.2: Model Fit-Expenditure in Tourism Forecast (2024-2030)

Fit Statistic	Mean	SE	Minimum	Maximum	Percentile							
					5	10	25	50	75	90	95	
Stationary R-squared	0.418	.	0.418	0.418	0.418	0.418	0.418	0.418	0.418	0.418	0.418	0.418
R-squared	0.719	.	0.719	0.719	0.719	0.719	0.719	0.719	0.719	0.719	0.719	0.719
RMSE	1632.658	.	1632.658	1632.658	1632.658	1632.658	1632.658	1632.658	1632.658	1632.658	1632.658	632.658
MAPE	12.466	.	12.466	12.466	12.466	12.466	12.466	12.466	12.466	12.466	12.466	12.466
MaxAPE	29.384	.	29.384	29.384	29.384	29.384	29.384	29.384	29.384	29.384	29.384	29.384
MAE	928.046	.	928.046	928.046	928.046	928.046	928.046	928.046	928.046	928.046	928.046	928.046
MaxAE	2616.308	.	2616.308	2616.308	2616.308	2616.308	2616.308	2616.308	2616.308	2616.308	2616.308	2616.308
Normalized BIC	15.947	.	15.947	15.947	15.947	15.947	15.947	15.947	15.947	15.947	15.947	15.947

Table 4.3: Forecast(2024-2030)

Year		2024	2025	2026	2027	2028	2029	2030
Expenditure in Tourism (in lakhs)	Forecast	11189.72	11769.31	11892.45	11951.05	12283.65	12976.95	13871.85

The forecast for government expenditure in tourism indicates a steady upward trajectory, reflecting a sustained financial commitment by the Himachal Pradesh government toward tourism revival and infrastructure development.

As shown in Figure 1, the forecast line (in blue) continues to rise after 2024, suggesting that the state government is progressively increasing tourism allocations over time. This pattern indicates ongoing public investment in destination infrastructure, marketing campaigns, eco-tourism initiatives, and post-pandemic revival programs.

Notably, the expenditure shows a consistent growth rate of approximately 3–5% per annum, implying optimism and confidence in tourism's role as a driver of state GDP and employment.

However, financial expansion alone does not guarantee sectorial recovery, hence, the next section examines whether tourist arrivals exhibit a matching pattern.

4.2 Forecast of Total Tourist Arrivals

Understanding future tourist arrivals is essential for assessing the demand-side dynamics of the tourism sector in Himachal Pradesh. By extending past trends into the forecast period, the analysis provide a clearer picture of whether tourist inflow is expected to grow, stabilize or decline in the coming years. These projections also help evaluate how well tourism demand aligns

with the government's increasing investment and whether current infrastructure and services are adequate to support future visitor numbers.

Table 4.4: Domestic & Foreign Tourist Arrival in Himachal Pradesh (2008-2024)

Year	Total Tourist Arrivals (Domestic + Foreign)
2008	9749433
2009	11437155
2010	13265602
2011	15089406
2012	16146332
2013	15129835
2014	16314400
2015	17531153
2016	18450520
2017	19601533
2018	16450503
2019	17212107
2020	3213379
2021	5637102
2022	15100277
2023	16004924
2024	18124694

Source: Department of Tourism, Government of Himachal Pradesh, 2024

Total Tourist Arrival Forecast in Himachal Pradesh (2025-2030)- ARIMA (3,1,1)

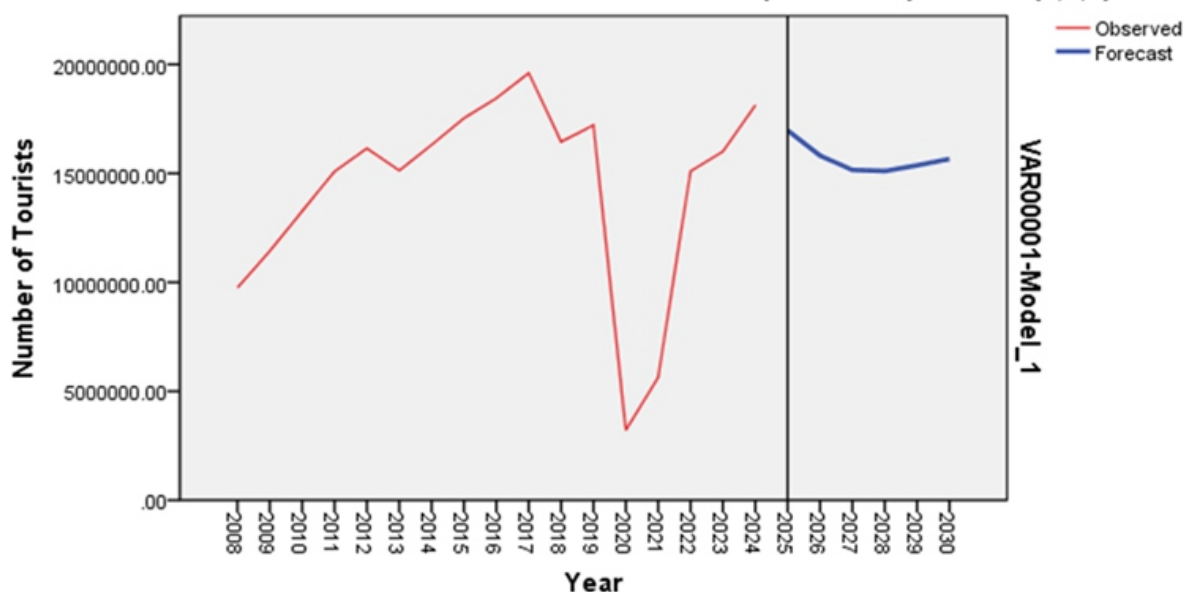


Figure 4.2-Total Tourist Arrival Forecast (2025-2030)

Table 4.5: Model Fit- Total Tourist Arrival Forecast (2025-2030)

Fit Statistic	Mean	Minimum	Maximum	Percentile							
Stationary	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234
R-squared	0.186	0.186	0.186	0.186	0.186	0.186	0.186	0.186	0.186	0.186	0.186
RMSE	4718190.672	4718190.672	4718190.672	4718190.672	4718190.672	4718190.672	4718190.672	4718190.672	4718190.672	4718190.672	4718190.672
MAPE	37.928	37.928	37.928	37.928	37.928	37.928	37.928	37.928	37.928	37.928	37.928
MaxAPE	410.495	410.495	410.495	410.495	410.495	410.495	410.495	410.495	410.495	410.495	410.495
MAE	2680403.044	2680403.044	2680403.044	2680403.044	2680403.044	2680403.044	2680403.044	2680403.044	2680403.044	2680403.044	2680403.044
MaxAE	13190768.98	13190768.98	13190768.98	13190768.98	13190768.98	13190768.98	13190768.98	13190768.98	13190768.98	13190768.98	13190768.98
Normalized BIC	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.6

Table 4.6: Forecast (2025-2030)

Year		2025	2026	2027	2028	2029	2030
Number of Tourists	Forecast	16,967,957	15,812,226	15,154,840	15,109,071	15,364,160	15,655,188

The forecast of total tourist arrivals reveals a contrasting trend. While the pre-2020 data shows robust growth (especially between 2014 and 2018), the series experienced a sharp contraction during 2020–2021 due to the COVID-19 pandemic. Post-2022, arrivals began to recover gradually, but the ARIMA (3,1,1) forecast indicates that the growth will plateau after 2024.

In other words, while government spending continues to increase, tourist arrivals are not expected to rise proportionally. The forecast line suggests a stagnant or slightly declining pattern, signaling limited recovery momentum in the near future.

This outcome implies that the tourism demand elasticity with respect to government expenditure is weak, and the benefits of higher spending have not yet translated into corresponding visitor inflows.

4.3 Comparative Analysis: Divergence between Spending and Arrivals

The juxtaposition of Figures 4.1 and 4.2 highlights a policy–performance gap. Between 2024 and 2030, Himachal Pradesh's tourism expenditure is expected to increase by over 24%, yet tourist arrivals show no significant upward shift.

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4.3 Comparative Analysis: Divergence between Spending and Arrivals

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This divergence points toward several underlying factors:

1. Destination Saturation: Overdependence on a few tourist hubs (Shimla, Manali, Dharamshala) limits expansion potential.
2. Environmental Constraints: Frequent landslides, overcrowding, and ecological degradation deter long-stay tourism.
3. Infrastructure Gaps: Connectivity issues, poor waste management, and limited urban amenities reduce visitor satisfaction.
4. Changing Tourist Preferences: Post-pandemic travelers seek sustainable, offbeat, and personalized experiences.
5. Delayed Impact of Expenditure: Tourism infrastructure investments often yield results after a lag period.

Hence, while the state's policy intent is clear, revive tourism through increased spending; the outcomes remain subdued in the short term.

4.4 Discussion

The ARIMA forecasts suggest a paradox: financial optimism but behavioral stagnation. The increasing fiscal allocation reflects the government's efforts to rejuvenate tourism through better infrastructure, marketing, and diversification programs. However, the projected tourist arrivals do not mirror this upward trajectory, implying limited short-term responsiveness of demand to expenditure.

Possible explanations include:

- Expenditure Inefficiency: Funds may be concentrated on infrastructure without sufficient focus on promotion, accessibility, or digital innovation.
- Macroeconomic Factors: Rising travel costs, inflation, and global economic uncertainties can restrict domestic and international travel.
- Carrying Capacity and Environmental Stress: Himachal's fragile ecology may be limiting the scale of tourism expansion.

This divergence underlines the need to evaluate not just how much is spent, but how effectively it is utilized. The findings emphasize that policy formulation must integrate sustainability, innovation, and local engagement alongside budgetary expansion.

Moreover, ARIMA-based forecasting has proven to be a reliable empirical tool in identifying such structural mismatches. By capturing both historical momentum and future projections, it enables policymakers to align fiscal priorities with realistic demand expectations.

4.5 Summary of Findings

- Government expenditure on tourism is projected to increase steadily between 2024 and 2030, reaching ₹13,871.85 lakh by 2030.
- Tourist arrivals, however, show a flattening trend, suggesting weak short-term responsiveness to government spending.
- The mismatch between budget growth and tourist inflows highlights inefficiencies in fund allocation, destination management, and marketing outreach.
- ARIMA forecasting effectively demonstrates that quantitative increases in spending must be coupled with qualitative improvements in sustainability, experience design, and promotion to achieve balanced growth.

5. Conclusion

The present study applied the ARIMA forecasting technique to analyze the relationship between Government of Himachal Pradesh's expenditure on tourism and total tourist arrivals. The models ARIMA (2,1,2) for tourism expenditure and ARIMA (3,1,1) for total tourist arrivals, revealed a striking divergence between fiscal inputs and tourism performance.

The forecast of government expenditure suggests a continuous upward trend from ₹11,189.72 lakh in 2024 to ₹13,871.85 lakh in 2030, indicating strong policy intent and commitment to tourism-led development. However, the forecast for total tourist arrivals reveals a stagnant or slightly declining trend, implying that increased financial inputs have not yet translated into proportional growth in tourist demand.

This mismatch between rising expenditure and flattening tourist arrivals suggests a potential inefficiency in the utilization or targeting of funds. While the government's tourism budget demonstrates a consistent commitment to revival, the lack of corresponding demand growth points toward the need for strategic redirection and better outcome monitoring.

In essence, the study highlights that financial expansion alone is not sufficient to guarantee tourism recovery. The success of Himachal Pradesh's tourism sector depends equally on the quality of expenditure, policy alignment with visitor behavior, and sustainability considerations.

5.1 Key Insights from the ARIMA Forecasts

1. Persistent Upward Fiscal Commitment
 - The ARIMA (2,1,2) forecast indicates a clear and steady rise in tourism-related government expenditure between 2024 and 2030.
 - This reflects proactive measures by the government to boost tourism infrastructure, marketing, and employment generation.
2. Tourist Arrivals Plateauing Post-2024
 - Despite increasing expenditure, the ARIMA (3,1,1) forecast for total tourist arrivals shows minimal growth, suggesting the sector's limited short-term responsiveness to budgetary inputs.
 - This highlights that current spending patterns may not be effectively addressing demand constraints or changing traveler preferences.
3. Weak Expenditure–Outcome Linkage
 - The forecasts collectively reveal a decoupling between investment and performance, tourism spending has an upward momentum, but arrivals fail to follow.
 - This suggests that expenditure effectiveness and tourism management efficiency need greater policy focus.

The findings have significant implications for tourism policy and public expenditure management in Himachal Pradesh. While the state has demonstrated fiscal commitment, the impact of this spending is not optimally reflected in tourist inflows. The key challenge lies in bridging the gap between budget growth and sectorial performance.

1. Shift from Input-Based to Outcome-Based Budgeting: Rather than merely increasing allocations, policies should link budget utilization to measurable tourism outcomes such as visitor satisfaction, sustainability, and destination diversification.
2. Tourist Diversification: Excessive reliance on traditional tourist hubs (Shimla, Manali, Dharamshala) has led to congestion and environmental strain. Encouraging rural, eco, and wellness tourism can distribute tourist flows more evenly and attract niche markets.
3. Infrastructure vs. Experience Balance: While physical infrastructure remains vital, the focus should extend

toward digital infrastructure (smart booking systems, data-driven marketing) and experiential tourism (culture, food, festivals).

4. Sustainability and Climate Adaptation: Given Himachal's fragile ecosystem, environmental management should be integrated with all tourism projects. Green certifications, carrying-capacity regulations, and waste management systems should be mandatory for tourist destinations.
5. Post-COVID Travel Behavior: The pandemic has permanently altered travel preferences toward safety, cleanliness, and authenticity. Expenditure should prioritize digital campaigns, contactless systems, and community-based tourism.
6. Enhanced Monitoring and Evaluation Systems: Establishing real-time dashboards and KPIs for tourism spending would improve transparency, help track return on investment, and align fiscal planning with performance indicators.

5.2 Recommendations for Future Planning

On the basis of empirical results and observed mismatch, the study put forwards the following recommendations for Himachal Pradesh's tourism policy framework: to strengthen the tourism sector, several strategic focus areas require targeted interventions. Budget optimization should be achieved through output-based budgeting, where financial allocations are directly linked to measurable performance indicators, ensuring more efficient utilization of public funds. In terms of destination management, promoting lesser-known regions and offbeat locations can help distribute tourist flow more evenly and reduce pressure on overcrowded sites. Marketing strategies must increasingly rely on data analytics and digital platforms to reach emerging visitor segments and expand the overall tourist base. Sustainability is another key priority, calling for the strict enforcement of eco-tourism standards and climate-sensitive planning practices to safeguard long-term ecological stability. Additionally, capacity building through training local youth in hospitality and digital tourism can enhance both employment opportunities and service quality. Finally, improving infrastructure, particularly connectivity, sanitation, and safety in remote destinations, will significantly elevate the overall tourist experience.

5.3 Limitations of the Study

- The ARIMA forecasts are based purely on historical time-series data and do not include external variables such as inflation, global travel trends, or policy shocks.
- The forecast horizon (2024–2030) assumes stable macroeconomic and political conditions. Any disruption may alter the projected trends.

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The Antecedents of Green Consumer Heterogeneity from the Perspective of External Green Marketing Cues: A Revisit

*Swati Shaw

Abstract

The transition to a sustainable business framework opens up a variety of markets that resourceful people and businesses can successfully identify and serve, including the creation of new goods and services, increased productivity at already-existing businesses, novel marketing strategies, and re-organisation of current business models and procedures. In this context, it is crucial for researchers to comprehend the consumer niche and the approaches used by the business to attract this group of customers. The study's goal was to look into how female customers' intentions to purchase environmentally friendly cosmetics were influenced by their demographic, psychographic, and behavioural characteristics. To operationalize and validate segments from the data gathered from 461 female respondents of Kolkata and its outskirts, analytical techniques such as cluster analysis, multiple discriminant analysis, and chi-square were used. Consumer groups have been divided into three categories and given the names "Behavioural Green," "Potential Green," and "Reasonable Green." The study illustrates how external green marketing cues and purchase intention are related, which can help managers better understand female consumers who use environmentally friendly cosmetics and rethink their marketing methods.

Keywords: *Green Segmentation, External Green Marketing Cues, Demographic Criterion, Psychographic Criterion, Behavioural Criterion.*

1. Introduction

Customers' differences, according to Laroche (2001), are what prompt academics and decision-makers to understand the fundamentals of market segmentation and finally aspire to plan the differentiation strategies in the green marketing study. According to Kotler et al. 2009, difference has always been a key concept in marketing. They also noted that in the actual world, it is impossible to treat all customers equally because they have such vastly diverse preferences when it comes to tastes, likes, and purchasing habits. In a bid to make use of the tactical advantage of green distinctiveness as the primary starting point of environmental benefit amid the age of business competition and environmental responsibility, several organisations have started to implement segmentation, targeting, and positioning with respect to environmental concern. One of the most effective methods for comprehending the mindset of environmentally conscious buyers and divide people based on

how they display uniform environmentally conscious characteristics is green market segmentation (Ottman, 2011).

2. Conceptual Framework and Objective

2.1 Literature Review - According to different researchers, in order to begin the process of market segmentation, one must first select a group of factors that will serve as the framework for the segmentation premises or standards for determining patterns of consumption. Look for the direct route concerning the state within the environmentally conscious market for consumers while examining the overall position of the different segmentation criteria and the variables that are pertinent to them. The combined impact of behavioural, psychographic, and demographic parameters will be examined.

2.1.A Demographic Criterion - In the 1970s and 1980s, consumer marketing began to frequently use socio-

demographic characteristics. Numerous works concerning green segmentation studies have employed socio-demographic factors to divide consumers into groups. These factors became popular in studying the connection between environmental awareness and green consumption. The current study makes the case that, for defining the green customer in the Indian setting, demographics namely age, gender, education, income level, occupation, and location should be taken into account.

2.1.B Psychographic Criterion - For more insightful analysis of consumer purchasing behaviour, psychographics may be used as an alternative segmentation criterion. These have been promoted as more useful selection criteria for separating out the uniform characteristics of green consumers than demographics. As a result, numerous research adjusted their convictions in both mind and heart regarding environmental variables. But few research (Ottman, 2010; Sarti et al., 2018) have looked at how customers feel about external marketing variables. Several researchers have proposed including new variables associated to marketing boosts like green commercials, green brand, green trust, and eco-labels in current consumer study to better comprehend the behavioural side of "purchasing behaviour" for green goods and services. Based on the literature that is currently accessible, it is evident that consumers' conceptual views about environmental marketing cues, namely, green product labels, green brands, and green commercials, were hardly addressed as the basis for psychographic segmentation in developing nations. Consequently, the present work aims to implement the psychographic segmentation standards based on the standpoints of "external green marketing cues," specifically knowledge about environmental-friendly cosmetics brands, knowledge about environmental-friendly cosmetics labels, and environmental advertising, as they can also support or undermine an individual's responsiveness towards purchase intention.

2.1.C Behavioural Criterion - According to behavioural segmentation, consumers are divided into categories depending on how they perceive, approach, use, or respond to a product. This method also aims to understand consumers' purchasing patterns from both the perspectives of users and non-users. Researchers have tried to divide customer groups into various sets using "ECCB," one of the key behavioural criteria for segmenting the green market. Most studies on this behavioural component and/or the prolonged strategy of different models has been applied to understand the trend of environmentally conscious actions in various cultural contexts, along with India (Joshi and Rahman, 2015). The importance of

green purchasing intention (GPI) and green purchase behaviour above other types of environmentally conscious behaviours within the framework of developing nations has attracted significant scholarly attention (Joshi et al., 2019). On the basis of the discussion above, it can be claimed that it is crucial to address the "attitude-intention-behaviour" research gaps regarding green consumers. As a result, "GPI" has been used in the current study like a baseline for characterising behaviour patterns in relation to India's green consumption.

2.2 Objective - The study's goal was to ascertain how female customers' purchase intentions for environmental-friendly cosmetics were influenced by their demographic, psychographic, and behavioural characteristics.

3. Research Design

The study makes use of a validated five points likert scale, ranging from strongly agree to strongly disagree. There are two sections to the questionnaire. The demographic information for the female respondents is in the first section, while the second section discusses consumer perceptions of green consumerism and purchases of environmentally friendly cosmetics. Through online platforms like Facebook and WhatsApp, female respondents of Indian descent who are actually living in Kolkata and its surroundings and who have previously purchased cosmetics and are relatable to environmentally friendly cosmetics products were invited to take part in the investigation.

Utilizing SPSS v.20, data analysis was carried out. EFA was carried out in the initial stage of figuring out the dimensionality of the measuring scales, and CFA was deployed to prove the accuracy of the study's conceptions. Another method was applied to group respondents is k-means clustering. Data were then examined after being subjected to multivariate techniques of discriminant analysis (i.e., MDA). To characterize the observed features of clusters, a Chi-square test (2) was run based on demographic data.

4. Analysis and Interpretation

4.1 Confirmatory Factor Analysis - To evaluate the dimensionality, reliability, and validity of constructs, the confirmatory factor analysis (CFA) had been initiated using the method of maximum likelihood estimation. The results of the sampling adequacy test using Kaiser-Meyer-Olkin are displayed in Table 4.1A. This value is normally acceptable as it is above 0.50. Through Bartlett's Test of Sphericity, the value of chi square is extremely significant when $p < 0.05$.

Table 4.1A: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.834
Approx. Chi-Square		1740.5988
Bartlett's Test of Sphericity	df	45
	Sig	.000

Source: Self-generated through the use of IBM SPSS

Table shows the composite reliability (CR) values associated with factors taken into consideration for the investigation, which were both within and over the cutoff point of 0.70. This demonstrates the dependability and validity of convergence. The convergent validity is determined by the average variance explained (AVE) for two of the study's constructs, which is greater than 0.50, while it is lower for the other two. However,

because the composite reliability (of both the construct) is relatively high than 0.6, the convergent validity of the construct is still sufficient (Fornell & Larcker, 1981). Discriminant validity was established by finding that the square root of the AVE values for each research measure was greater than the correlations between the variables (Table 4.1C).

Table 4.1B: Reliability and Convergent Validity

Constructs	α	CR	AVE
Knowledge about Environment-Friendly Cosmetics Brand (EFCBR)	0.729	0.838	0.524
Knowledge about Environment-Friendly Cosmetics Label (EFCLB)	0.696	0.792	0.454
Knowledge about Environment-Friendly Cosmetics Ads (EFCAD)	0.703	0.861	0.549
Purchase Intention of Environment-Friendly Cosmetics (PIEFC)	0.833	0.925	0.479

Table 4.1C: Discriminant Validity

Constructs	EFCBR	EFCLB	EFCAD	PIEFC
1. EFCBR	0.724			
2. EFCLB	0.526**	0.674		
3. EFCAD	0.167**	0.129**	0.741	
4. PIEFC	0.499**	0.534**	0.126**	0.692

Source: Self-generated through the use of IBM SPSS

Finally, for determining the measurement model's fit, several goodness-of-fit (GOF) statistics were estimated and used to check the CFA measurement model. According to Hair et al. (2015), all study components had fit values that were significantly over the threshold for acceptable (chi square (χ^2) /df = 2.19, TLI = 0.968, NFI = 0.986, CFI = 0.992, and RMSEA = 0.029).

4.2 Cluster Analysis – The four underlying characteristics that were determined to be suitable in the CFA step before were used as clustering variables in cluster analysis to discover green consumer categories. First, using SPSS version 20.0, a hierarchical clustering approach was utilized to ascertain the potential number of cluster solutions. The Between group Linkage method of agglomeration coefficient and squared

Euclidian distance were both used in this process. Given that it was deemed suitable to the following stage of cluster analysis, three possible cluster solutions were picked on the basis of clustering procedure's agglomeration coefficient inhibiting rule. Following that, a K-means procedure was used to determine whether a cluster contained members of that cluster. Four clustering variables were modified: EFCBR (Knowledge about Environment-Friendly Cosmetics Brand), EFCLB (Knowledge about Environment-Friendly Cosmetics Label), EFCAD (Knowledge about Environment-Friendly Cosmetics Ads/Advertising), and PIEFC (Purchase Intention of Environment-Friendly Cosmetics). In a similar spirit, the K-mean clustering procedure's mean and standard deviation scores were used to estimate the memberships of the three clusters.

Table 4.2A: ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
EFCBR1	94.351	2	0.922	458	102.337	.000
EFCBR2	83.013	2	1.042	458	79.665	.000
EFCLB1	74.327	2	0.827	458	89.83	.000
EFCLB2	83.759	2	0.995	458	84.155	.000
EFCAD_1	66.527	2	0.736	458	90.411	.000
EFCAD_2	126.151	2	0.599	458	210.581	.000
PIEFC1	87.765	2	1.177	458	74.562	.000
PIEFC2	154.855	2	0.707	458	219.076	.000
PIEFC3	177.288	2	0.566	458	313.085	.000
PIEFC4	167.358	2	0.874	458	191.464	.000

Source: Self-generated through the use of IBM SPSS

Table 4.2B: Summary Statistics of Cluster Solutions

Constructs	Cluster 1(N=164)		Cluster 2 (N=121)		Cluster 3 (N=176)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
EFCBR	2.5366	.92438	3.5165	.87067	1.9489	.70322
EFCLB	2.5793	.77329	3.4876	.70847	2.0170	.85673
EFCAD	4.5640	.54872	3.9835	.83650	3.0881	.60183
PIEFC	1.7591	.51577	3.5021	.80396	1.6634	.48102

Source: Self-generated through the use of IBM SPSS

4.3 Multiple Discriminant Analysis – A number of tests were run after the cluster analysis technique had reached the stage of the ideal number of clustering memberships to see if there were any meaningful differences among the three groups. The next step was to use Wilks' lambda criterion of multiple discriminant

analysis since cluster analysis is unable to display the components' discriminant strength which facilitates better distinction between groups (Jaiswal et al. 2021). The approach of multiple discriminant analysis was applied in order to evaluate the clusters (Jaiswal et al. 2021).

Table 4.3A: Tests of Equality of Group Means

Constructs	Wilk's λ	F	Sig.
Knowledge about Environment-Friendly Cosmetics Brand (EFCBR)	0.642	127.583	.000
Knowledge about Environment-Friendly Cosmetics Label (EFCLB)	0.648	124.208	.000
Knowledge about Environment-Friendly Cosmetics Ads (EFCAD)	0.511	219.104	.000
Purchase Intention of Environment-Friendly Cosmetics (PIEFC)	0.360	407.903	.000

Source: Self-generated through the use of IBM SPSS

Wilks' lambda test results are shown in Table 4.3A, and they reveal significant variations existed across the group means for each of the four tested constructs ($p < .001$). Additionally, the Wilk's lambda (λ) metrics of each construct showed that PIEFC ($\lambda = .360$, $F = 407.903$, $p < .001$) and EFCAD ($\lambda = .511$, $F = 219.104$,

$p < .001$) had the greatest ability to distinguish between the three groups, while EFCBR ($\lambda = .642$, $F = 127.583$, $p < .001$) had the least ability to do so and EFCLB ($\lambda = .648$, $F = 124.208$, $p < .001$) had the lowest ability to do so.

Table 4.3B1: Summary of Canonical Discriminant Functions-Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	2.371a	69.3	69.3	0.839
2	1.052a	30.7	100	0.716

a. First 2 canonical discriminant functions were used in the analysis

Source: Self-generated through the use of IBM SPSS

Table 4.3B2: Summary of Canonical Discriminant Functions-Wilk's Lambda

Test of Function	Wilk's Lambda	Chi-square	Df	Sig.
1 through 2	.145	882.730	8	.000
2	.487	328.037	3	.000

Source: Self-generated through the use of IBM SPSS

As per the remarks of Hair et al. (2015), Table 4.3B2 and Table 3B2 show the discriminant analysis findings, which reveal two significant ($p < .001$) canonical discriminant functions, where

function 1 ($\lambda = .145$, chi-square=882.730, $p < .001$) demonstrated a higher amount of variance amongst the clusters than function 2 ($\lambda = .487$, chi-square=328.037, $p < .001$).

Table 4.3C: Structure Matrix

Constructs	Function 1	Function 2
Purchase Intention of Environment-Friendly Cosmetics (PIEFC)	.816*	-.438
Knowledge about Environment-Friendly Cosmetics Brand (EFCBR)	.485*	.018
Knowledge about Environment-Friendly Cosmetics Label (EFCLB)	.478*	.024
Knowledge about Environment-Friendly Cosmetics Ads (EFCAD)	.317	.827*

Source: Self-generated through the use of IBM SPSS

Furthermore, to gauge each variable's distinct contributions to the discriminant functions, the relevance of each factor to the discriminant function was calculated by utilising structure matrix (Saleem et al., 2018). All variables, with the exception of EFCAD (Knowledge about Environmentally Friendly Cosmetics Ads), had significant associations to the discriminant function 1, according to Table 4.3C. Table 4.3C also demonstrated a strong

correlation between the assessed variables PIEFC (Purchase Intention of Environmental-Friendly Cosmetics), EFCBR (Knowledge about Environmental-Friendly Cosmetics Brand), and EFCLB (Knowledge about Environmental-Friendly Cosmetics Label). The results showed that PIEFC, EFCBR, and EFCLB had higher correlations with function 2 than EFCAD, EFCBR, and EFCLB.

Table 4.3D: Classification Results-Predicted Group Membership

Original Cluster	Cluster 1	Cluster 2	Cluster 3	Total
Cluster 1	148 (90.2%)	3 (1.8%)	13 (7.9%)	164 (100%)
Cluster 2	10 (8.3%)	104 (86%)	7 (5.8%)	121 (100%)
Cluster 3	7 (4.0%)	0 (0%)	169 (96%)	176 (100%)

a. 91.3% of original grouped cases correctly classified

Source: Self-generated through the use of IBM SPSS

Finally, to assess the classification findings' accuracy, Table 4.3D showed that, throughout the phase of the discriminant function, 91.3% of people were accurately categorized into their original clusters, confirming the sufficient validity.

4.4 Profile of Green Consumer – The results were therefore extremely consistent with prior studies of environmental

consumer categorisation. The three separate groupings should finally be identified as follows:

Cluster 1 was the second-largest cluster, comprising 164 (35.57%) respondents. With the exception of EFCAD, or advertising for environmentally friendly cosmetics, all four clustering variables' mean scores were comparatively greater

than those of Cluster 2. (4.56). Additionally, as shown in Table 4.4A, the behavioural indicator of PIEFC, purchase intention of eco-friendly cosmetics (1.75), was substantially greater than that of Cluster 2. The researchers suggested the label "potential greens" for this particular segment based on the detailed observations because they are unsure of whether they will care for green marketing cues enough. As long as it is simple and meets their demands, these customers can be pushed to purchase green items. Table 4.4A showed that the demographic profile of potential greens was predominately (93.9%) made up of adults under the age of 44 who were primarily from Kolkata (61.6%) among the three clusters of this study which comprises students and working women (73.2%) mostly (80.5%) either under graduate or postgraduate. Moreover, the potential greens majorly (71.3%) belong up to the income level of INR 20,000.

With 121 (26.25%) participants, Cluster 2 had the smallest sample size of consumers. Most significantly, it had lower mean scores for all underlying criteria. This cluster was labelled as "reasonable greens" since it was discovered that such stated attitudes and behave in a particular way were neutralised in terms of how they translated into the actual buying decisions for environmentally friendly cosmetics (3.50). Additionally, they

demonstrated a lack of interest in brands, labelling, and advertisements for environmentally friendly cosmetics. Furthermore, Table 4.4A showed that the demographics of reluctant greens were primarily composed of the second-largest youth participants aged 18 to 24 years (53.7%), where a sizable number of participants were under graduate (62.8%) and most of them were students and homemakers (76.9%), with mostly (70.2%) the income level of less than INR 5,000, and most of them were from Kolkata (53.7%).

For all four of the clustering factors utilised in this study, Cluster 3 had the highest mean scores. Table 4.2B showed that Cluster 3 had a favourable and high orientation toward green marketing cues, like PIEFC, or purchase intention of environment- friendly cosmetics (1.66), and EFCBR, or environment-friendly cosmetics brands (1.94), EFCLB, or environment-friendly cosmetics labels (2.01), and EFCAD, or environment-friendly cosmetics advertising (3.08). As a result, Cluster-3 has been given the designation "behavioural greens" in Table 4.4A. The findings supported the behavioural greens' professed willingness to buy eco-friendly cosmetics, which appeared to convert into their actual decision to buy such goods. The idea is that environmentally conscious consumers have positive attitudes, intentions, and behaviours.

Table 4.4A: Classification Results-Predicted Group Membership

Demographic Variable	Category	Cluster 1 N=164	Cluster 2 N=121	Cluster 3 N=176	Total N=461
Age	18-24	47.6%	53.7%	41.5%	46.9%
	25-34	25.0%	14.9%	28.4%	23.6%
	35-44	21.3%	20.7%	23.9%	22.1%
	45-54	4.3%	10.7%	4.5%	6.1%
	55&above	1.8%	0%	1.7%	1.3%
Qualification	Secondary	4.3%	8.3%	1.1%	4.1%
	Senior Secondary	10.4%	11.6%	9.1%	10.2%
	Under Graduate	40.9%	62.8%	46.6%	48.8%
	Post Graduate	39.6%	13.2%	37.5%	31.9%
	Other	4.9%	4.1%	5.7%	5.0%
Income	< INR 5,000	46.3%	70.2%	54.0%	55.5%
	INR 5,001- INR 20,000	25.0%	19.0%	25.6%	23.6%
	INR 20,001-INR 35,000	11.0%	2.5%	10.8%	8.7%
	INR 35,001-INR 50,000	10.4%	3.3%	6.3%	6.9%
	> INR 50,000	7.3%	5.0%	3.4%	5.2%
Occupation	Student	37.2%	46.3%	37.5%	39.7%
	Home maker	20.7%	30.6%	26.1%	25.4%
	Working women	36.0%	17.4%	32.4%	29.7%
	Make-up Artist	6.1%	5.8%	4.0%	5.2%
Location	Kolkata	61.6%	53.7%	50.0%	55.1%
	Outskirts of Kolkata	38.4%	46.3%	50.0%	44.9%

Source: Self-generated through the use of IBM SPSS

It is simple to summarise the behavioural greens' descriptive statistics, as primarily consisting of participants who aged between 18-44 years (93.8%) equally from Kolkata and its surroundings, and were either under graduate or postgraduate. In addition, behavioural greens appeared as the largest cluster (38.17%) with 461 participants. 96% of people are either students, working women, or home-makers, with a monthly salary ranging from less than INR 5,000 to INR 20,000 (79.6%).

Lastly, Table 4.4B evaluates the significant category variable differences between the three different groups. Cross tabulations of demographics, like age, education, income level, occupation, and location, had been used to conduct Pearson's chi-square test (Do Paco and Raposo, 2009). Except for "location," which was not proven to be meaningful ($p > .05$) for discriminating between the groups, the findings demonstrate that all demographic factors between the clusters differed significantly ($p < .05$).

Table 4.4B: Chi-Square Tests

Demographic Variable	Value of Pearson Chi-Square	df	Asymp. Sig. (2-sided)	Cells having Expected Count Less than 5
Age	16.523	8	.035	3 (20.0%)
Qualification	34.852	8	.000	1 (6.7%)
Income level	23.764	8	.003	0 (0.0%)
Occupation	14.162	6	.028	0 (0.0%)
Location	4.732	2	.094	0 (0.0%)

Source: Self-generated through the use of IBM SPSS

5. Conclusion

The current study used demographic, psychographic, and behavioural segmentation criteria to give a thorough account of green consumer segmentation in the early Indian developing market scenario. As a result of this methodology, the clustering variables EFCBR (Knowledge about Environment-Friendly Cosmetics Brand), EFCLB (Knowledge about Environment-Friendly Cosmetics Label), EFCAD (Knowledge about Environment-Friendly Cosmetics Ads), and PIEFC (Purchase Intention of Environment-Friendly Cosmetics) were chosen as the underlying factors of external green marketing cues. The aforementioned psychographic and behavioural criteria were utilised, together with cluster analysis, discriminant analysis, the chi-square test, and cross tabulations of demographic variables, to divide respondents into a number of distinct groups. The three different segments that resulted were identified as "Behavioural greens" (i.e., who think and act green), "Reasonable greens" (i.e., who are confused and uninformed) and "Potential greens" (i.e., who think but don't every time undoubtedly act green). The findings of this segmentation analysis are significant for shaping marketing techniques in the Indian setting of a growing consumer market since they highlight the primary criteria for categorising green consumers and provide the critical perception of green profiling.

6. Limitations

This research has certain drawbacks, including the reality that it only looked at environmentally friendly cosmetic items (a

particular category), so results may vary if other such products are taken into account. Also included in the data collection were female respondents from the Indian city of Kolkata and its surroundings. Additionally, the factors of age, education, monthly income, occupation, and geography have been taken into account for this study.

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Credit, Confidence, and Change: Unlocking Women's Entrepreneurship through Financial Inclusion in India

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Abstract

Women entrepreneurs are increasingly acknowledged as crucial contributors to inclusive growth in India; however, their engagement in economic activities is often hindered by restricted access to formal financial systems. This study explores how financial inclusion can facilitate and enhance women's entrepreneurship in India, with a focus on credit access, savings, insurance, and digital finance. Utilizing nationally representative data and a straightforward linear regression model, the research investigates the correlation between women's entrepreneurial endeavors and financial inclusion metrics such as account ownership, access to institutional credit, and the use of digital financial services. The study also draws on insights from government initiatives like Stand-Up India and Mahila E-Haat, which aim to improve women's economic involvement. The results indicate that better access to finance significantly boosts entrepreneurial initiation, longevity, and operational scaling among women-led businesses. Moreover, financial inclusion helps to dismantle obstacles in traditionally male-dominant industries by decreasing dependence on informal credit sources. The paper concludes that promoting financial inclusion is not just a social welfare initiative but an essential policy action for empowering women's entrepreneurship, boosting productivity, and fostering sustainable economic growth in India.

Keywords: Financial Inclusion, Women Entrepreneurship, Access to Credit, Gender and Development, Financial Empowerment

Introduction

In acknowledgment of the substantial role that women-owned businesses play in India's overall economic progress, the Indian government has implemented infrastructure improvements, enacted legislative changes, and increased the availability of financial intermediaries to support the growth of these enterprises. Recently, there has been a notable rise in interest concerning the concept of "financial inclusion," which can be broadly defined as offering access to the formal financial sector to groups that have been historically marginalized. Policymakers around the globe are brainstorming ways to assist the economically disadvantaged in becoming more engaged in society. Financial inclusion has gained considerable political backing over the years due to its demonstrated capability to improve the living standards of the general population. Its role in fostering economic development and combating poverty is increasingly recognized. Access to institutional funding enables greater investments in human capital and the creation of new

job opportunities. When individuals lack access to regulated financial services, they often have to turn to expensive informal lending sources or depend on their limited savings, which hinders their capacity to achieve success.

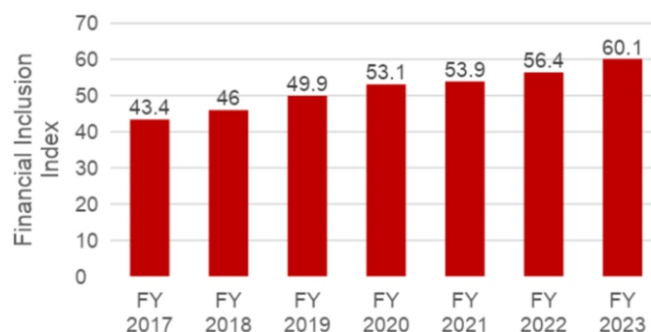


Figure 1: Growth of Financial Inclusion Index in India; Source: FinTech Weekly

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The term "financial inclusion" now refers to more than just basic access to banks and other financial services. With the potential to help achieve seven of the United Nations' Sustainable Development Goals (SDGs), it has become a priority for policymakers and authorities. Despite this progress, women continue to encounter a unique set of obstacles on their journey toward achieving full financial inclusion within the formal banking sector. A significant issue for developing nations is the absence of affordable financial services such as credit, insurance, and digital payment systems. The goal of the financial inclusion initiative is to grant access to the formal financial

system for those with lower income levels. Ensuring that low-income and vulnerable populations can access financial resources is essential for alleviating poverty and enhancing social unity. Financial inclusion, often referred to as inclusive growth, involves enabling individuals from disadvantaged backgrounds to utilize banking services at affordable rates. Financial exclusion takes place when individuals are denied access to any form of financial services. If a person or group is unable to access conventional banking services, they are described as financially excluded.

Table 1: Major schemes launched by the government to promote entrepreneurship and financial inclusion;

Scheme / Program	Year of Launch	Objective / Focus	Women's Participation
Rashtriya Mahila Kosh (RMK)	1993	Microcredit support for poor women	7.5 lakh+ beneficiaries
Pradhan Mantri Jan Dhan Yojana (PMJDY)	2014	Universal financial inclusion through bank accounts	55% accounts held by women
MUDRA Yojana	2015	Collateral-free loans to micro-entrepreneurs	69% loans to women
Stand-Up India	2016	Loans for women and SC/ST entrepreneurs	80%+ beneficiaries women
Mahila E-Haat	2016	Online marketing platform for women entrepreneurs	Thousands onboarded

Source: pmjdy.gov.in

1.1. Hurdles to Financial Inclusion of Women

The Indian economy has seen some moderately positive developments in the last few decades. Nonetheless, millions of Indians remain marginalized from mainstream financial institutions. There is now careful consideration being given, as has been done in other sectors, about how to expand the official financial sector. However, despite ongoing initiatives aimed at promoting financial services access for women, these efforts represent only a fraction of the major challenges that need to be addressed for substantial progress to occur.

Therefore, the challenges are:

- a. The extent to which groups such as the poor, women, and youth have been excluded from the traditional banking system was not well understood until recently. Frequently, these economies lacked a standardized way to measure the frequency of individuals utilizing different financing options.
- b. Women's ability to succeed with formal financial institutions may be restricted by a deficiency in recognition and confidence when it comes to wealth management. Financial institutions are less likely to consider women as creditworthy due to the types of businesses they typically run and their historical performance. This is because more women than men operate businesses from home, focusing on low-value-added, low-capital-intensive sectors such as traditional services and retail.
- c. Even though women business owners generally have a higher level of education, they possess fewer years of management experience and fewer professional connections compared to their male counterparts. They dedicate less time to their businesses as they tend to family responsibilities. These factors partially explain the gender pay gap in self-employment between men and women [Jose & Younas, 2023].

- d. Significant barriers to women's financial intermediation include limited personal finances in many countries, fewer avenues for education, employment, and entrepreneurship compared to men, constraints on time and mobility, inadequate access to information and networks, and social and economic norms that undermine incentives for seeking banking services.

Ultimately, women without land or property ownership may face legal and regulatory barriers that inhibit innovation in products, services, and delivery methods. Shortcomings in the financial sector can also hinder women's access to financing, such as when credit bureaus fail to gather sufficient data on potential female borrowers or when asset frameworks limit the types of collaterals that can be offered. It is common for women to be denied access to conventional banking services due to ingrained biases against them based on gender. Furthermore, there is an issue where banks, marketers, and service providers do not always cater to women.

1.2. Household Nash Bargaining Model

Game theory offers a valuable perspective for analyzing the strategic interactions that influence women's entrepreneurial

choices within their households. Entrepreneurship is seldom an isolated decision; instead, it is intertwined with negotiations regarding resources, responsibilities, and support systems. When considering financial inclusion, a woman's access to credit, savings options, and digital financial services lessens her reliance on intra-household transfers; however, her decision to invest is still affected by her partner's willingness to provide assistance. This interrelation can be represented as a two-player game, where the woman has to decide whether to launch a business, while her spouse must choose whether to offer support or withhold resources. The outcomes consider not just financial gains but also how benefits are shared within the household. By conceptualizing the issue through a game-theoretic framework, we can systematically examine how advancements in financial inclusion can alter equilibrium outcomes—progressing from no entrepreneurship, to conditional entrepreneurship reliant on spousal cooperation, and ultimately to autonomous entrepreneurship. This approach underscores the significance of financial access in transforming household bargaining dynamics and empowering women's economic agency.

Woman \ Spouse	Support (S)	Withhold (W)
Invest (I)	$(B - (c - m - g), -g + sB) = \left(\frac{B - c + m + g}{c + m + g}, -g + sB\right)$	$(B - (c - m), 0) = \left(\frac{B - c + m}{c + m}, 0\right)$
Not invest (N)	$(0, -g)$	$(0, 0)$

Figure 2: Household Bargaining Model Payoff matrix; Source: Author's analysis

The game in Table 1 illustrates the intra-household choices involved in a small women-led business. The woman must decide whether to invest (I), while the spouse must choose between providing financial support g (S) or withholding it (W). Financial inclusion affects this dynamic through $m = m(FI)$, which lowers the woman's effective private costs related to launching the enterprise (due to better access to credit, reduced transaction costs, or more affordable digital finance). The four outcome payoffs demonstrate that when both participants cooperate (I,S), the household receives the gross return B , but the spouse contributes g and claims a portions of the returns; if the woman invests without support from her spouse (I,W), she bears all the costs but retains the entire net return. Two threshold values of m are defined as follows: $m_0 = c - B$ (the point at which the woman will invest without spousal assistance) and $m_1 = c - B -$

g (the point at which she will only invest if her spouse provides support). As m increases (due to policy-driven improvements in financial inclusion), the equilibrium progresses through three phases: (i) no investment when $m < m_1$; (ii) conditional investment (investment occurs only if the spouse offers support) when $m_1 \leq m < m_0$, where the spouse's willingness to assist is contingent upon whether $sB \geq g$; and (iii) autonomous investment when $m \geq m_0$, allowing the woman to invest without needing spousal financial support. Thus, modest improvements in financial inclusion can create new intra-household negotiation scenarios (where investment relies on spousal support), while more significant enhancements can enable independent female entrepreneurship by reducing reliance on intra-household finances.

Table 2: Payoffs concerned to household bargaining model; Source: Author's analysis

Region	Condition on m	Spouse profit condition	Equilibrium	Interpretation
A- No-investment	$m < m^1 = c - B - g$	-	(N, W)	No business activity.
B1 - Conditional investment (support)	$m^1 \leq m < m^0 = c - B$	$sB \geq g$	(I, S)	Investment only with spouse support.
B2 - Conditional investment (withhold)	$m^1 \leq m < m^0$	$sB < g$	(N, W)	No investment due to lack of support.
C1 - Autonomous investment (support)	$m \geq m^0$	$sB \geq g$	(I,S) or (I, W)	Woman invests; spouse may still support.
C2 - Autonomous investment (withhold)	$m \geq m^0$	$sB < g$	(I, W)	Woman invests independently.

2. Literature Review

One of the key frameworks for comprehending women's empowerment and household decision-making is Amartya Sen's bargaining approach. Sen (1990) posited that women's involvement in household decisions hinges on their "fallback position," referring to the resources they can independently access. In the realm of entrepreneurship, financial inclusion enhances this fallback position by providing women with independent access to credit, thereby bolstering their bargaining power in households and allowing them to engage in business activities.

Expanding on this idea, Kabeer (1999) highlighted that financial inclusion encompasses not only access to resources but also agency and institutional frameworks. She illustrated that microfinance initiatives often augment women's ability to make strategic life choices, such as embarking on entrepreneurship. This viewpoint situates financial inclusion within broader empowerment narratives, presenting it as a transformative element rather than just an economic factor.

Empirical research also underscores the connection between financial access and entrepreneurial success. For example, Duflo and Banerjee (2011) discovered that access to microcredit enhanced the likelihood of women in India starting businesses, although the scale of those enterprises remained modest. Their study suggests that while financial inclusion reduces entry barriers, it does not inherently lead to large-scale

entrepreneurship, highlighting the significance of additional factors like education and social support.

Similarly, Pitt and Khandker (1998) found that microcredit provided by the Grameen Bank in Bangladesh significantly increased women's engagement in self-employment and enhanced household welfare outcomes. Their results emphasize that access to financial resources not only empowers women but also creates positive spillover effects for families, reinforcing the argument for financial inclusion as a strategy for development.

More recent research by Demirgüç-Kunt, Klapper, and Singer (2017) utilizing global financial inclusion data indicates that women entrepreneurs in developing nations encounter disproportionate obstacles to formal finance, which limits their business potential. They advocate for tailored financial products for women, alongside supportive policies, to promote equitable conditions in entrepreneurship.

Lastly, Bruton, Khavul, Siegel, and Wright (2015) broadened this discussion by situating women's entrepreneurship within a larger institutional framework. They assert that financial inclusion must be paired with reforms in legal frameworks, property rights, and access to markets to foster sustainable entrepreneurial ecosystems for women. Their perspective suggests that, while financial access is vital, it should be viewed in conjunction with the structural context in which women operate.

3. Research Methodology

This research utilizes a quantitative approach to assess the influence of financial inclusion on women's entrepreneurship in India. The methodological framework is based on the idea that better access to financial services alleviates credit limitations, changes intra-household negotiations, and boosts women's ability to start and grow businesses. Data will be collected from nationally representative and trustworthy sources, prioritizing government datasets to guarantee both reliability and comparability. Information at the household level regarding participation in entrepreneurship and employment outcomes will be obtained from the Periodic Labour Force Survey (PLFS) and the National Sample Survey (NSS) focusing on Unincorporated Non-Agricultural Enterprises. Indicators of financial inclusion such as ownership of accounts, loan acquisition, and access to government transfer initiatives will be sourced from administrative records including the Pradhan Mantri Jan Dhan Yojana (PMJDY) data, Reserve Bank of India (RBI) banking statistics, and Ministry of Finance documents concerning Direct Benefit Transfer (DBT).

To examine the relationship between financial inclusion and women's entrepreneurship, we employ a simple linear regression framework. The dependent variables are measures of entrepreneurial activity, including a binary indicator for business ownership, log-transformed monthly revenue, and the share of household consumption controlled by women. The key independent variable is a Financial Inclusion (FI) index constructed through principal component analysis (PCA) using three dimensions: bank account ownership, access to formal credit, and participation in digital transactions. This continuous index allows us to capture both the extensive and intensive margins of financial access.

$$Y_i = \alpha + \beta FI_i + \gamma' X_i + \varepsilon_i \quad (1)$$

Here,

- Y = outcome for woman / household iii (entrepreneurship dummy, log business revenue, or woman's consumption share)
- Fi = financial inclusion index (constructed using PCA of account ownership, loan access, and digital transaction usage)
- Xi = control variables (age, education, household size, landholdings, caste, region dummies)
- ε_i = error term

Control variables include household and individual characteristics such as age, education, household size, caste, landholdings, and regional dummies, drawn from government sources such as the National Sample Survey (NSS) Enterprise Surveys and the Periodic Labour Force Survey (PLFS). Estimation is performed using Ordinary Least Squares (OLS), with robust standard errors to account for heteroskedasticity. Results are reported with standardized coefficients to allow comparability across outcomes. This approach provides a transparent and interpretable measure of the strength of association between financial inclusion and women's entrepreneurial outcomes, while controlling for socioeconomic heterogeneity.

4. Results and discussions

The results of the regression analysis reveal the varied effects of financial inclusion on the entrepreneurial success of women. The coefficient for the financial inclusion index is not only positive but also statistically significant in all three models, indicating its crucial importance. In the first model, an increase of one unit in financial inclusion corresponds to a 21.5 percentage point increase in the likelihood that women will participate in entrepreneurial activities. This represents a considerable impact, suggesting that having access to savings accounts, credit, and digital payment systems fundamentally changes women's economic decisions by alleviating financial barriers and boosting their capacity to take risks.

Table 3: Results of Linear control variable regression

Variables	(1) Entrepreneurship (Dummy)	(2) Log Business Revenue	(3) Woman's Consumption Share
Financial Inclusion Index	0.215*** (0.052)	0.182*** (0.045)	0.097** (0.038)
Age	0.012 (0.008)	0.009 (0.007)	-0.004 (0.005)
Education (years)	0.031*** (0.011)	0.024** (0.010)	0.019** (0.009)
Household Size	-0.014 (0.010)	-0.00023	-0.008 (0.007)
Landholding (acres)	0.028* (0.015)	0.036** (0.017)	0.022* (0.013)
Constant	-0.341 (0.254)	1.217** (0.513)	0.482* (0.269)
Observations	4,250	2,810	4,250
R ²	0.29	0.34	0.22

Source: Author's analysis

In the second model, which concentrates on log business revenue, financial inclusion continues to demonstrate a significant influence. A one-unit increase correlates with an 18.2 percent boost in revenue, indicating that access to finance not only promotes entrepreneurship but also helps sustain and expand businesses. This may result from improved access to working capital, the ability to manage cash flows more effectively, or enhanced involvement in formal supply chains through digital transactions. The impact on revenue also reveals that when women entrepreneurs are equipped with inclusive financial resources, they can significantly enhance household income and contribute to local economic growth.

The third model explores the intrahousehold aspect by examining the share of household consumption controlled by women. In this context, financial inclusion results in a notable 9.7 percentage point increase, demonstrating that financial empowerment leads to greater bargaining power within families. This finding supports collective household models, where control over financial resources alters decision-making authority. It is crucial to recognize that entrepreneurship, bolstered by financial inclusion, represents not only an economic transformation but also a social change, reinforcing women's autonomy in determining household spending.

The control variables offer further insights. Education stands out as a strong and reliable predictor across all models, highlighting its significance as both a human capital investment and a catalyst for financial literacy. The size of landholdings is also relevant, indicating the ongoing impact of physical collateral in financial systems. Conversely, larger household sizes tend to have a negative or negligible effect, reflecting the limitations imposed by extensive family responsibilities and unpaid caregiving tasks that often disproportionately burden women. While age shows a positive association, it is not statistically significant, suggesting that finance and education access are more influential than life-cycle factors in determining entrepreneurial success.

Together, these findings illustrate that financial inclusion is not just a means to facilitate business development but a fundamental enabler that enhances women's economic participation, boosts household welfare, and transforms gender roles within families.

5. Conclusion

This research aimed to investigate how financial inclusion contributes to the advancement of women's entrepreneurship, employing nationally representative data and a straightforward regression analysis. The results are clear: financial inclusion significantly boosts the likelihood of women becoming

entrepreneurs, increases their business revenues, and improves their control over household expenditures. The consistency of these findings across various aspects underscores the transformative potential of inclusive financial systems.

At the policy level, these results highlight the necessity of enhancing access to formal financial services. Initiatives such as Jan Dhan Yojana, direct benefit transfers, and digital payment systems have already established a vital groundwork. However, to fully leverage the benefits for women's entrepreneurship, additional policies are required—such as offering more micro-credit, lowering collateral demands, and strengthening financial literacy initiatives specifically designed for women. It will be crucial to tackle challenges such as the gender biases in access to credit officers, mobility issues, and prevailing social norms to ensure that financial inclusion leads to substantial business outcomes.

The implications of these results extend to broader development considerations. By allowing women to pursue entrepreneurship, financial inclusion not only empowers individuals but also fosters overall economic growth. Enterprises run by women aid in generating local employment, diversifying household income, and enhancing resilience against economic downturns. Additionally, the increase in women's share of household spending illustrates how entrepreneurship can transform bargaining dynamics and promote gender equality within households.

To sum up, financial inclusion should be regarded as more than just a financial policy—it serves as a catalyst for social and economic change. By supporting women entrepreneurs, it improves both economic effectiveness and fairness, setting off a positive feedback loop where growth and empowerment strengthen one another. Therefore, enhancing women's financial inclusion emerges as an essential strategy for fostering inclusive and sustainable development in India.

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Psychological and Cognitive Determinants of Retirement Financial Behaviour: The Mediating Role of Self-Control among Tribal Communities in India

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Abstract

This study examines how financial literacy (FL), retirement goal clarity (RGC), and future time perspective (FTP) influence retirement financial behaviour (RFB), with self-control (SC) examined both as a direct predictor and as a mediating variable. Focusing on working individuals in Bodoland Territorial Region (BTR), a tribal-dominated area in Assam, it extends the literature on retirement planning within marginalized communities. Survey data from 641 working individuals in Kokrajhar district were analysed using Partial Least Squares Structural Equation Modeling (PLS-SEM). Guided by the Theory of Planned Behaviour and the Behavioural Life-Cycle Model, findings reveal retirement goal clarity (RGC) as the strongest predictor of retirement financial behaviour (RFB), followed by financial literacy (FL) and self-control (SC). Future time perspective (FTP) showed no direct effect but influenced retirement financial behaviour (RFB) indirectly through self-control (SC). Self-control (SC) significantly mediated the relationships between all the three predictors and retirement financial behaviour (RFB). These findings suggest that interventions aimed at improving retirement preparedness should extend beyond conventional financial education to incorporate behavioural skill development, particularly in goal formulation and self-regulation. This study is among the first to integrate cognitive, psychological, and behavioural factors influencing retirement financial behaviour (RFB) in a tribal Indian context. By highlighting self-control (SC) as a key mediating factor, it advances behavioural finance theory and offers insights into bridging the gap between intention and action in marginalised settings.

Keywords: Retirement financial behaviour, Financial Literacy, Self-control, Retirement goal clarity, Tribal communities-India.

1. Introduction

Retirement represents a pivotal life transition, marking the shift from active employment to a period of financial dependence on accumulated assets such as savings, investments, or pensions. In India, this issue has gained heightened importance due to rapid economic growth, demographic changes, and the gradual erosion of traditional family-based support systems. A notable transformation is the shift from defined benefit (DB) plans, which guaranteed fixed post-retirement income, to defined contribution (DC) plans, where individuals bear greater responsibility for saving and investing for retirement (Lusardi and Mitchell, 2006). In contexts without a comprehensive social security system, this transition places the burden of financial preparedness squarely on individuals, making retirement planning essential for economic security in later life.

Despite this, Indian households continue to show low participation in pension schemes and insurance products. The *Household Finance Committee Report* (Reserve Bank of India, 2017) observed that households allocate little to pensions, healthcare, or insurance, largely due to mistrust in financial products. Household wealth is heavily concentrated in residential property, with minimal retirement savings. Alarming trends persist: the *Aegon Centre for Longevity and Retirement* (2016) found limited retirement engagement among Indians, while the *Max Life Insurance India Retirement Index Study* (2023) revealed that two out of five Indians have not yet begun planning for retirement. These gaps are particularly concerning given rising life expectancy and growing financial risks in later life.

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While research on retirement planning in India is expanding (Hoffman and Plotkina, 2020a; Tomar *et al.*, 2021), it has primarily focused on urban and metropolitan populations. Marginalized groups, especially, Scheduled Tribes have received little scholarly attention, despite facing unique structural challenges such as economic disadvantage, geographic remoteness, restricted access to formal financial services, and low literacy levels. Empirical studies document low levels of financial literacy (Singh and Singh, 2023; Dutta and Sarkar, 2019) and limited engagement with savings and investments within tribal communities (Sadhu, 2022; Nayak, 2013). Despite growing interest in retirement planning, empirical evidence on retirement financial behaviour remains virtually absent for working individuals in the Bodoland Territorial Region (BTR) of Assam (Basumatary and Bhattacharjee, 2025), a tribal-dominated area where Scheduled Tribes constitute the majority of the population. This study seeks to address this limitation by providing systematic evidence from an otherwise underrepresented region.

A plethora of studies on retirement planning has concentrated on demographic determinants such as age, gender, education level, marital status, and income (Joo and Pauwels, 2002; Hershey, 2004; Moorthy *et al.*, 2012). Yet, cognitive and psychological factors, despite their critical influence, have often been sidelined. Drawing on Hershey's (2004) argument, demographic factors are understood to influence retirement outcomes indirectly through psychological mechanisms. Accordingly, this study emphasizes core psychological factors including future time perspective (FTP) and retirement goal clarity (RGC), both of which are central to retirement planning research.

With individuals bearing greater responsibility for retirement finances, financial literacy has emerged as a vital cognitive resource. The rapid expansion of financial markets and the increasing complexity of financial products, underscore the need for informed decision making. Earlier studies have demonstrated the influence of financial literacy on retirement planning (Lusardi and Mitchell, 2006; Hauff *et al.*, 2020), yet its interplay with psychological constructs remains insufficiently examined.

Behavioural tendencies also play a decisive role. Self-control, in particular, has been linked to savings behaviour (Stromback *et al.*, 2017; Ogundare *et al.*, 2024). However, its role as a mediator between psychological and cognitive determinants and retirement financial behaviour remains underexplored. Stromback *et al.* (2017) highlighted how individual traits such as self-control, time perspective and financial literacy shape financial behaviour, leading to diverse outcomes. Insights from

behavioural finance further suggest that psychological biases often cause individuals to deviate from rational decision-making (Asebedo *et al.*, 2019). Supporting this view, Ogundare *et al.* (2024) showed that self-control mediates the relationship between financial attitude, financial knowledge, and the savings behaviour among rural women entrepreneurs in Nigeria. Such findings suggests that individuals with stronger self-control can better resist impulsive spending and remain committed to long-term saving goals.

Guided by the Behavioural Life Cycle (BLC) hypothesis, which posits that individual's deviate from rationality due to cognitive and emotional biases, this study investigates how financial literacy (FL) (cognitive factor) and future time perspective (FTP) and retirement goal clarity (RGC) (psychological factors) influence retirement financial behaviour (RFB). It further examines self-control (SC) both as a direct predictor and as a mediating variable. By integrating these constructs into a comprehensive framework, the study aims to provide novel insights into the behavioural mechanisms that shape retirement preparedness, particularly in the context of marginalized tribal communities in India.

Aligned with the Viksit Bharat vision of inclusive and sustainable development, this study emphasizes the need to address regional disparities in retirement planning. By highlighting the specific challenges faced by tribal communities, it supports national goals of equitable growth and social welfare while offering policy-relevant insights for inclusive development in India.

2. Research Framework and Hypotheses Formulation

Theoretical Foundations

Theory of Planned Behaviour (TPB):

Ajzen's (1991) Theory of Planned Behaviour posits that three key factors influence behavioural intention: (1) Attitude towards the behaviour: beliefs about outcomes and their evaluations, relevant here to psychological constructs such as future orientation and retirement goal clarity; (2) Subjective norms: perceived social pressures to engage or not engage in the behaviour; and (3) Perceived behavioural control: the belief in one's ability to perform the behaviour, closely linked with financial literacy. Collectively, these elements shape intentions to plan and save for retirement, thereby influencing actual retirement financial behaviour.

Behavioural Life-cycle Model (BLCM):

The BLCM (Shefrin and Thaler, 1988) extends the traditional Life-cycle hypothesis by recognising that individuals often deviate

from rational economic behaviour. It introduces behavioural constructs such as self-control, mental accounting, and framing to explain deviations from optimal savings patterns. The model suggests that people mentally compartmentalize their wealth into current income, current assets, and future income, with strongest spending impulses tied to current income. Self-control becomes essential for resisting short-term consumption and prioritising long-term goals such as retirement savings. This framework directly informs the present study's focus on psychological and behavioural traits shaping retirement financial decisions.

Related Literature

Financial literacy (FL) and Retirement financial behaviour (RFB)

Financial literacy (FL) can be understood as an individual's capacity to effectively use financial knowledge and skills throughout the life course in order to attain and maintain financial well-being (Hung *et al.*, 2011). A growing body of research has established a strong association between financial literacy and financial behaviour, particularly in the context of retirement planning and saving decisions (Hershey *et al.*, 2010; Lusardi and Mitchell, 2011; Kimiyagahlam *et al.*, 2019; Hauff *et al.*, 2020). Individuals with higher levels of financial literacy are more likely to engage in proactive financial behaviors such as budgeting, savings and investing for retirement.

H1: *Financial literacy (FL) has a significant positive influence on retirement financial behaviour (RFB).*

Future time perspective (FTP) and Retirement financial behaviour (RFB)

FTP also referred to as future orientation, reflects the extent to which individuals place greater emphasis on future outcomes rather than present or past considerations (Howlett *et al.*, 2008). It is a well-established psychological determinant of retirement planning and savings behaviour. Prior research by Jacobs-Lawson and Hershey (2005) indicates that individuals with a stronger future-oriented outlook are more likely to set long-term goals and actively participate in financial planning. Similarly, Kimiyagahlam *et al.* (2019) reported a positive correlation between future orientation and retirement planning, with savings attitude acting as a mediator. Tomar *et al.* (2021) reported that individuals with a stronger future orientation are more inclined to engage proactively in retirement planning and savings activities.

H2: *Future time perspective (FTP) has a significant positive influence on retirement financial behaviour (RFB).*

Retirement goal clarity (RGC) and Retirement financial behaviour (RFB)

Well-defined retirement goals play a crucial role in strengthening planning efforts and saving behaviour (Moorthy *et al.*, 2012). Goal clarity is a key factor in predicting planning behaviour, which, in turn, influences savings tendencies (Stawski *et al.*, 2007). Studies suggests that setting specific and well-defined goals motivates individuals to actively engage in financial planning, increasing their saving efforts (Hershey *et al.*, 2010). Additionally, Tomar *et al.* (2021) found a positive connection between retirement goal clarity and planning behaviour.

H3: *Retirement goal clarity (RGC) has a significant positive influence on retirement financial behaviour (RFB).*

Self-control (SC) and Retirement financial behaviour (RFB)

Self-control is a critical behavioural trait influencing long term financial planning and savings. It reflects an individual's ability to regulate impulses, delay gratification, and prioritize long term benefits over short term rewards (Baumeister *et al.*, 2007; Tangney *et al.*, 2004). Studies shows that individuals with higher self-control are more likely to demonstrate responsible and consistent financial behaviour (Stromback *et al.*, 2017; Gathergood, 2012).

H4: *Self-control (SC) has a significant positive influence on retirement financial behaviour (RFB).*

Mediating role of Self-control (SC)

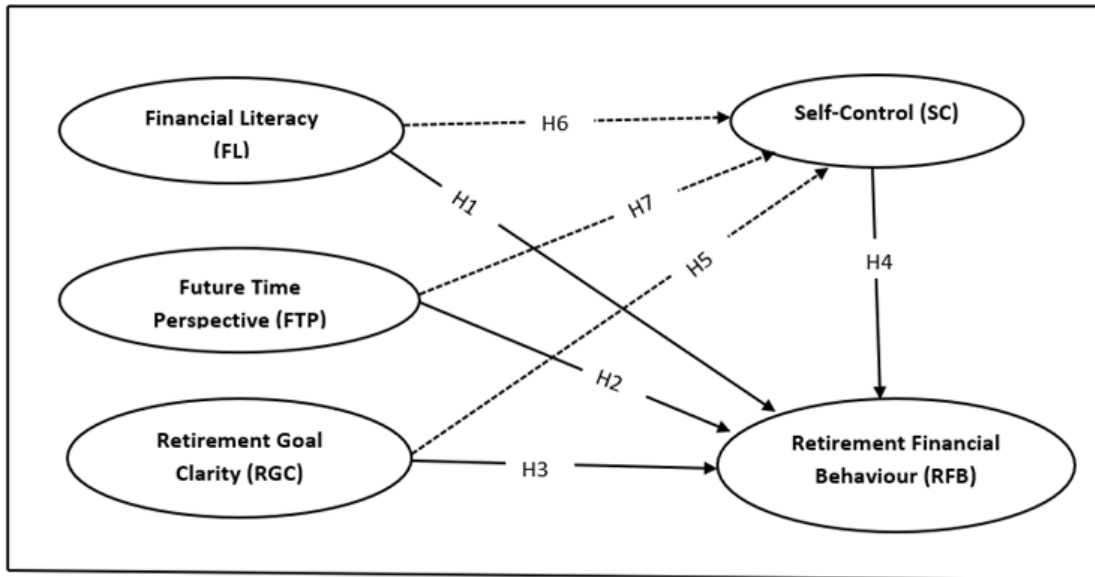
Beyond direct effects, self-control may mediate the relationships between cognitive and psychological traits and retirement financial behaviour. According to the goal-setting theory, having clear and specific goals can enhance behavioural regulation by increasing motivation and directing attention toward goal relevant actions (Locke and Latham, 2002). Financial literacy contributes to the development of disciplined behaviours by equipping individuals with the knowledge and skills needed to resist impulsive spending and adopt strategic planning (Stromback *et al.*, 2017; Ogundare *et al.*, 2024). Similarly, future-oriented mindset encourages long-term thinking and planning, and its impact on financial behaviour may be largely explained through higher levels of self-control (Zimbardo and Boyd, 1999).

H5: *Self-control (SC) mediates the relationship between retirement goal clarity (RGC) and retirement financial behaviour (RFB).*

H6: *Self-control (SC) mediates the relationship between financial literacy (FL) and retirement financial behaviour (RFB).*

H7: *Self-control (SC) mediates the relationship between future time perspective (FTP) and retirement financial behaviour (RFB).*

Figure 1: The Conceptual Model



Source: Authors' own work

3. Research Methodology

Data Collection

This study adopts a quantitative research design, employing primary data collected through structured survey instruments, administered using a combination of personal interviews and mailed questionnaires. The study population comprised working individuals aged 18 years and above residing in the Bodoland Territorial Region (BTR). Within this region, Kokrajhar district was deliberately chosen as the study area because it serves as the administrative headquarters of the BTR, thereby representing a central location that attracts individuals from all four constituent districts.

The survey was completed by 641 working respondents. The required minimum sample size was determined using G*Power analysis software by specifying an effect size of 0.05 (f^2), an α error probability of 0.05, and a statistical power of 0.95 with nine predictor variables. The analysis indicated a minimum requirement of 218 respondents, thereby confirming the adequacy and robustness of the final sample size.

A stratified purposive sampling technique was employed to ensure representation of two distinct categories: (i) employed individuals working in government, private, and public sectors organisations, and (ii) self-employed individuals, including business owners, professionals, and gig workers. This sampling strategy enabled the inclusion of respondents whose occupational profiles were directly aligned with the study's objectives, thereby supporting a more nuanced examination of retirement financial behaviour across different employment groups.

Measures

The retirement financial behaviour (RFB) construct was developed by adapting items from two well-established scales: the Retirement Planning Behaviour (RPB) scale developed by Moorthy *et al.* (2012) and the Retirement Savings Behaviour (RSB) scale proposed by Jacobs-Lawson and Hershey (2005). To refine and validate the measurement items, an exploratory factor analysis (EFA) was performed, yielding a composite scale comprising eight items. Each item was rated on a five-point Likert scale (1=strongly disagree to 5= strongly agree). This unified factor, termed “retirement financial behaviour”, comprehensively captures both planning and saving dimensions of retirement preparedness. The scale demonstrated strong internal consistency, with a Cronbach's alpha of 0.884.

The future time perspective (FTP) construct was measured using a five-item scale adapted from Tomar *et al.* (2021) and rated on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree). Similarly, retirement goal clarity (RGC) was assessed using a five-item instrument developed by Tomar *et al.* (2021), employing the same 7-point Likert response format.

The self-control (SC) construct was assessed using a nine-item scale developed by Stromback *et al.* (2017), which integrates items from the Brief Self-Control Scale (Tangney *et al.*, 2004) and the Short-Term Future Orientation Scale (Antonides *et al.*, 2011). Items were rated on a 5-point Likert scale, ranging from 1 (Not at all) to 5 (Very much). Respondents indicated their level of agreement with each statement, reflecting their ability to regulate impulses and maintain long-term financial discipline.

Financial literacy (FL) was assessed using five multiple-choice items adapted from Lusardi and Mitchell (2017). The questions covered fundamental financial concepts, including compound interest, inflation, money illusion, and time value of money. To minimize random guessing, a “Don't know” response option

was provided for each item. Each correct response was awarded a score of one.

Table 1 presents the descriptive statistics of all measurement items across the constructs based on the survey responses.

Table 1. Descriptive Statistics of Items

Item	Statements	Mean	Median	Standard deviation
FTP1	I like to think about what the future will hold.	5.03	6	1.65
FTP2	I enjoy thinking about how I will live years from now in the future.	5.07	5	1.54
FTP3	I look forward to life in the distant future.	5.14	6	1.52
FTP4	According to me, it is important to have a long-term perspective in life.	5.39	6	1.52
FTP5	My close friend would describe me as future-oriented.	4.09	4	1.6
RGC1	I set specific goals regarding how much I will need to save for my retirement.	4.5	5	1.88
RGC2	I think a great deal about the quality of life I want to lead after retirement.	4.49	5	1.9
RGC3	I have a clear version of how my life shall be after retirement.	4.4	5	1.93
RGC4	I have set clear goals for gaining information about retirement.	4.25	4	1.94
RGC5	I have discussed retirement plans with my spouse, friends, and significant others.	4.07	4	1.88
SC1	I have a hard time breaking bad habits	2.4	2	1.28
SC2	I get distracted easily	2.63	2	1.3
SC3	I am good at resisting temptation	3.58	4	1.14
SC4	I do things that feel good in the moment but regret later on	2.83	3	1.29
SC5	I often act without thinking through all the alternatives	2.62	2	1.33
SC6	I only focus on the short term	2.7	2	1.34
SC7	The future will take care of itself	2.92	3	1.36
SC8	I live more for the day of today than for the day of tomorrow	3.14	3	1.36
SC9	My convenience plays an important role in the decisions I make	3.86	4	1.1
RFB1	I am concerned about the state of my financial preparation for my retirement.	3.15	4	1.27
RFB2	I am confident that I will have a decent standard of living in my retirement.	3.3	3	1.18
RFB3	At present, I rate my financial preparation for retirement as good.	3.15	3	1.18
RFB4	Made meaningful contributions to a voluntary retirement savings plan.	3.01	3	1.21
RFB5	Relative to my peers, I have saved a great deal for retirement.	2.89	3	1.13
RFB6	Accumulated substantial savings for retirement.	3.01	3	1.17
RFB7	Made a conscious effort to save for retirement.	3.43	4	1.16
RFB8	Based on how I plan to live my life in retirement, I have saved accordingly.	3.16	3	1.19

Source(s): Authors' own work

Note: FTP = Future Time Perspective; RGC = Retirement Goal Clarity; SC= Self-Control; RFB = Retirement Financial Behaviour.

4. Discussion of Results

Descriptive Statistics

Table 2 presents the demographic characteristics of the study participants. A substantial proportion of respondents were in the younger age groups, with 33.2% aged 18-29 years and 32.8% aged 30-39 years. By contrast, only 2.3% of respondents were aged 60 years and older, reflecting the limited representation of older individuals in the sample.

Gender distribution shows that 67.2% of participants were male, while 32.8% were female. With respect to annual income, nearly half of the respondents (48.4%) reported earnings up to ₹ 2,50,000, whereas a smaller segment (10.1%) reported incomes exceeding ₹10,00,000.

Educational attainment was relatively high among participants, with 39.3% holding graduate degrees and 26.2% possessing postgraduate qualifications. In terms of occupational background, 51.9% were employed across private, government, or public sector organisations, while 48.1% were self-employed, including businesspersons, professionals, and gig workers.

Overall, the demographic profile of respondents demonstrates diversity in age, gender, income, education, and employment type. This broad representation enhances the generalizability of the findings and provides a robust basis for analyzing retirement financial behaviours across different socio-economic and occupational groups.

Table 2. Demographic profile of respondents

Variables	Categories	Observations	Percentage (%)
Age	18 to 29 years	213	33.2
	30 to 39 years	210	32.8
	40 to 49 years	121	18.9
	50 to 59 years	82	12.8
	60 years and above	15	2.3
Gender	Male	431	67.2
	Female	210	32.8
Annual income	Up to Rs 2,50,000	310	48.4
	Rs 2,50,001 to Rs 5,00,000	163	25.4
	Rs 5,00,001 to Rs 10,00,000	103	16.1
	Above Rs 10,00,000	65	10.1
Education	Up to Matriculation	69	10.8
	Higher Secondary/Diploma	123	19.2
	Graduate	252	39.3
	Post-graduate	168	26.2
	Above post-graduate	29	4.5
Type of employment	Employed	333	51.9
	Self-employed	308	48.1

Source: Authors' own work

Measurement model analysis

Table 3 reports the results of the measurement model assessment, focusing on construct reliability and convergent validity. The evaluation includes factor loadings, Cronbach's alpha (α), composite reliability (CR), and average variance

extract (AVE) for the items under each construct. According to Hair et al. (2017), factor loadings in the range of 0.50 and 0.70 will be considered acceptable if CR and AVE values meet the recommended threshold levels.

As shown in Table 3, most items demonstrated acceptable

reliability; however, five items (FTP5, SC1, SC2, SC3, and SC9) were excluded due to factor loadings below 0.5, which did not meet the minimum acceptable threshold.

All constructs reported Cronbach's alpha value above 0.7, confirming strong internal reliability. Similarly, CR values for

each construct exceeded the 0.7 benchmark, further affirming internal consistency. Convergent validity was established through AVE, with all constructs achieving values greater than 0.5, which supports the adequacy of convergent validity in the measurement model (Hair et al., 2017).

Table 3. Reliability and Convergent Validity Outcomes

Constructs	Items	Loadings	α	CR	AVE
FTP	FTP1	0.85	0.875	0.914	0.726
	FTP2	0.877			
	FTP3	0.861			
	FTP4	0.82			
RGC	RGC1	0.812	0.873	0.909	0.666
	RGC2	0.846			
	RGC3	0.863			
	RGC4	0.848			
	RGC5	0.703			
SC	SC4	0.693	0.725	0.785	0.508
	SC5	0.633			
	SC6	0.787			
	SC7	0.704			
	SC8	0.616			
RFB	RFB1	0.617	0.884	0.908	0.555
	RFB2	0.802			
	RFB3	0.754			
	RFB4	0.73			
	RFB5	0.75			
	RFB6	0.816			
	RFB7	0.655			
	RFB8	0.81			

Source(s): Authors' own work

Note: Cronbach's Alpha (α), Composite Reliability (CR), and Average Variance Extracted (AVE), Future Time Perspective (FTP), Retirement Financial Behaviour (RFB), Retirement Goal Clarity (RGC), Self-control (SC).

The heterotrait-monotrait (HTMT) ratio was used to evaluate the discriminant validity, with values below 0.90 indicating adequate discriminant validity (Hair et al., 2017). As shown in

Table 4, all HTMT values fall below the recommended threshold, thereby satisfying the HTMT criterion.

Table 4. Discriminant validity result of the measurement model.

Construct	FL	FTP	RFB	RGC	SC
FL					
FTP	0.344				
RFB	0.189	0.403			
RGC	0.068	0.405	0.825		
SC	0.439	0.384	0.427	0.345	

Source(s): Authors' own work

Note: FL = Financial Literacy; FTP = Future Time Perspective; RFB = Retirement Financial Behaviour; RGC = Retirement Goal Clarity; SC = Self-Control.

Structural model analysis

In evaluating a structural model, the first step involved assessing multicollinearity through Variance Inflation Factor (VIF). Using the full collinearity assessment procedure, it was observed that the VIF values across all constructs were below the recommended threshold of 3, indicating no multicollinearity issues (Hair *et al.*, 2019).

The structural model was then analyzed to examine the hypothesized relationships among the constructs. Following the standard bootstrapping procedure with 5000 subsamples on the dataset of 641 working individuals, the significance of the path coefficients was estimated in line with Hair *et al.* (2017). As outlined by Hair *et al.* (2017), three essential criteria were considered in evaluating the structural model in PLS-SEM using

SmartPLS: the significance of the path coefficients, the coefficient of determination (R^2), and the effect size (f^2).

The hypotheses testing results are presented in Table 5. As evident, FL emerged as a positive significant predictor of RFB ($\beta=0.094$, p -value=0.001), thereby supporting H1. This finding is consistent with earlier studies (Kimiyağahlam *et al.*, 2019; Hauff *et al.*, 2020; Ogundare *et al.*, 2024) and suggests that individuals with higher FL are more inclined to exhibit proactive and informed financial behaviours that contribute to enhanced retirement preparedness. Importantly, this result reinforces the theoretical proposition that FL functions as a foundational cognitive resource in shaping long-term financial decision-making and highlights its practical relevance in designing financial education interventions, particularly in the context of tribal communities.

Table 5. Path Analysis Results

Hypothesis	Path	β	P values	Decision
H1	FL -> RFB	0.094	0.001***	Supported
H2	FTP -> RFB	0.057	0.126	Rejected
H3	RGC -> RFB	0.676	0.000***	Supported
H4	SC -> RFB	0.091	0.010**	Supported
H5	RGC -> SC -> RFB	0.019	0.037*	Supported
H6	FL -> SC -> RFB	0.028	0.018*	Supported
H7	FTP -> SC -> RFB	0.014	0.039*	Supported

Source(s): Authors' own work

Note: Significance levels: $p < 0.05$ (*), $p < 0.01$ (**), $p < 0.001$ (***)

Financial Literacy (FL), Future Time Perspective (FTP), Retirement Financial Behaviour (RFB), Retirement Goal Clarity (RGC), Self-control (SC).

The direct effect of FTP on RFB was not significant ($\beta=0.057$, p -value=0.126), leading to rejection H2. This suggests that simply possessing a future-oriented outlook may not be sufficient to

drive retirement-related financial decisions, particularly in contexts where immediate financial needs are more pressing. This finding indicates possible indirect effect through mediation

and contrasts with earlier evidence reported by Jacob and Hershey (2005) and Kimiyagahlam *et al.* (2019).

In contrast, RGC showed a strong positive and significant effect on RFB ($\beta=0.676$, p -value=0.000), thus supporting H3. This indicates that individuals with clear and well-defined goals are more likely to take up planning activities to boost their contributions towards savings for retirement. These results align with prior studies by findings of Hershey *et al.* (2010), Tomar *et al.* (2021), and Stawski *et al.* (2007), underscoring the central role of goal setting in promoting retirement preparedness.

SC also exhibited a positive and significant effect on RFB ($\beta=0.091$, p -value=0.010), thus supporting H4. This suggests that individuals with stronger self-regulatory abilities are more likely to adopt disciplined and responsible financial practices that contribute to long-term retirement planning. This finding highlights the critical role of behavioural traits in financial decision making and corroborates earlier research by Stromback *et al.* (2017), Tang *et al.* (2015), and Gathergood (2012), which identify self-control as a key determinant of saving and future oriented financial behaviour.

The analysis further revealed significant indirect effects, confirming the mediating role of SC in linking psychological and cognitive variables to RFB. Specifically, the indirect path from RGC to RFB through SC was positive and significant ($\beta=0.019$, p -value=0.037), supporting H5. This suggests that individuals with clear goals are more likely to strengthen their SC, which in turn promotes consistent, goal-oriented retirement planning. This is consistent with the theoretical assertion that goal clarity enhances motivational regulation (Hershey *et al.*, 2007; Moorthy *et al.*, 2012).

Similarly, SC mediated the relationship between FL and RFB, as the indirect path is statistically significant ($\beta=0.028$, p -value=0.018), supporting H6. This finding indicates that FL does more than provide knowledge; it also fosters self-regulatory capacity- such as delaying gratification, curbing impulsive spending, and maintaining financial discipline that ultimately enhances retirement planning. This mediating role of SC aligns with the findings of Stromback *et al.* (2017) and Ogundare *et al.* (2024).

Finally, the indirect path from FTP to RFB through SC was also positive and significant ($\beta=0.014$, p -value=0.039), confirming H7. The direct path was not found to be significant indicating that FTP may not directly influence retirement financial decisions but it contributes indirectly by fostering greater SC, which in turn promotes more disciplined financial behaviour.

Individuals with a stronger orientation toward the future are more likely to recognize the long-term implications of their current financial choices. This forward-thinking mindset encourages the development of self-regulatory mechanisms that enable them to delay gratification, resist short-term temptations, and prioritize actions aligned with long term financial goals. This highlights that future orientation becomes a meaningful psychological resource only when coupled with self-control.

Beyond individual path relationships, the explanatory power of the model was also assessed using the co-efficient of determination (R^2) which measures the degree of variance explained in the dependent construct by structural model of the study (Hair *et al.*, 2017). Henseler *et al.* (2009) recommends the R^2 value of 0.67 as substantial, 0.33 as moderate, and 0.19 as weak. The R^2 value of the dependent variable RFB is found to be 0.558 which implies that the independent predictor variables of our model is able to explain 55.8% of the variance in dependent variable, followed by 21.4% of the variance in SC. Hence, apart from self-control, R^2 value of our model is moderate and close to the substantial level, implying that the model has a strong explanatory capacity for RFB.

Following the assessment of the path coefficients and the coefficient of determination (R^2), the next step involved evaluating the effect size, f^2 . The effect size measures the magnitude of impact exerted by the exogenous constructs on the dependent variable and is computed using Cohen's function f^2 . According to Cohen (1988), value of 0.35, 0.15 and 0.02 indicate strong, moderate, and weak effects respectively. The effect size analysis based on these guidelines, revealed that FL ($f^2 = 0.016$), FTP ($f^2 = 0.006$), and SC ($f^2 = 0.015$) each exerted a small effect on RFB. In contrast, RGC ($f^2 = 0.854$) exhibited a large effect, indicating that it is the most influential predictor of RFB among working individuals in the Bodoland Territorial Region.

To conclude the analysis of structural model, we tested the model's predictive power using the Q^2 value (Hair, Risher, Sarstedt and Ringle, 2019). The values of Q^2 for the endogenous constructs in both models are above zero, hence confirming predictive relevance.

Furthermore, model fit was assessed using the standardized root mean residual (SRMR), which represents the average of the standardized residuals between the observed and the predicted covariance matrix (Henseler *et al.*, 2014; Hair *et al.*, 2017). An SRMR value below 0.08 is generally considered to indicate good model fit. In this study, the SRMR value was found to be 0.075, suggesting that the estimated model adequately fits the data and provides a reliable representation of the observed data.

5. Conclusion

This study offers an important contribution to the literature on retirement financial behaviour by integrating cognitive factor (financial literacy) and psychological factors (retirement goal clarity and future time perspective) with the behavioural trait of self-control in a single predictive framework. Drawing on PLS-SEM analysis of data from 641 working individuals in the Bodoland Territorial Region (BTR) of Assam, North-east India, an area that has received minimal attention in retirement planning literature, this research findings uncovers several novel insights.

The findings reveal that retirement goal clarity is the strongest predictor of retirement financial behaviour, demonstrating that even in resource constrained environment, clearly defined objectives can inspire proactive saving and planning for later life. Financial literacy and self-control also exert significant positive effects, highlighting the importance of both financial knowledge and behavioural discipline in shaping retirement preparedness. Although, future time perspective did not have a direct effect, it influenced behaviour indirectly through self-control, suggesting that a forward-looking mindset must be coupled with impulse regulation and behavioural consistency to translate into financial action, an empirical relationship not previously tested in this context.

Importantly, the mediating role of self-control across all three predictors provides fresh evidence for behavioural finance theories, demonstrating how self-regulatory capacities help individuals in disadvantaged contexts bridge the gap between intention and action in retirement financial planning. Collectively, the results offer a more nuanced understanding of how cognitive knowledge, psychological orientation, and behavioural regulation interact to influence retirement preparedness in marginalized populations.

6. Implications

The findings of this study have important theoretical and practical implications. From a theoretical perspective, the study contributes to behavioural finance by clarifying the interaction between cognitive and non-cognitive traits and by identifying self-control as a pivotal mediating mechanism in retirement financial behaviour. In doing so, it extends the Behavioural Life-Cycle Hypothesis, which posits that individual often depart from rational economic decision-making due to psychological biases and self-regulatory constraints. By explicitly focusing on tribal populations, the study further underscores the presence of behavioural heterogeneity in financial planning, an aspect that is frequently overlooked in conventional economic models that assume homogenous decision-making.

From a practical standpoint, the findings call for a reorientation of financial education and policy interventions. Merely disseminating financial knowledge is insufficient; equal emphasis must be placed on strengthening individuals' capacities for goal setting, impulse control, and future-oriented decision-making. Financial institutions, government agencies, and community-based organisations should therefore design integrated interventions that combine financial literacy with behavioural skill development. Such an approach is particularly relevant for communities in the BTR, where access to formal financial services is constrained and trust in financial institutions remains limited. By aligning educational content with behavioural reinforcement, policymakers can more effectively enhance retirement preparedness in marginalised settings.

7. Recommendations

Based on the findings of this study, several policy and practice-oriented recommendations can be proposed to enhance retirement preparedness among underserved populations. First, retirement planning initiatives should integrate behavioural training modules alongside conventional financial literacy components. Such interventions may include practical exercises in budgeting discipline, expenditure tracking, and the use of commitment mechanisms aimed at strengthening self-control and sustaining consistent saving behaviour. Second, community-based workshops and employer-led programmes should actively support individuals in formulating clear, specific, and time-bound retirement goals, given that retirement goal clarity emerges as the strongest determinant of retirement financial behaviour in this study. Structured goal-setting frameworks can help translate abstract retirement intentions into actionable financial plans. Third, financial inclusion policies should be tailored to local cultural and socio-economic contexts. Financial service providers can leverage digital technologies such as mobile applications and SMS-based tools to deliver timely reminders, monitor savings progress, and offer personalised feedback, thereby reinforcing self-regulatory behaviour over time. Finally, collaborative approaches involving government agencies, non-governmental organisations (NGOs), and financial service providers are essential for developing retirement products and educational interventions that simultaneously address cognitive constraints and behavioural barriers. Such partnerships can ensure that retirement planning initiatives are both context-sensitive and behaviourally informed, ultimately improving long-term financial security in marginalised communities.

8. Limitations

While this study provides valuable insights into retirement financial behaviour in an underexplored context, several

limitations should be acknowledged. Future research could adopt comparative designs across multiple regions to capture broader socio-cultural and institutional variations. Longitudinal studies would be particularly useful in tracking changes in financial behaviour and self-regulatory mechanisms over time. While the study focuses on key psychological determinants, future research could extend the framework by incorporating additional psychological and contextual factors such as financial anxiety, risk tolerance, peer influence, and social norms to develop a more comprehensive understanding of retirement financial behaviour.

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Drivers of Customer Loyalty in the Telecom Industry: An Empirical Study of Quality, Price, and Satisfaction

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Abstract

The purpose of this study is to analyze the effects of a variety of variables on the level of satisfaction of the customer, as well as their intentions of staying with the company for a longer period of time. In addition, the study investigates the mediating role of customer satisfaction in independent constructs and customer loyalty. To more accurately predict customer perceptions, this study uses a conceptual model based on the constructs of the SERVQUAL. Perceived price fairness and affective commitment are used as extended variables. 410 responses from questionnaire surveys conducted across the nation were used for the quantitative analysis, using path analysis. Furthermore, the influences of psychological constructs on behavioural intentions related to loyalty and satisfaction are examined. Results revealed that service reliability represents the most important driver of customer satisfaction. It is followed by service assurance, perceived price fairness, and affective commitment. Moreover, customer loyalty was not directly influenced by service assurance or service reliability, with customer satisfaction ranked as the most significant driver, followed by affective commitment and perceived price fairness as the second most significant driver. A service business like telecom is frequently distinguished by its capacity to keep customers. Consumers in India are more price sensitive due to low switching costs and substantial competition. Perceived price fairness among customers can influence positive attitude towards a company, and satisfied customers are likely to stay longer, research on customer loyalty and satisfaction is critical. Stakeholders will benefit from this study's assistance in developing customer retention policies and strategies. The results of the study recommend service providers and policymakers recognize the growing importance of customer satisfaction and use it effectively and efficiently in the telecommunications industry to attract a greater number of loyal customers. The research contributes to our understanding of customer loyalty and satisfaction. The goal of this study is to expand the SERVQUAL, particularly for those sectors where tangibility is less common. Psychological constructs such as affective commitment and perceived price fairness were also examined in relation to customer satisfaction and retention. It is also investigated whether customer satisfaction plays a mediating role in determining customer loyalty.

Keywords: Service satisfaction, Commitment, Customer Loyalty, Mediation, Indian telecom sector

Introduction

India has the world's most extensive telecom network, trailing only China. Over the years, the use of telecommunications services has increased significantly in India. The growing use of internet services in health, education entertainment and many more has changed the industry drastically (Kalia et al., 2021). Teledensity, a commonly used statistic, is the number of connections per 100 people. As of March 2023, India has an 82.46 teledensity rate. As reported by TRAI (2023), India's

telecom industry comprises 1,034.26 million subscribers and 846.57 million broadband connections. The MNP scheme, launched in 2019, recorded 819.70 million port-out requests by March 2023. To remain competitive in markets with this level of market maturity, businesses must implement customer retention strategies to prevent customers from switching brands.

Intense competition among operators has shifted the focus from customer acquisition to customer retention (Shahzad et

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al., 2021; Poulouse et al., 2020). Therefore, marketing theorists and practitioners have noted a growing interest in maintaining long-term customer relationships. Acquiring new customers entails significantly higher costs than retaining existing ones (Strauss et al., 2001; Reichheld & Scheffer, 2000). Consequently, it is essential for telecommunications firms to understand the determinants that affect the customer loyalty and the processes through which it develops.

The current environment requires product/service differentiation to retain customers (Agag et al., 2023). To increase their market share, telecom operators are now placing a greater emphasis on both highly loyal customers and those who are likely to leave their service due to poor service (Wassouf et al., 2020). Increasing customer loyalty remains the biggest challenge in a market where new customer acquisition is slowing down (Ngoma et al., 2019). Management of customer value and service quality (SQ) is essential for sustaining customers' satisfaction and loyalty (Slack et al., 2020a; Slack and Singh, 2020). Telecom companies should focus on CL, CS, and SQ (Belwal and Amireh, 2018). The loyalty has been acknowledged as a vital element in corporate achievement (Sramek et al., 2009; Gustafsson et al., 2005; Kandampully and Suhartanto, 2000). It is a behavioural construct that illustrates a willingness to purchase a brand's products on a regular basis, even when circumstances might make such behaviour difficult (Lin et al., 2023).

Recent studies have used a variety of constructs, including service quality, convenience, fairness, and more, to assess customer satisfaction and loyalty (Kalia, et al. 2021; Saroha and Diwan 2019; Chatterjee, et al. 2018; Kaur and Soch (2018); and Kumar et al. 2017). The present research aims to advance knowledge and shed more light on consumer perceptions and behaviours. Most of the service industry has historically employed the five dimensions of service quality (Parasuraman et al., 1988). The study uses only two constructs of service quality (assurance and reliability) because telecommunications is a low-contact service as machines predominate and enable service standardization (Izogo, 2015a; Izogo, 2017).

Extensive research has established service quality and customer satisfaction as key determinants of customer loyalty (Venkatakrisnan et al., 2022; Shahzad et al., 2021; Naz et al., 2021; Saroha & Diwan, 2019; Izogo, 2015a; Izogo & Ogba, 2015). However, gaps remain in the existing literature. While many scholars have directed their attention to the influence of overall perceived service quality on customer loyalty (Venkatakrisnan et al., 2022; Kalia et al., 2021; Afiuc et al., 2021), only a small number of studies investigated how individual service quality dimensions specifically affect customer loyalty (Izogo, 2017;

Izogo, 2015a; Ladhari & Leclerc, 2013). Second, customer satisfaction and loyalty are greatly influenced by perceived pricing fairness; yet, not much research has been done to determine whether customer loyalty and fairness perception interact (Malc et. al, 2016; Martin et al., 2009). The study aims to comprehensively study satisfaction and loyalty in telecom industry using these dimensions and make empirical conclusions. Thus, this investigation aims to narrow the gap by addressing the following research question:

RQ1. How does service assurance and reliability, perceived price fairness and affective commitment affect customer satisfaction and loyalty in the telecom industry and what are the implications for the future of telecom industry?

RQ2. What role does customer satisfaction plays in path of independent constructs and customer loyalty?

The paper is structured as follows. After the introduction, Section 2 discusses the theoretical framework and develops the research hypotheses, focusing on service quality, pricing perception, affective commitment, and consumer behavior. Section 3 describes the research methodology, and Section 4 presents the empirical results. Section 5 concludes the study with implications for theory and practice and suggestions for future research in service quality and customer behavior. Section 6 outlines the study's limitations and directions for future research.

2. Theoretical background and hypotheses development

2.1 Background

Customer satisfaction is viewed as a crucial component in influencing the degree of customer loyalty in a number of investigations, including those conducted by (Akroush et al., (2011); Deng et al., (2010); Eshghi et al., (2007), Kim et al., (2004), Gerpott et al., (2001), as well as Lee et al., (2001). There exist certain outliers, such Almosawi (2012), wherein no noteworthy correlation was observed between the two, or Boohene and Agyapong (2010), whereby the findings indicate an adverse association between them. The five aspects of service quality that Parasuraman et al. (1988) defined have been employed by a number of studies (Kalia et al., 2021; Li and Shang, 2020; Slack et al., 2020a) to gauge customer satisfaction. Difference in consumer behaviour findings are because of variance in demographics of respondents, state of economic development, government involvement and level of competition existing in the country.

The concept of service quality has undergone extensive study, with a focus on its conception and implementation of

dimensions as well as the construct's effects. The research done by Parasuraman et al. (1985, 1988) is one of the most thorough and possibly most quoted studies on this subject. Initially identifying ten aspects of SQ, (Parasuraman et al., 1985) decreased the number to five (Parasuraman et al., 1988). Chen and Cheng (2012) proposed a two-dimensional model of service quality that integrates core quality and interaction quality, despite the fact that the five dimensions of SQ have been widely applied in numerous industries. According to Davis-Sramek et al. (2009), there are two important aspects of service quality: the technical and interpersonal execution of instructions. Additionally, Efficiency, information quality, responsiveness, and site design were recognised by (Ladhari and Leclerc 2013) as the elements of service quality in the context of online financial services. Over the year's tangibility, reliability, empathy, assurance and responsiveness are majorly used as determinant of service quality (SQ) in all the industries (Kalia et al., 2021), but with the advent of technology antecedents and precedents of SQ has changes and are still evolving. Service reliability and service assurance was taken as two dimensions for analyzing customer satisfaction in telecom industry by (Izogo 2015, 2017). (Rahi and Ghani 2019) considered Assurance and reliability most relevant factors of service quality. Therefore, studies of service quality should concentrate on the relevant dimensions within the industry or context being investigated. According to (Zubair et al. 2019), SQ is the best metric for gauging customer satisfaction because it fosters a feeling of trust in the minds of

customers. Studies like those by (Izogo, 2017; kalia et al., 2021; Akbar and Parvez 2009; Kim and Lee 2010; Boohene and Agyapong 2010) show a strong and positive connection between the aspects that determine service quality and the retention of customers. When service providers achieve total service quality, they may experience rewards including enthusiastic and favourable customer reactions as well as customer loyalty and satisfaction (Arguello et al., 2020; Gong and Yi, 2018). Nonetheless, very little research has taken price perception and affective commitment into the model forming customer satisfaction and loyalty as consequence, the current study will yield significant understanding for telecom operator's decision-making procedures and future strategies. Affective commitment is a better variable to study long term relation intention of consumers (Izogo, 2017). Price of service is an important factor considered by telecom consumers specifically in developing nations (Shahzad et al., 2021). Table 1 mentioned below represents a comparative investigation of studies on customer loyalty conducted in India to addresses research gaps

The study focuses on loyalty intentions of customer in telecom industry and has the following objectives:

- To create a theoretical framework that explains how affective commitment, perceived fairness in pricing, service quality, and customer satisfaction as well as loyalty are related; and
- To empirically validate the theoretical framework linkage.

Table 1: Comparative research analysis on Loyalty

Authors	Industry	Independent constructs	Mediators	Moderators	Outcome Variable
Venkatakrishnan, et al., 2022	e-retailing	e- service quality, price, customer satisfaction	Customer satisfaction	Web design, trust Loyalty	Loyalty
Gupta et al., 2022	Logistics	Service quality constructs	Customer satisfaction	---	Loyalty
Kalia et al., 2021	Telecom	Service quality, Commitment, Trust		Marital status, gender, connection type	Loyalty
Kaur and Soch, 2018	Telecom	Corporate image Commitment, Trust, Switching cost	---	---	Customer Satisfaction and Loyalty
Rajni and balaji 2018	Telecom	Customer Satisfaction, end user technology	---	---	Loyalty
Kaura et al., 2015	Bank	Service quality, Perceived price, service Convenience	---	---	Customer Satisfaction and Loyalty
This study	Telecom	Service quality (assurance and Reliability), Perceived price Fairness and Affective commitment	---	---	Customer Satisfaction and Loyalty

Source(s): Author's own work

2.2 Hypotheses development

2.2.1 Service assurance

Assurance involves offering the customer a sense of confidence and trust (Famiyeh *et al.*, 2018)(Nguyen *et al.*, 2018). Assurance has a favourable impact on customer feelings as a component of service quality. Customer satisfaction is positively related with assurance in almost all industries, but with respect to telecom it is one of the most prominent factor (Kalia *et al.*, 2021); Izogo (2017). The more the service provider is able to win over the customer's confidence and trust, the more likely it is that the customer will be pleased and enthusiastic about the experience (Reza *et al.*, 2023); (Alsaggaf and Althonayan2018). The relation between service assurance and customer loyalty is also explored in previous literature (S. Alnsour *et al.*, 2014; Lai et, al., 2009). Prior studies have validated the impact of service assurance and customer satisfaction and customer loyalty, hence we form following hypotheses:

H1a Service assurance has significant influence on customer satisfaction

H1b Service assurance has significant influence on customer loyalty

2.2.2 Service reliability

In order to increase customer satisfaction, service reliability is another important aspect of service quality that needs to be regularly monitored(Mir *et al.*, 2023) (Singh *et al.*, 2021) (Andrade *et al.*, 2019) (Suleiman, 2011). A service provider's reliability is their capacity to reliably and accurately deliver the services they have committed to (Ladhari *et al.*, 2011; (Martinelli and Balboni 2012). Empirical researches made by (Agarwal and Dhingra, 2023; Ayinaddis *et al.*, 2023; Lin, H.-F 2022; Lai *et al.*, 2021; Ramon *et al.*, 2018; Engdaw, 2019) shows that customer satisfaction and loyalty are significantly impacted by the reliability perception of the customer towards their service provider. Given the context of the literature, we think it is important to investigate how the aforementioned variables affect each other. Thus, we propose the following hypotheses:

H2a Service reliability positively influence customer satisfaction

H2b Service reliability positively influence customer loyalty

2.2.3 Perceived price fairness:

Customers' purchase intentions are influenced by their impression of the price. Early researchers have offered

compelling empirical proof that favourable price perceptions have a substantial impact on customer satisfaction (Varki and Colgate, 2001; Bolton and Lemon, 1999; Voss *et al.*, 1998). Since customers regularly compare prices with those of competitors and determine if a company's rates are fair given the quality of the services they offer, price has a significant impact on customer satisfaction in the telecom business (Ahmed *et al.*, 2022; Shahzad *et al.*, 2021; Fornell and Wernerfelt, 1987). The consumer's opinion of price fairness has a greater impact on his or her pleasure than do their purchasing decisions or their actions towards the service provider (Campbell, 1999; Martins, 1995). If a user believes that prices are unreasonable, it could lead to consumer dissatisfaction and eventually switching (Andrés *et al.*, 2013). PPF is crucial to preventing switching and fostering long-term relationships with customers hence, we propose that:

H3a Perceived price fairness positively influence customer satisfaction

H3b Perceived price fairness positively influence customer loyalty

2.2.4 Affective commitment

Psychological attachment is indicated by commitment (O'Reilly and Chatman, 1986). In successful relationships, commitment is crucial (Tonder and Petzer 2020; Chiu *et al.*, 2018). The notion of commitment, which originates from industrial and organisational psychology, is the will to continue operating in a particular way, such as maintaining a relationship with a business partner (Fehr, 1988). The definition of commitment in the literature on buyer-seller relationships is "an either an implicit or explicit pledge of ongoing relationships between exchange partners (Dwyer *et al.*, 1987; Gundlach *et al.*, 1995; San chez-Perez and Bonillo, 2004). It is a mental stimulus that urges to maintain a relationship with a brand (or company) for an extended amount of time. The duration and frequency of customer business have a favorable relationship with affective commitment; however, affective commitment, not prior organisational experience, is what affects customer satisfaction (Fatima *et al.*, 2015; Johnson *et al.*, 2008). Hence, we postulate that:

H4a Affective commitment positively influence customer satisfaction

H4b Affective commitment positively influence customer loyalty

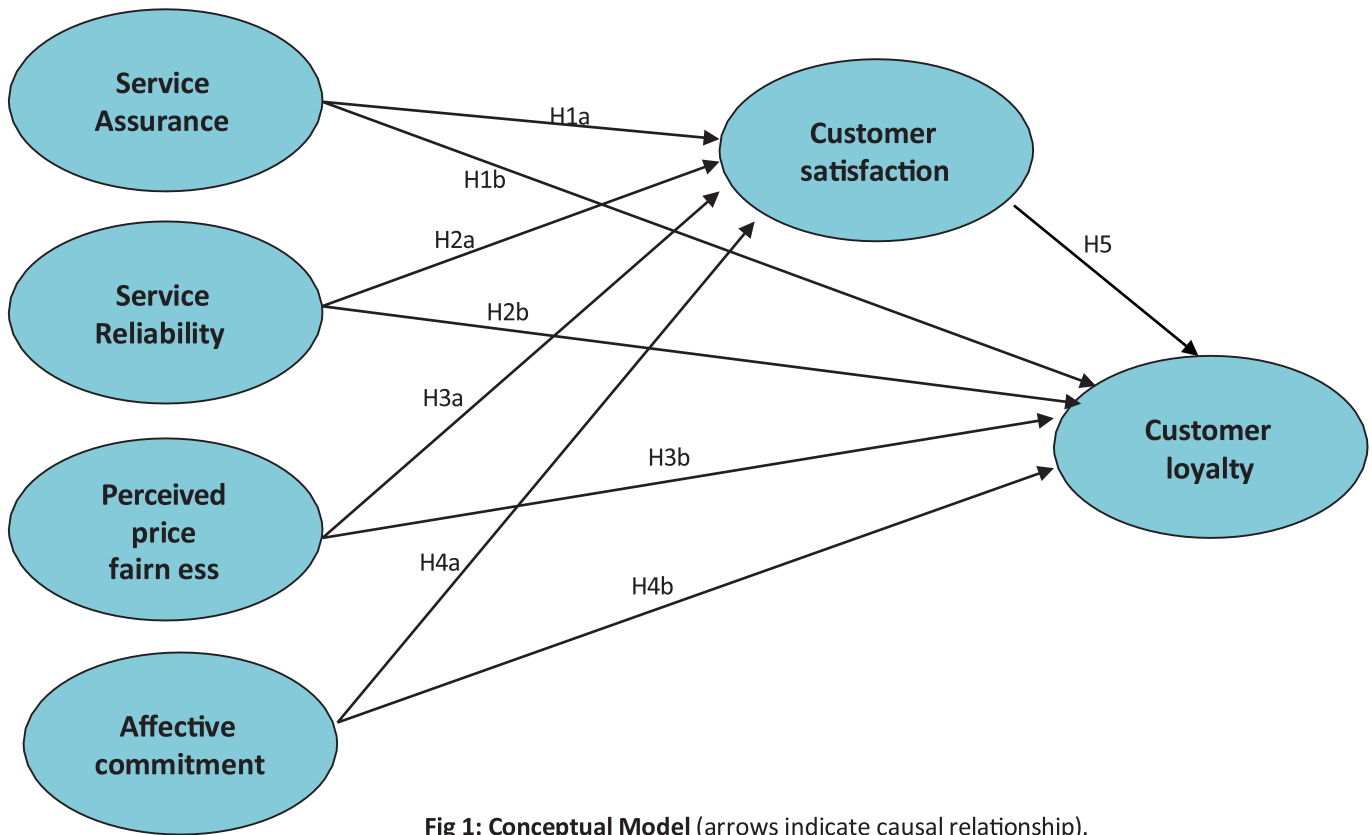


Fig 1: Conceptual Model (arrows indicate causal relationship).

2.2.5 Customer satisfaction and loyalty

Customer satisfaction (CS) is essential for any businesses growth as satisfied customers are the ones who repurchase and stay for longer period (Kalia et al., 2021). Customer Loyalty (CL) is the intention of customers to make recurring purchases of a particular service. Gaining a new telecom customer is six to ten times expensive than keeping an existing one. Additionally, the likelihood of acquiring 8–10 good customers can actually be ruined by one bad customer (Saroha and Diwan2019). Studies previously made reveled when customers perceives that their expectations are met by a product or service, they exhibits loyal behavior by expressing their intentions to stay with their service provider (Venkatakrishnan *et al.*, 2022; Ighomereho *et al.*, 2022; Lee and Moghavvemi, 2015). Academicians in various field (Venkatakrishnan *et al.*, 2022; Dinesh and Raju, 2022; Amin, 2016; Kandampully *et al.*, 2015; Aksoy, 2014) empirically confirms that higher perceived level of service quality results in increases satisfaction, which results in more loyal customers (Izogo, 2015). This study hence reaffirms existing research and suggests the following:

H5 Customer satisfaction is positively associated with customer loyalty

2.2.6 Customer satisfaction as a mediator

The role of customer satisfaction (CS) as a mediator has been examined previously by (Rahman *et al.*, 2018; Vessel and Zabkar 2009; Caruana, A. 2002). The association between customer loyalty and service excellence is mediated by customer satisfaction (Agarwal and Dhingra, 2023; Makanyeza and Chikazhe, 2017). (Ahrholdt *et al.*, 2016) have linked SQ CS and CL, such dimensions are increasingly being used in service industry to predict more accurate perception of customers towards their service providerThe components that affect customer satisfaction and loyalty, as well as how they interact and compare, are not well understood in the Indian telecom sector (Saroha and Diwan, 2017; 2019). According to a recent study (Raza et al., 2020) conducted in Pakistan, the connection between service quality and customer loyalty can be explained by customer satisfaction. Another study on customers in Malaysia conducted by (Lee and Moghavvemi 2015), discovered that customer satisfaction was a pre-requisite for customer loyalty. Thus we propose following hypotheses on the basis of abundant literature:

H6a-d Customer satisfaction mediates the relation between service assurance, service reliability, perceived price fairness, affective commitment and customer loyalty

3. Research methodology

3.1 Measures

With some modifications, the variables used in this study (Table 2) were taken from earlier studies. The four-item service assurance scale was adapted from Parasuraman et al. (1988), Izogo (2015), and Izogo (2017). Three items from Herrmann et al. 2007 and four items from (Parasuraman et al., 1988, Izogo 2015, and Izogo 2017) were used to measure perceived price fairness and service reliability, respectively. Four items from (Fullerton, 2003; Gustafsson, 2005; Kaur and Soch, 2012; and Izogo, 2015) were used to measure affective commitment. Two items from (Gustafsson 2005) were taken to measure customer satisfaction, and four items from (Zeithaml et al., 1996; Henning-Thurgau, 2004; and bahri-ammari 2017) were used to measure customer loyalty. **Annexure A** lists the operationalized constructs used in this investigation. A seven-point "Likert" scale was used to collect all of the responses, with 1 denoting "strongly disagree" and 7 denoting "strongly agree." Before beginning the main study, the questionnaire had been developed, pre-tested, and tested to ensure construct reliability, face validity, and content validity. In accordance with convention, the study measures used in other studies were examined in the literature to determine the content validity of the instruments for the current study (Cavana et al., 2001). A preliminary test was also given to a small group of selected telecom users in order to determine whether the scale items

accurately reflect the concept being measured. In response to the comments, some of the items were modified. This guaranteed the accuracy of the information (Cavana et al., 2001).

3.2 Sample description

The survey was administered in India during May-September 2024. A structured questionnaire was used to collect data from Indian users of non-corporate telecom services (both prepaid and postpaid). The survey was completed by 446 people in total and final analysis takes 410 observations into account. According to the recommended levels, this translates to a response rate of 91.93%, which is quite high (Nulty, 2008; Slack et al., 2020b). Non-probability-based sampling has been utilised by numerous researchers to gather data when a predetermined list of consumers is not accessible (Venkatakrisnan et al., 2022; Singh et al., 2022; Al-Hattami, 2021; Baltar and Brunet, 2012). To determine the sample size for our structural model, we used an a priori method (Soper, 2021). It has been used by many researchers recently to determine the minimum sample size of study (Saini and Singh 2020; kurvas et al., 2020; Dedeoglu et al. 2018). According to Cohen (1992), the minimum sample required was 296 with a medium projected effect size of 0.23, a desirable statistical power level of 0.8, and latent variables equal to 6 and observable variables equal to 21 at 0.05 probability level. Our selection is a lot bigger than the suggested sample size.

Table 2: Research Variables of the Study

Construct	Description	Main Source
Service assurance	It refers to the sense of security and credibility that a provider of customer services conveys.	Parasuraman et al., 1988, Izogo 2015, Izogo 2017
Service reliability	The ability to deliver the promised service dependably and accurately	Parasuraman et al., 1988, Izogo 2015, Izogo 2017
Perceived price fairness	The degree to which respondents perceive the price to be fair for the service being delivered	Herrmann et al., 2007
Affective commitment	The extent to which respondents feel sense of identification and involvement with a service provider.	Fullerton, 2003; Gustafsson 2005; Kaur and Soch, 2012; Lariviere et al., 2014
Customer satisfaction	The degree to which respondents are happy with the service being provided to them	Gustafsson 2005
Customer loyalty	Ability of service provider to keep respondent engaged with themselves for a longer period of time	Zeithaml et al., 1996; Henning-Thurgau, 2004; bahri-ammari2017; Kalia et al., 2019

Source: Author's own work

4 Data analysis and inference

4.1 Demographic profile of respondents:

The respondents for the study conducted consist of male 191

(46.6%) and 219 (53.4 %) females. Other details of demographics are presented in **Table 3**.

Table 3: Respondents demographic profile (n=410)

Demographic	Frequency rate	percentage
Male	191	46.6%
Female	219	53.4%
Education		
Undergraduate	203	49.5%
Post graduate	162	39.5%
M.Phil/PhD	45	11.0%
Occupation		
Government employee	25	6.1%
Self employeed	14	3.4%
Students	347	84.6%
Professional	22	5.4%
Others	2	0.5%
Monthly household income(Rs.)		
Below 10000	96	23.4%
10000-25000	96	23.4%
25000-50000	93	22.7%
Above 50000	125	30.5%

4.2 Measurement model

There may be a common method bias issue since the facts and figures were based on single customers (mobile users). The Harman single-factor test can be used to locate and confirm this issue. The findings show that the first factor only accounts for 22.841% of the total, which is below (Endaraet al.,2019) edge limit of 50%. As a result, the study's response data are free of bias.

4.2.1 Reliability and Validity

The measurement model incorporates the evaluation of the convergent and discriminant reliability and validity of first-order constructs which specifies the reliable methods used to assess the projected model (Hair *et al.*, 2011). As per Fornell and Larcker (1981), the test's discriminant validity was evaluated by calculating the average variance of each construct over the square of the correlation coefficient between latent variables and by evaluating if the correlations among the constructs were lower than 0.85. In the current study, affective commitment, perceived price fairness, service assurance, and reliability are modeled as first-order reflective constructs for assessing customer satisfaction. Customer satisfaction is then further studied in relation with customer loyalty. In accordance with (Kalia, et al., 2021); (Shahzad, et al., 2021); and (Izogo, 2015), five dimensions, including CS, lead to CL while four dimensions of SR, SA, PPF, and AC lead to CS. (Izogo, 2015) also examined

how SR, SA, and customer loyalty affect CL. In the beginning, the convergence validity was assessed. It comprises metrics such as loadings, composite reliability (CR), average extracted variance (AVE), and Cronbach's alpha.

The findings for factor loadings, composite reliability (CR), average variance extracted (AVE), and Cronbach's alpha are shown in Table 5. The composite reliability (CR) for every construct surpassed the recommended value of 0.70, and the average variance extracted (AVE) for each construct was larger than the standard value of 0.50, indicating that convergent validity was maintained (Tiwari, *et al.*, 2023; Hair, et al.,2021; Henseler, *et al.*, 2009). The factor loadings item SR5 was eliminated during the assessment because the low cut-off value was less than the threshold limit of 0.5 (Kant et al., 2024; Hair *et al.*, 2019). Compared to the recommended values of 0.50, 0.70, and 0.70, respectively, the AVE, CR, and Cronbach alpha values were higher (Jaiswal et al., 2024; Hair *et al.*, 2019; Babin, *et al.*, 2008;);(Santos, 1999). Thus, it demonstrates sufficient internal consistency, convergent and discriminant validity, and it verifies that all constructs can be utilised to assess the research model suggested by the study.

4.3 Model fit test

According to Table 4, the model fit was appropriate for acceptance up to the criterion proposed by Hair et al., 2021.

These criteria include the GFI=0.943, which is desirable for acceptance >0.90 (Browne and Cudeck, 1992), RMSEA=0.037, which is desirable for acceptance <0.08, the NFI= 0.959, CFI= 0.985, IFI=0.985, and chi-square/df = 1.556, which is desirable

for acceptance <5.0 (Carmines and Mclver, 1981). Every measure showed a passably excellent match, indicating that there is consistency between the study's conclusions and conceptual framework and the survey data itself.

Table 4: Evaluation results of the model value

Indicators	Norm	Result	Judgment
χ^2/df	<4	1.556	Yes
GFI	>0.9	0.943	Yes
AGFI	>0.9	0.924	Yes
RMSEA	<0.08	0.037	Yes
NFI	>0.9	0.959	Yes
CFI	>0.9	0.985	Yes
IFI	>0.9	0.985	Yes

4.4 Structural model (results)

The present research investigated the influence of SA, SR, PPF, and AC on CS and CL. Table 7 illustrates that SR was the most important and significant predictor of CS in the current investigation, having the most favourable impact among all direct pathways. While CS has the highest score and is the most significant predictor for CL. We used SPSS and AMOS for data analysis. Findings shows that, service Assurance (H1a: $\beta = 0.286$, $p < 0.001$), service reliability (H2a: $\beta = 0.415$, $p < 0.001$) and

Perceived price fairness (H3a: $\beta = 0.266$, $p < 0.001$) and Affective commitment (H4a: $\beta = 0.168$, $p < 0.001$) positively influence Customer satisfaction. Customer satisfaction significantly affect the Customer loyalty (H6: $\beta = 0.315$, $p < 0.001$). Moreover customer loyalty is influenced by Perceived price fairness (H3b: $\beta = 0.160$, $p < 0.001$) and Affective commitment (H4b: $\beta = 0.203$, $p < 0.001$). Therefore, price perception; commitment and satisfaction were the main predictor of customer loyalty for the current study as exhibited in table 7.

Table 5 : Measurement Model Results

Constructs	Indicators	Factor loadings	Composite Reliability (CR)	Average Variance Extracted (AVE)	Cronbach's alpha
Affective Commitment	AC1	0.675	0.805	0.509	0.801
	AC2	0.744			
	AC3	0.784			
	AC4	0.642			
Customer Loyalty	CL1	0.838	0.903	0.7	0.903
	CL2	0.858			
	CL3	0.841			
	CL4	0.808			
Perceived Price Fairness	PPF1	0.848	0.889	0.727	0.888
	PPF2	0.857			
	PPF3	0.853			
Customer Satisfaction	CS1	0.888	0.864	0.761	0.864
	CS2	0.856			
Service Assurance	SA1	0.939	0.955	0.842	0.954
	SA2	0.923			
	SA3	0.91			
	SA4	0.898			
Service Reliability	SR1	0.917	0.954	0.839	0.954
	SR2	0.886			
	SR3	0.924			
	SR4	0.936			

Table 6: Result of discriminant validity measures

	CS	S	SR	PPF	AC	CL
Customer satisfaction(CS)	0.872					
Service assurance(SA)	0.365	0.918				
Service reliability(SR)	0.508	0.064	0.916			
Perceived price fairness(PPF)	0.412	0.086	0.243	0.853		
Affective commitment(AC)	0.275	0.175	0.063	0.119	0.713	
Customer loyalty(CL)	0.387	0.121	0.139	0.293	0.298	0.836

Note(s): Diagonals (in bold) represent the square root of AVE and other entries represent the correlations

Table 7: Results of the hypothesis testing

Hypotheses	Path			Estimate	S.E.	C.R.	P	Results
H1a	CS	<---	SA	0.286	0.033	6.345	***	S
H2a	CS	<---	SR	0.415	0.033	8.847	***	S
H3a	CS	<---	PPF	0.266	0.054	5.58	***	S
H4a	CS	<---	AC	0.168	0.073	3.469	***	S
H1b	CL	<---	SA	-0.038	0.03	-0.705	0.481	NS
H2b	CL	<---	SR	-0.07	0.031	-1.174	0.24	NS
H3b	CL	<---	PPF	0.16	0.049	2.793	***	S
H4b	CL	<---	AC	0.203	0.065	3.567	***	S
H5	CL	<---	CS	0.315	0.058	4.082	***	S

Source(s): Authors' own findings, S = Supported, NS = Not supported

Note: *** Significant level = 0.001

4.5 Mediation Analysis

To examine mediation effects in this study, we followed a well-established three-step approach originally developed by Baron and Kenny (1986) and later enhanced by Wang et al. (2016). This methodology has been widely used in empirical research (He & Hu, 2022; Jaiswal et al., 2021; Tiwari et al., 2023). First, we must establish that the independent variable has a significant effect on the dependent variable. Second, we need to confirm that the independent variable significantly influences the proposed mediator. Third, mediation is verified when the mediator demonstrates a significant impact on the dependent variable. Full mediation is indicated when the effect of the independent variable on the dependent variable becomes insignificant after

the mediator is included. partial mediation exists when both the independent variable and the mediator maintain significant relationships with the dependent variable simultaneously. If the independent variable fails to show a significant relationship with either the mediator or the dependent variable in the first two steps, mediation cannot be established.

We looked for any mediation effect of customer satisfaction between predicting constructs and CL (refer Table8). Mediation results shows that satisfaction significantly mediated between two constructs SA, SR and CL. CS is also observed to be a partial mediator in path of PPF, AC and CL. All the hypotheses are accepted as CS is acting as a mediator in all of them.

Table 8: Results of Mediation

Hypotheses	IV	M	DV	IV -> DV	IV -> M	IV + M -> DV	Mediating Role	
						IV -> DV	M -> DV	
H6a	SA	CS	CL	0.130**	0.364**	-0.018ns	0.383**	Full Mediation
H6b	SR	CS	CL	0.151**	0.518**	-0.077ns	0.425**	Full Mediation
H6c	PPF	CS	CL	0.266**	0.529**	0.163**	0.314**	Partial
H6d	AC	CS	CL	0.389**	0.496**	0.213**	0.320**	Partial

Note: IV = Independent Variable, M = Mediator, DV=Dependent Variable, ** p<0.01, * p<0.05, ns = Not Significant.

SA= service assurance; SR= service reliability; PPF= perceived price fairness; AC= affective commitment; CS= customer satisfaction and CL= customer loyalty

5. Discussion and implication

The research validates relationships between the research's considered constructs and offers suggestions to telecom operators on sustaining customer satisfaction and fostering customer loyalty. From both theoretical and practical angles, our study has a number of implications. The earlier models on the topic suffer from a variety of flaws because they tended to take a disaggregated approach and only concentrate on a few specific aspects of customer interaction. In an effort to close this gap, the current study produced a customer loyalty model that is extremely all-encompassing and incorporates practically every aspect of customer loyalty. After empirically modelling these relationships into a comprehensive framework, the relative effects of each driver will be statistically assessed. Our understanding of customer loyalty in the telecom industry is currently being deepened and expanded upon by the current study. With customer satisfaction acting as mediators in the suggested model, this study investigates the connection between SQ, PPF, AC, CS, and CL for telecom service users in India. Assurance and reliability significantly associated with customer satisfaction and these findings were supported by previous studies such as Venkatakrishnan *et al.*, 2022; Kalia *et al.*, 2021; Gupta *et al.*, 2022 ; Kaura *et al.*, 2015(**hypothesis1a and 2a**), but both the dimension shows negative insignificant impact on customer loyalty. Study made by (izoko 2017) reveals a similar results relating to service assurance only (**Hypothesis1b**). On the basis of literature, we hypothesized that SQ (assurance and reliability), PPF,AC has positive impact on customer satisfaction and customer loyalty. The current study was interested in affective customer commitment since it is strongly associated with consumer loyalty and is not solely dependent on opinions regarding economic advantages but

rather long-term desires to maintain a relationship with the business (**hypotheses H4a and 4b**). We also found PPF and AC to have positive impact on both CS and CL, findings are in line with the previous studies (Cinjarevic *et al.*, 2010). Our research findings (**Hypotheses 3a and 3b**) are in accordance with the previous findings that customer satisfaction and loyalty are being influenced by PPF (Dinesh and Raju, 2022; Yasri *et al.*, 2020; Raza *et al.*, 2020; Amin *et al.*, 2013; Cinjarevic *et al.*, 2010) and AC (Parihar and Dawra 2020) (Chiu *et al.*, 2018;Izogo, 2017). Contrarily, analysis revealed that assurance and reliability do not directly influence customer loyalty (**Hypotheses 1b and 2b**) but rather that satisfaction acts as a mediating factor between these SQ constructs and loyalty(**Hypotheses5a and 5b**). Therefore, while service quality dimensions do not directly influence customer loyalty in the telecom sector, they have a considerable impact on customer satisfaction, which mediates the relationship between drivers of SQ and loyalty.

5.1 Theoretical implication:

The findings of this investigation have various theoretical ramifications. The first finding of this study was the confirmation that both SQ dimensions had a considerable beneficial impact on customer satisfaction and a concomitant indirect effect on customer loyalty. Service reliability, followed by service assurance, price fairness, and affective commitment, had the greatest impact on customer satisfaction of all the constructs. Second, the study looked at how SQ, Price Fairness, Affective Commitment, and Loyalty directly relate to one another. This analysis produced some extremely intriguing findings. Both measures of SQ exhibit an insignificant relationship with loyalty, but had indirect significant relation with CL. Even though assurance and reliability are enough to satisfy customers, they

don't always lead to long-term loyalty. Customers may still switch providers if a competitor offers a more attractive deal.

Affective commitment, followed by pricing fairness showed a significant positive association which mean positive emotional feeling towards a brand and perception of fair pricing of a service influences their feeling of satisfaction and long-term relations. The third significant contribution of this research is the identification of customer satisfaction as a direct and intermediary influence between SQ and loyalty.

5.2 Practical implication

This research facilitates telecommunication service providers, operators, and upcoming studies on the quality of telecommunication services. The majority of service quality factors are directly tied to service personnel; thus, suppliers must ensure that their personnel are trained to meet customer expectations and are conversant with these quality factors.

A number of marketing-related practical consequences are revealed by the study's findings. We advise telecom providers to give reliability and affective commitment more consideration. It has been observed that operator switching is extremely prevalent in India; hence, this study will assist companies in improving customer loyalty by fostering satisfaction. Although it has previously been stated that customer loyalty is positively impacted by service quality, studies that look into the roles of the other factors are lacking. The results of this study offer a comprehensive framework for quality, price perception, and commitment linkage in order to foster loyalty in the Indian telecom sector.

We strongly suggest focusing on service assurance and pricing perception in order to raise consumer satisfaction and loyalty, respectively. The findings are significant because they present a novel viewpoint on affective commitment and the extent to which it influences consumers' perceptions of satisfaction and loyalty. The effectiveness of customer relationship management would be greatly improved by placing more emphasis on psychological factors and reducing customer complaints.

6 Conclusion Limitations and future research direction

In evaluating customer satisfaction and loyalty for telecom service consumers, the study identifies the importance of service quality, price perception, and commitment. The study further uses customer satisfaction as a mediating variable in path of dependent constructs and customer loyalty. Responses of 410 users were taken to form a structural model. Findings revealed interesting results regarding consumer behavior. Service quality was seen to have a significant impact on

customer satisfaction whereas non significant direct impact on customer loyalty. Price perception and commitment had a direct impact on both CS and CL. Customer satisfaction was the most significant determinant of loyalty followed by affective commitment and PPF.

Despite our best efforts to create a solid research design, this study has certain flaws. Data was initially gathered using a cross-sectional method. We believe that a longitudinal or time-series data collection strategy can provide more information on the development of consumer behaviour (Venkatakrisnan *et al.*, 2022; kalia *et al.*, 2021; Rindfleisch *et al.*, 2008). Secondly, the study used no moderation, Moderation of rural and urban telecom service can be used to better differentiate the opinions, as bifurcates by TRAI. Third, the study was conducted in India an emerging economy; generalization can be difficult due to differences in cultural, social and economic environment. Finally, researchers may consider using other variables such as switching cost, WOM, corporate image perception, as direct as well as mediating variable for better conceptualizing customer loyalty among telecom users.

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Affective Mechanisms and Materialistic Predispositions: Structural Determinants of the Dark Facets of Consumer Decision-Making

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Abstract

This study explores the affective and material dynamics underpinning the darker side of consumer decision-making. Integrating bibliometric mapping and structural equation modelling (SEM), it examines how emotional arousal, impulsivity, and materialism jointly shape ethically ambivalent consumption patterns. The bibliometric analysis, based on Dimension data (2010–2025), reveals an academic shift from traditional affective models toward neuro-affective and sustainability-oriented perspectives. Empirically, SEM results (n = 402; AMOS 24.0) confirm that emotional arousal significantly heightens impulsivity, which in turn reinforces materialistic orientations, culminating in compulsive or unethical buying behaviour. Impulsivity partially mediates this linkage, highlighting affective activation as an indirect catalyst of materialistic drives. The study advances theoretical understanding of emotional regulation and moral disengagement while offering insights for ethically attuned marketing communication

Keywords: Consumer Emotions, Impulsivity, Materialism, Dark Consumption, Ethical Decision-Making

1. Introduction

1.1 Affective Foundations and Rationale

Modern consumption extends beyond functional need fulfillment to embody expressions of identity, desire, and social belonging. Algorithmic marketing, influencer narratives, and sensory engagement have transformed markets into affective ecosystems, where emotions dictate both purchasing motives and behavioral intensity (Belk, 2022). Emotional activation, once peripheral, now forms the nucleus of consumer engagement—fueling gratification and self-validation yet often precipitating ethical ambivalence.

Heightened emotional arousal can suppress deliberation and heighten reactivity, driving impulsive decision pathways that prioritize hedonic reward over reflection (Rook & Fisher, 2021). Within such contexts, material possessions operate as affective regulators—tools for emotional compensation and self-construction. Sustained reliance on acquisition nurtures materialistic orientations, embedding consumption within cycles of escapism, reward-seeking, and affective repair

(Dittmar, 2023). These interlinked processes delineate the dark side of consumer behaviour, encompassing compulsive buying, moral disengagement, and ethically questionable consumption (Khamitov et al., 2023).

1.2 Theoretical Orientation

Guided by Affective Regulation Theory, Dual-System Decision Models, and Self-Determination Theory, this study conceptualizes consumption as an emotion-driven mechanism transcending rational boundaries. Affective Regulation explains the pursuit of goods as a strategy for mood regulation (Gross, 2015), while Dual-System frameworks highlight System 1's affective dominance over System 2's reflective control (Kahneman, 2011). Within this interplay, materialism functions as a behavioral schema that promises affective equilibrium through ownership (Richins, 2020).

This recursive sequence—emotional arousal → impulsivity → materialism → dark consumption—captures the psychological continuum underlying ethically ambivalent consumer choices. To explore this mechanism, the study integrates bibliometric

mapping to delineate the field's intellectual evolution and structural equation modelling (SEM) to empirically validate the proposed causal pathways.

1.3 Research Objectives and Hypotheses

Objectives-

In response to the gaps identified in the literature, the present study aims to:

1. Investigate the extent to which **emotional arousal (EA)** acts as a determinant of **dark consumer choices (DCC)**.
2. Examine the influence of **materialistic orientations (MAT)** in shaping maladaptive consumption patterns.
3. Evaluate the role of **impulsivity (IMP)** in intensifying deviant consumer tendencies.
4. Advance an integrative framework that synthesizes bibliometric insights with **structural equation modelling (SEM)**, thereby providing a multidimensional understanding of the antecedents of dark consumer behaviour.

Hypotheses-

Derived from theoretical reasoning and prior empirical evidence, the following hypotheses are proposed:

Hypothesis 1

- **H1:** Emotional arousal (EA) exerts a **positive and significant effect** on dark consumer choices (DCC).
H0: Emotional arousal has **no significant effect** on dark consumer choices.

Hypothesis 2

- **H1:** Impulsivity (IMP) exerts a **positive and significant effect** on dark consumer choices (DCC).
H0: Impulsivity has **no significant effect** on dark consumer choices.

Hypothesis 3

- **H1:** Materialism (MAT) exerts a **positive and significant effect** on dark consumer choices (DCC).
H0: Materialism has **no significant effect** on dark consumer choices.

2. Literature Review

2.1 Emotional Stimuli and Affective Regulation

Emotions are central to consumption, influencing evaluations, purchase intensity, and post-purchase reflection (**Laros & Steenkamp, 2022**). Affective Regulation Theory posits that consumers use buying as an emotional repair tool to relieve distress or enhance mood (**Gross, 2015**). In digital spaces, algorithmic personalization and influencer cues amplify emotional contagion, creating “affective resonance loops” that

reinforce short-lived emotional stability but weaken cognitive restraint (**Hudders et al., 2021**).

2.2 Impulsivity as a Behavioural Catalyst

Impulsivity denotes spontaneous action under emotional pressure, driven by the dominance of fast, intuitive processes over reflective reasoning (**Kahneman, 2011**). Elevated affective arousal—such as stress or excitement—heightens impulsive buying tendencies (**Verplanken et al., 2020**). Neuro-affective research links this to diminished prefrontal control and heightened limbic activation, leading to compulsive and ethically ambiguous purchases (**Raab et al., 2022**).

2.3 Materialism as the Mediating Mechanism

Materialism reflects the belief that possessions define self-worth and emotional fulfilment (**Richins, 2020**). It mediates the effect-behaviour nexus, transforming emotional voids into consumption impulses (**Dittmar, 2023**). Through symbolic ownership and social signaling, materialism normalizes overconsumption and weakens ethical awareness (**Burroughs & Rindfleisch, 2021**).

2.4 The Dark Spectrum of Consumption

The dark side of consumer behaviour manifests through compulsive buying, moral disengagement, and addiction-like tendencies (**Palan et al., 2022**). Rooted in emotional dysregulation and material dependency, these behaviours illustrate the paradox of modern marketing—where emotional engagement drives both loyalty and ethical erosion (Roberts & Pirog, 2023).

3. Methodological Framework

3.1 Research Design

This study adopts a hybrid methodological architecture, integrating bibliometric analysis and Structural Equation Modelling (SEM) to explore both the intellectual and empirical dimensions of the affective-materialistic nexus in consumer decision-making.

The bibliometric phase provides a macro-level mapping of scholarly evolution, while the SEM phase offers micro-level empirical validation of hypothesized causal pathways.

3.2 Phase I: Bibliometric Mapping

3.2.1 Data Source and Search Strategy

Bibliometric data were retrieved from the Dimensions database covering publications from 2010 to 2025. The search query included key terms such as “emotional arousal,” “impulsivity,” “materialism,” “compulsive buying,” and “dark consumption.” Only peer-reviewed articles and conference proceedings published in English were included.

3.2.2 Analytical Techniques

Data cleaning and preprocessing were conducted using Microsoft Excel and VOS viewer 1.6.20. The following analyses were performed:

- Co-authorship analysis (authors, institutions, countries)
- Co-occurrence of keywords to identify thematic clusters
- Bibliographic coupling to detect research fronts
- Co-citation analysis to map intellectual foundations

The bibliometric visualization identified thematic transitions from affective and psychological models toward sustainability and neuro-affective paradigms.

3.3 Phase II: Structural Equation Modelling (SEM)

3.3.1 Sample and Data Collection

Primary data were collected from 402 respondents using a structured questionnaire based on validated scales. Respondents were adult consumers aged 18–45 years, selected using a purposive sampling method targeting frequent online shoppers.

3.3.2 Measurement Instruments

All constructs were measured using five-point Likert scales (1 = strongly disagree to 5 = strongly agree):

- Emotional Arousal (EA): Adapted from Rook & Fisher (2021)
- Impulsivity (IMP): Items based on Verplanken et al. (2020)
- Materialism (MAT): Measured using Richins (2020) short-form scale
- Dark Consumer choice (DCC): Developed from Palan et al. (2022) and Roberts & Pirog (2023)

3.3.3 Data Analysis Procedure

- Data were analyzed using AMOS 24.0 following a two-step approach:
- Measurement Model Assessment: To evaluate reliability (Cronbach's $\alpha > 0.7$), convergent validity (AVE > 0.5 , CR > 0.7), and discriminant validity (Fornell–Larcker criterion).
- Structural Model Assessment: To test causal relationships and mediations using bootstrapping (5,000 samples) with significance levels set at $p < 0.05$.

3.4 Ethical Considerations

All participants were informed about the purpose of the research and confidentiality of responses. Participation was voluntary, adhering to ethical standards for social science research.

4 Bibliometric Analysis and Findings

4.1 Overview of the Bibliometric Dataset

The bibliometric corpus for this investigation was extracted

from the **Dimensions** database, selected for its expansive and methodologically rigorous coverage of global scholarly outputs—including journal articles, monographs, book chapters, conference proceedings, technical reports, and curated edited volumes. A systematic search architecture was deployed to align the dataset precisely with the study's conceptual anchors of emotional arousal, impulsivity, materialism, and dark consumer behaviour. An initial query spanning **2012–2026**, built upon a consolidated set of domain-specific keywords (e.g., *emotional arousal, impulsivity, materialism, compulsive buying, dark consumption, unethical consumer behaviour, moral disengagement*), yielded **2,511 documents** (journal articles = 1,784; conference papers = 347; book chapters = 186; books = 122; edited volumes = 38; reports/working papers = 34). This heterogeneous body of literature ensured the inclusion of both foundational theoretical contributions and contemporary empirical advancements across behavioural science, consumer psychology, and neuro-affective marketing.

A stringent screening protocol was applied to establish conceptual purity and bibliographic integrity. **Inclusion criteria** encompassed English-language, peer-reviewed outputs explicitly engaging with affective, impulsive, or materialistic determinants of consumer behaviour. **Exclusion criteria** eliminated non-scholarly material (editorials, reviews, corrections), incomplete records, duplicate entries, and studies where the consumer-behavioural component was peripheral rather than theoretically substantive. Following this filtration process, the analytical corpus was refined to **1,963 documents** (journal articles = 1,416; conference proceedings = 284; book chapters = 161; books = 78; edited volumes = 24). This curated dataset provided a high-fidelity foundation for the subsequent scient metric analyses.

To operationalize the bibliometric procedures, the study employed **VOS viewer (v1.6.20)** for constructing co-authorship networks, keyword co-occurrence matrices, bibliographic coupling structures, and co-citation maps, supported by density and overlay visualizations. **Microsoft Excel** facilitated preliminary data standardization, duplicate elimination, temporal trend computation, and variable frequency mapping. Additionally, **Dimensions' built-in analytics suite** was utilized to authenticate metadata, extract citation metrics, and verify longitudinal publication trajectories.

4.2 Bibliometric Network Visualizations

In this section, four principal bibliometric networks are presented, each derived from the cleaned dataset using VOS viewer. The maps highlight the intellectual structure, thematic

progression, and collaborative patterns within the literature on emotional arousal, impulsivity, materialism, and dark consumption.

1. Co-Authorship Analysis

a. Co-Authorship Analysis (Authors)

The co-authorship analysis identified 470 authors who met the

inclusion criteria of having a minimum of two publications and two citations. The expanded threshold increased the comprehensiveness of the collaboration network, allowing the inclusion of both established and emerging researchers. The network revealed a highly multidisciplinary structure comprising marketing, consumer psychology, public health, food science, and digital behaviour clusters.

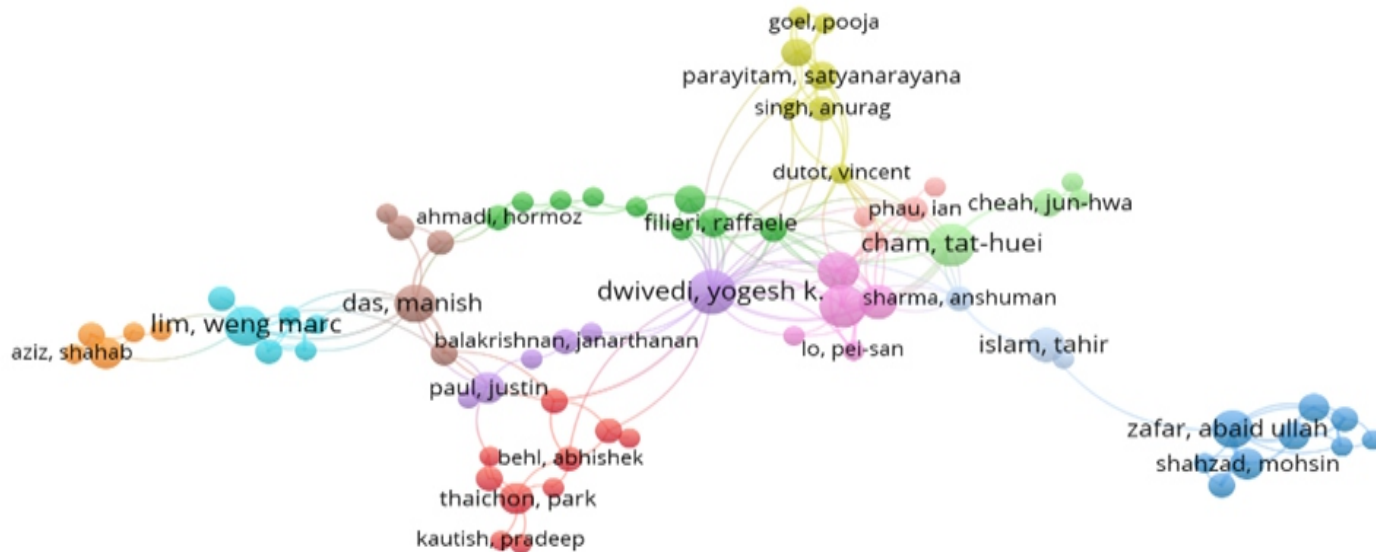


Fig 1. showing coauthorship analysis (Authors Wise)

Influential authors such as Dwivedi, Yogesh K., Carlson, Jamie, Filieri, Raffaele, and Karjaluoto, Heikki recorded exceptionally high citation counts, indicating their pivotal role in knowledge creation. Meanwhile, authors like Aw, Eugene Cheng-Xi, Hing, Nerilee, and Cham, Tat-Huei demonstrated high total link

strengths, highlighting their importance as collaborative hubs within the network. Overall, the co-authorship structure signifies a balanced ecosystem of thought leaders and high-connectivity contributors, reflecting robust scholarly interaction in the field

a. Co-Authorship Analysis (Institutions)

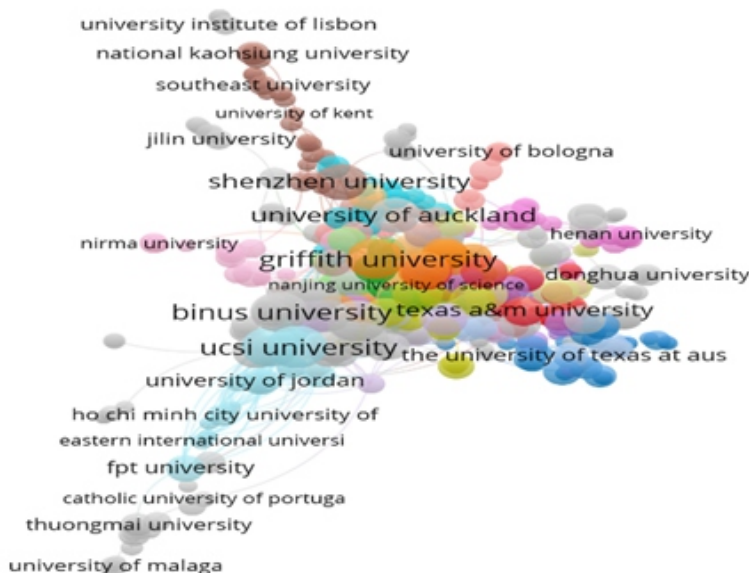


Fig 2. showing coauthorship analysis (Instituions Wise)

“The organizational co-authorship mapping reveals a distinctly stratified yet globally distributed research landscape. A small cohort of universities—most notably Audencia Business School, Curtin University, Griffith University, Hong Kong Polytechnic University, and Florida Gulf Coast University—emerges as the intellectual core of the field, combining substantial citation influence with strong collaborative engagements. Institutions such as Ajman University, City University of Macau, and Jaipuria Institute of Management function as critical network intermediaries, demonstrating high Total Link Strength despite comparatively moderate citation volumes, thereby indicating

their role as structural bridges that connect otherwise disparate research clusters. Several U.S. and European institutions exhibit high citation impact but relatively lower collaborative linkages, suggesting more independent or theory-driven contributions. In contrast, many Asian institutions display dense collaborative patterns, reflecting an increasingly interconnected and rapidly expanding research ecosystem. Overall, the network illustrates a field transitioning from citation-dominant Western leadership toward a more collaborative, Asia-centred structure, enriching the intellectual diversity and methodological breadth of the discipline.”

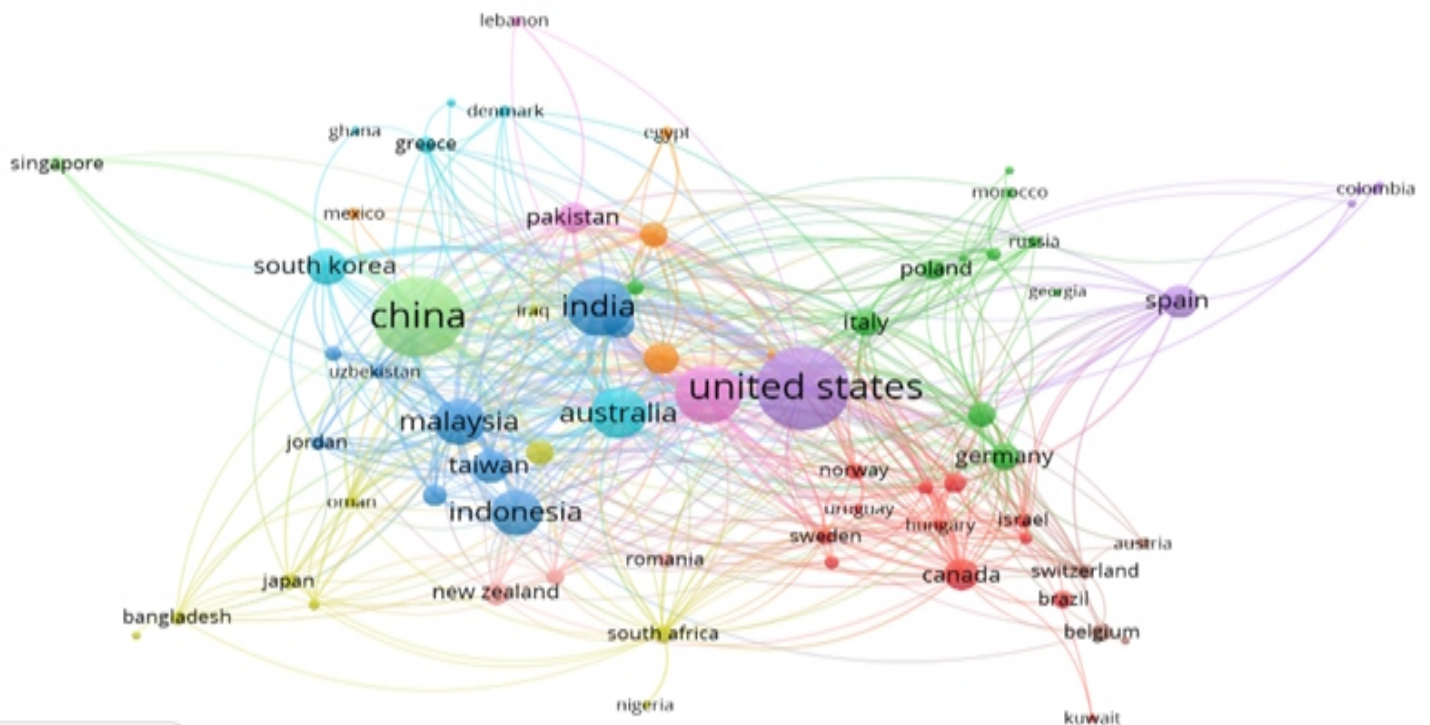


Fig 3. Coauthorship analysis (Country Wise)

The country-level co-authorship network reveals a markedly asymmetrical yet globally interconnected research landscape, anchored by the United States, the United Kingdom, China, India, Australia, and Malaysia, which constitute the dominant collaborative core with superior publication output, citation impact, and Total Link Strength. These nations function as central knowledge hubs, shaping much of the field’s intellectual and methodological trajectory. Emerging economies such as Pakistan, Indonesia, Vietnam, and several Gulf nations exhibit increasing collaborative engagement despite moderate citation profiles, signaling their growing integration into international research flows. Meanwhile, established European systems—including Germany, France, Finland, and the

Netherlands—demonstrate strong citation influence and balanced co-authorship patterns, consistent with mature scientific ecosystems. In contrast, countries with smaller research infrastructures across Eastern Europe, Africa, and parts of the Middle East display lower link strengths, reflecting structural or geographic limitations to collaboration. Overall, the network assumes a clear centre–periphery configuration, where a robust transnational core of Western and Asian research powers is complemented by an expanding cohort of emerging contributors, underscoring both the global diffusion of research activity and the concentration of intellectual leadership among a select group of highly connected nations.

2. Co-Citation Analysis

a. Co-Citation of Authors

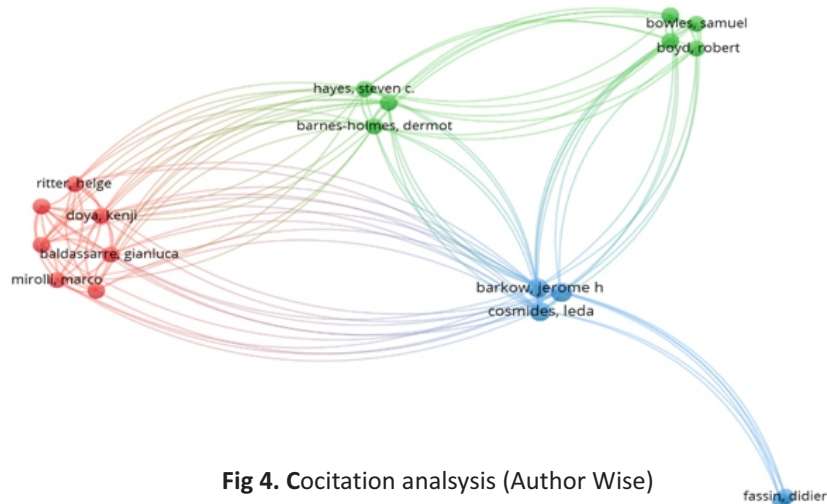


Fig 4. Cocitation analysis (Author Wise)

The author co-citation network reveals a structured and interdisciplinary intellectual base shaped by methodological, psychological, and computational scholarship. A central cluster—featuring Wynne W. Chin, Jörg Henseler, Vincenzo Esposito Vinzi, and Huiwen Wang—highlights the field's strong dependence on PLS-SEM and advanced quantitative modelling. A second dominant cluster, led by Leda Cosmides, John Tooby, Jerome H. Barkow, and Frank R. Kardes, reflects the influence of evolutionary and cognitive psychology on contemporary behavioural research. A third cluster, comprising Gianluca

Baldassarre, Dermot Barnes-Holmes, Kenji Doya, Bernhard Sendhoff, Marco Mirolli, and Helge Ritter, signals the growing contribution of computational neuroscience and embodied cognition. Bridging scholars such as Marc Lombard, Frank Biocca, Steven C. Hayes, Tianjing Li, and Vivian A. Welch facilitate cross-disciplinary integration. Foundational thinkers—including Daniel Kahneman, Roy Baumeister, Edward Deci, Richard Ryan, and George Loewenstein—remain conceptually influential, reinforcing the field's grounding in motivation, cognition, and decision-making theories.

a. Co-Citation of Sources (Journals)

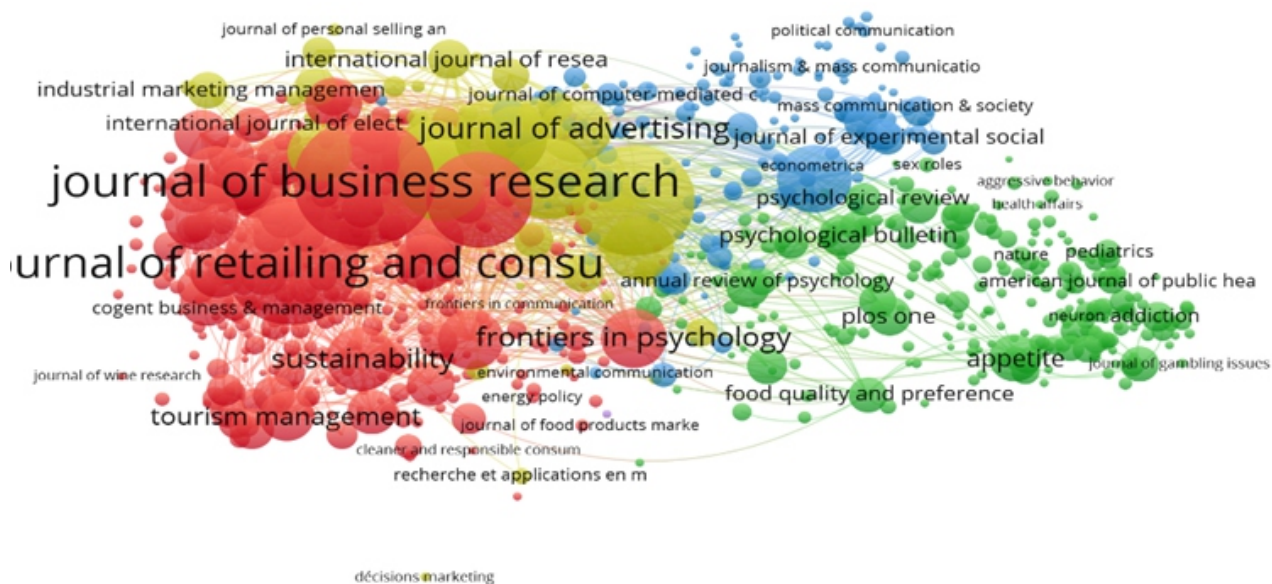


Fig 5. Co-citation analysis (Sources Wise)

The journal co-citation map reveals a well-structured and multidisciplinary knowledge base dominated by three major clusters. Central marketing journals—most notably the Journal of Business Research, Journal of Retailing and Consumer Services, and Journal of Advertising—form the intellectual core, indicating that empirical and theory-driven marketing research anchors the field. A second major cluster comprises psychology journals such as *Frontiers in Psychology*, *Psychological Bulletin*, and *Annual Review of Psychology*, reflecting the strong behavioural and cognitive foundations that underpin contemporary consumer research. A third cluster of

communication and media journals—including *Mass Communication & Society* and *Journalism & Mass Communication Quarterly*—highlights the growing importance of digital communication, persuasion, and mediated interactions. Peripheral journals related to sustainability, tourism, policy, and public health further indicate a broadening thematic scope. Overall, the structure depicts a mature and interconnected research ecosystem where marketing, psychology, and communication collectively shape scholarly discourse

3. Bibliographic Coupling

a. Bibliographic Coupling (Unit of analysis Documents)

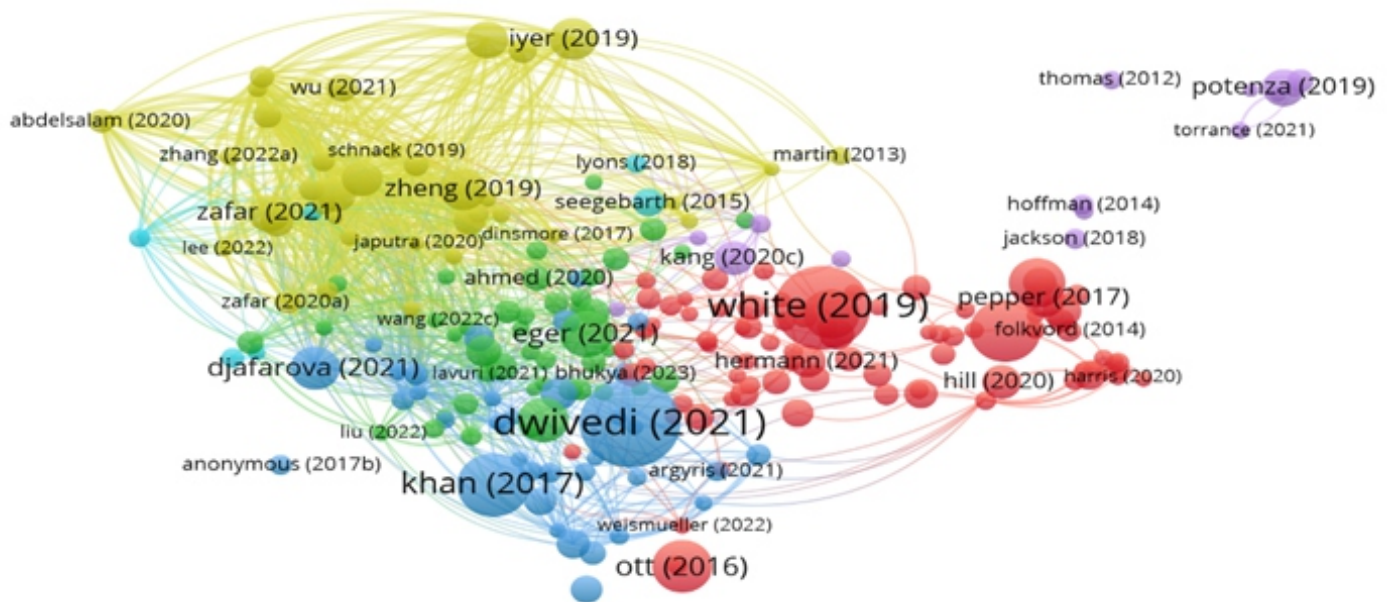


Fig 6. Bibliographic coupling analysis (Documents Wise)

The bibliographic coupling analysis, conducted at the document level, reveals a highly interconnected research landscape shaped by both foundational and emerging studies. Several documents demonstrate exceptionally strong coupling strength—most notably Redine (2022) (TLS = 865), Zafar (2021) (TLS = 665), Zafar (2020a) (TLS = 635), Zhang (2022b) (TLS = 566), Zhao (2021) (TLS = 499), and Chopdar (2022) (TLS = 451). These papers serve as methodological and conceptual anchors, indicating extensive shared references and strong thematic convergence across the field. A second influential tier includes works by Wang (2022a–d), Lee (2022, 2023), Kimiagari (2021),

Yin (2022), and Nekomahmud (2022), each forming dense citation alignments and bridging multiple thematic clusters. The presence of high-impact papers such as Dwivedi (2021), White (2019), Iyer (2019), Abbasi (2021), and Herman (2021) further strengthens the intellectual cohesion of the domain, signalling a shared reliance on digital behaviour, consumer psychology, marketing technology, and contemporary decision-making frameworks. Overall, the coupling structure indicates a mature and rapidly consolidating research area, where influential studies collectively shape the theoretical and methodological trajectory of the field

b. Bibliographic Coupling (Unit of analysis Sources)

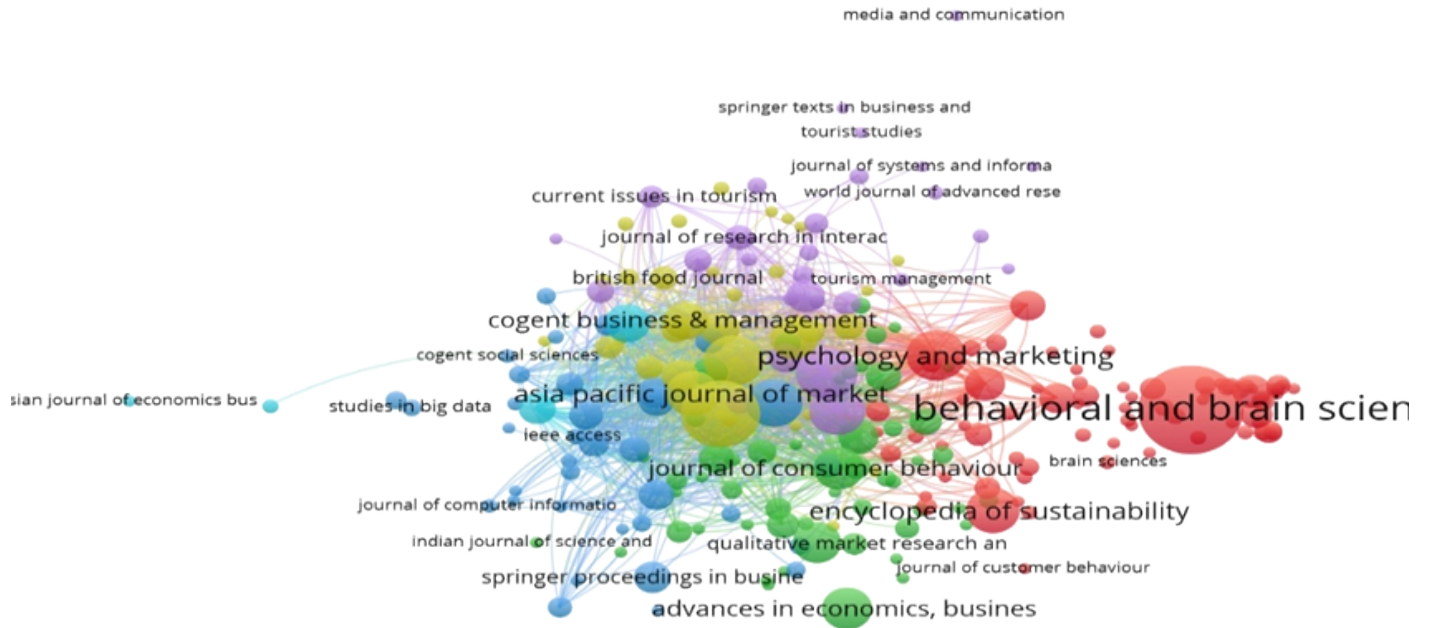


Fig 7. Bibliographic coupling analysis (Source Wise)

The bibliographic coupling analysis of sources reveals a densely interconnected journal ecosystem anchored by a mix of marketing, psychology, behavioural science, and interdisciplinary research outlets. Core journals such as Psychology and Marketing, Journal of Consumer Behaviour, Asia Pacific Journal of Marketing and Logistics, and Cogent Business & Management form the central structural cluster, indicating substantial overlap in their referenced literature and shared theoretical foundations. A strongly influential bloc is led by Behavioral and Brain Sciences, whose sizeable coupling strength highlights the field's increasing reliance on cognitive, neuropsychological, and behaviour-driven frameworks. Surrounding clusters—including sustainability-focused journals, tourism research outlets, and business and information systems sources—demonstrate the thematic breadth of the domain, with each contributing specialised but interconnected perspectives. The overall configuration reflects

a mature, interdisciplinary knowledge structure in which marketing and behavioural science journals serve as citation hubs, while adjacent disciplines enrich the field with methodological and conceptual depth. This tightly knit coupling pattern underscores a research landscape that is both intellectually coherent and progressively converging across disciplinary boundaries

c. Bibliographic Coupling (Unit of analysis Authors)

The bibliographic coupling analysis of authors reveals a tightly concentrated intellectual core alongside a few structurally isolated contributors. The central cluster is dominated by prolific scholars such as Yogesh K. Dwivedi, Justin Paul, and Nerilee Hing, whose strong coupling strength reflects extensive overlap in their referenced literature and their shared contributions to digital adoption, consumer behaviour, and marketing analytics.

huang, shengchun



Fig 8. Bibliographic coupling analysis (Author Wise)

This dense hub indicates a coherent and methodologically aligned research stream driving the field's contemporary discourse. In contrast, authors such as Daniel Nettle, Nicolas Baumard, and Shengchun Huang appear as peripheral yet influential nodes, suggesting specialized thematic contributions—particularly in evolutionary psychology, behavioural decision science, and computational

approaches—that, while impactful, are less integrated with the mainstream marketing-oriented corpus. Overall, the structure illustrates a field anchored by a unified scholarly nucleus, complemented by distinct, boundary-expanding authors whose work broadens the theoretical and methodological reach of the domain.

d. Bibliographic Coupling (Unit of analysis organization)

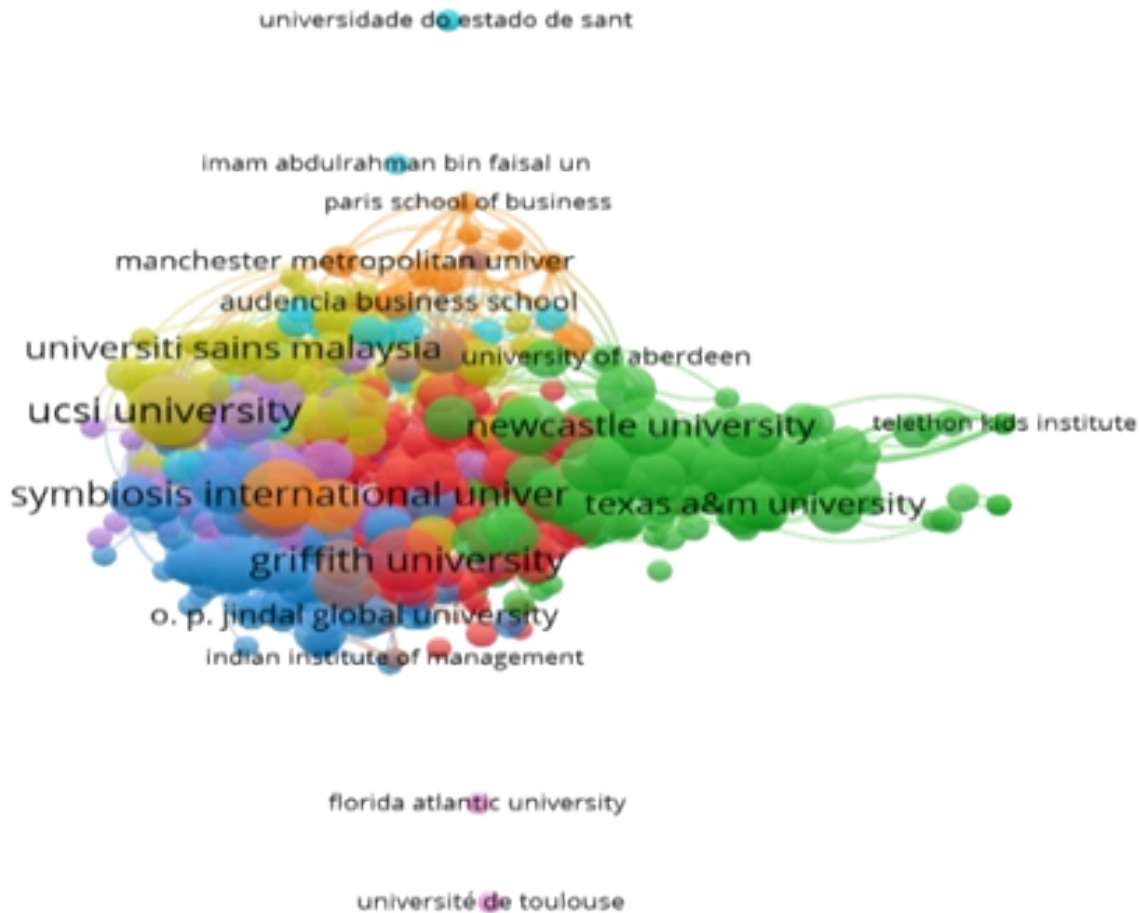


Fig 9. Bibliographic coupling analysis (Organisation Wise)

The bibliographic coupling of organizations reveals a densely interconnected global research network anchored by institutions with strong traditions in marketing, consumer behaviour, and digital transformation studies. Central actors such as University Sains Malaysia, UCSI University, Symbiosis International University, Griffith University, and Newcastle University form the structural core, indicating substantial overlap in their referenced literature and sustained engagement with similar theoretical frameworks. These institutions collectively shape the mainstream discourse through collaborative, high-output scholarship. Surrounding this core,

universities such as Texas A&M University, University of Aberdeen, and Telethon Kids Institute represent specialized clusters contributing complementary expertise in behavioural sciences and analytics-driven research. More peripheral yet strategically significant contributors—including Florida Atlantic University, Université de Toulouse, and Universidade do Estado de Santa Catarina—demonstrate emerging but less integrated research streams. Overall, the coupling structure highlights a field driven by a cohesive central group of institutions while simultaneously expanding through diverse, globally dispersed academic contributors.

a. Bibliographic Coupling (Unit of analysis country)

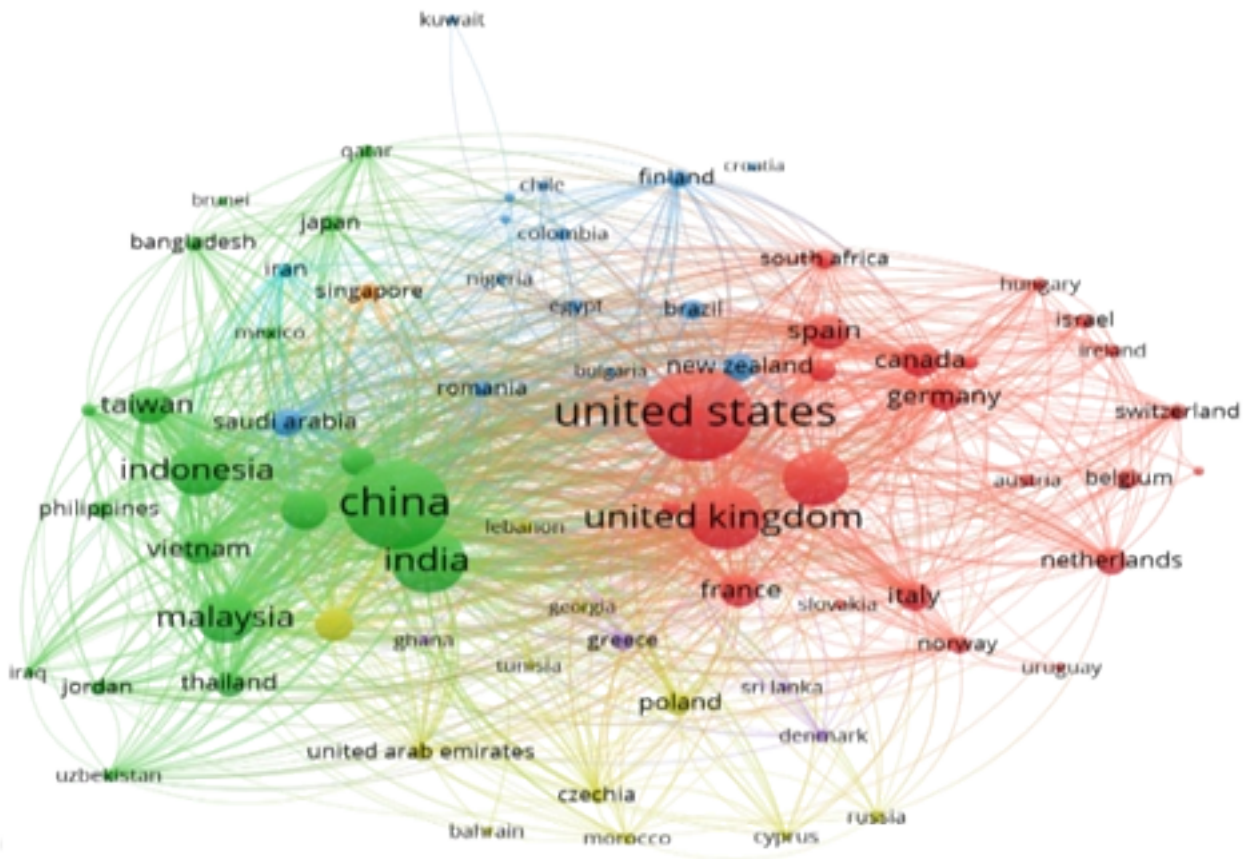


Fig 10. Bibliographic coupling analysis (Country Wise)

The country-level co-authorship map reveals a highly interconnected global research landscape, with distinct clusters anchored by major knowledge hubs. The United States and the United Kingdom emerge as dominant contributors, forming the central red cluster with dense international linkages. China and India lead the green cluster, representing Asia's rapidly expanding research footprint supported by strong collaborations across Southeast Asia and the Middle East. European nations form a coherent red–yellow cluster reflecting mature, high-intensity scholarly cooperation. Overall, the network demonstrates a balanced yet competitive structure in which Western and Asian countries act as dual engines of research production, driving the field through extensive cross-regional collaboration.

5. Empirical Analysis using Structural Equation Modelling (SEM)

5.1 Measurement Model Assessment-

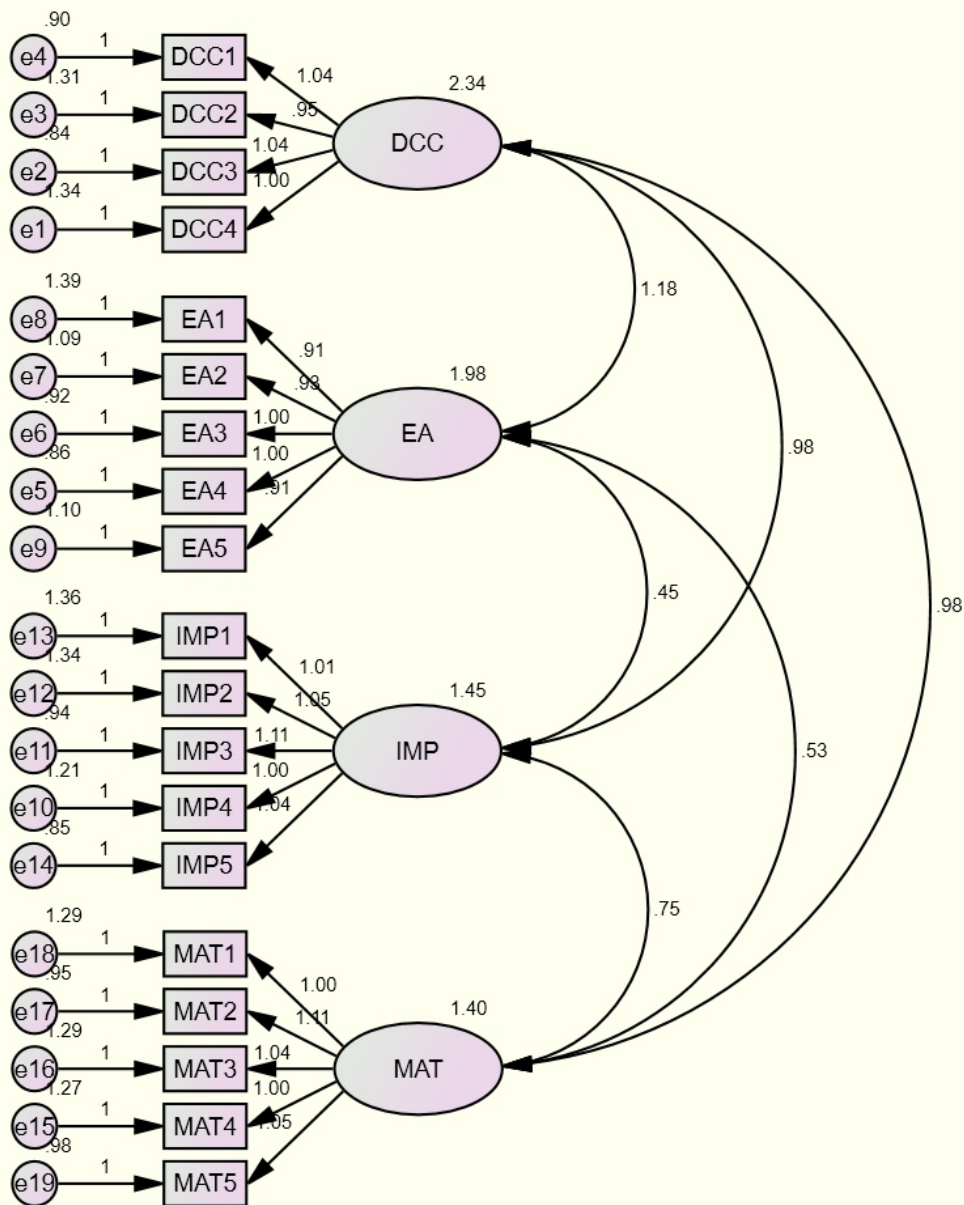
The overall measurement model demonstrated an excellent level of fit, indicating strong congruence between the hypothesized latent structure and the observed data. The RMSEA value (.045) remained well within the accepted upper bound of .06, accompanied by a high PCLOSE (.847), confirming the model's close fit. Incremental fit indices—including CFI (.973), TLI (.968), and IFI (.973)—all exceeded the recommended .95 threshold, reflecting superior comparative model performance. Additionally, absolute fit indices such as GFI (.934) and AGFI (.914) surpassed conventional benchmarks, affirming the model's adequacy. The standardized RMR (.036) further indicated minimal residual variance. Collectively, these indices confirm that the measurement model is statistically robust, theoretically coherent, and suitable for subsequent structural path analysis.

Measure	Estimate	Threshold	Interpretation
χ^2/df (CMIN/DF)	1.802	< 3.00	Excellent model parsimony
GFI	0.934	> 0.90	Good absolute model fit
AGFI	0.914	> 0.90	Adequate adjusted model fit
SRMR (Standardized RMR)	0.036	< 0.08	Very low residuals
RMSEA	0.045	< 0.06	Close model fit
RMSEA PCLOSE	0.847	> 0.50	RMSEA not significantly different from 0
NFI	0.941	> 0.90	Strong incremental validity
IFI	0.973	> 0.95	Excellent comparative fit
TLI	0.968	> 0.95	Excellent non-normed incremental fit
CFI	0.973	> 0.95	Excellent global model fit
PNFI	0.804	> 0.50	High parsimony-adjusted fit
PCFI	0.831	> 0.50	Good parsimony-comparative fit
HOELTER (0.05)	270	> 200	Sample size adequate for model stability
HOELTER (0.01)	290	> 200	Strong stability at stricter confidence

Table 1 – Showing Model fitness of Measurement model

Beyond the primary fit indices, the parsimony-related measures further validate the strength of the measurement model. The χ^2/df ratio of 1.802 indicates an optimal balance between model complexity and explanatory power, confirming that the model is neither over-fitted nor under-specified. The parsimony indices—PNFI (.804) and PCFI (.831)—both exceed the minimum recommended threshold, suggesting that the model maintains high explanatory adequacy even after adjusting for complexity.

The Hoelter critical N values (270 at $p = .05$ and 290 at $p = .01$) demonstrate that the sample size is more than sufficient to support the model with high statistical stability. Additionally, the strong performance of NFI (.941) indicates substantial improvement over the null model, while the IFI (.973) and CFI (.973) confirm excellent comparative fit. Collectively, these indicators reinforce that the measurement model is statistically stable, highly parsimonious, and well-positioned for reliable structural analysis in the next stage of SEM.



MEASUREMENT MODEL

Fig 11 – Showing the measurement model

Illustrating how the observed indicators load onto their respective latent constructs—Emotional Arousal (EA), Impulsivity (IMP), Materialism (MAT), and Dark Consumer Choice (DCC). Each construct is depicted as an ellipse, with arrows pointing from the latent variables to their indicators, signifying reflective measurement

5.1.1 Reliability and Validity Results

Prior to testing the structural relationships, the reliability and validity of the measurement model were rigorously assessed to ensure the adequacy and psychometric soundness of the latent constructs.

a. Composite Reliability Assessment

Construct	Composite Reliability (CR)	Recommended Threshold	Interpretation
IMP	0.874	> 0.70	High reliability
DCC	0.897	> 0.70	High reliability
EA	0.892	> 0.70	High reliability
MAT	0.867	> 0.70	High reliability

Table 2 – Showing the Composite Reliability

Note: All CR values exceed *the suggested threshold, confirming robust internal consistency* for all constructs.

Internal consistency reliability was assessed using composite reliability (CR), which is considered more apposite than Cronbach's alpha in the context of structural equation modelling. As presented in Table 1, all latent constructs—

Impulsivity (IMP), Dark Consumer Choice (DCC), Emotional Arousal (EA), and Materialism (MAT)—exhibited CR values well above the recommended threshold of 0.70. These results specify a high degree of internal steadiness and authorize that the measurement items reliably capture their respective underlying constructs.

b. Convergent Validity (AVE)

Construct	AVE	Recommended Threshold	Interpretation
IMP	0.582	> 0.50	Acceptable convergent validity
DCC	0.686	> 0.50	Strong convergent validity
EA	0.625	> 0.50	Strong convergent validity
MAT	0.567	> 0.50	Acceptable convergent validity

Table 3– Showing the Convergent validity

Convergent validity was scrutinized using the Average Variance Extracted (AVE) criterion, which reflects the extent to which a latent construct explains the variance of its observed indicators. As reported in Table 2, the AVE values for all constructs—Impulsivity (IMP), Dark Consumer Choice (DCC), Emotional Arousal (EA), and Materialism (MAT)—exceeded the indorsed minimum threshold of 0.50. This indicates that, on average, more than half of the variance in the measurement items is captured by their respective constructs rather than by measurement error. Collectively, these findings provide strong

experimental support for the convergent validity of the measurement model.

Along with this the factor loading have also been attached to explicate the validity of the constructs which suggest indicators loaded significantly onto their corresponding latent constructs, with standardized loadings exceeding the recommended benchmark of 0.70. This demonstrates that each item contributes meaningfully to the construct it is intended to measure

Construct	AVE	Indicator	Standardized Factor Loading
DCC	0.686	DCC1	0.859
		DCC2	0.785
		DCC3	0.868
		DCC4	0.797
EA	0.625	EA1	0.734
		EA2	0.779
		EA3	0.827

		EA4	0.834
		EA5	0.773
IMP	0.582	IMP1	0.722
		IMP2	0.737
		IMP3	0.808
		IMP4	0.738
		IMP5	0.805
MAT	0.567	MAT1	0.720
		MAT2	0.802
		MAT3	0.733
		MAT4	0.724
		MAT5	0.782

Table 4- Showing the Factor Loadings for each construct

Note - All standardized factor loadings for *each construct were above 0.70, further supporting convergent validity.*

Construct	IMP	DCC	EA	MAT
IMP	0.763			
DCC	0.530	0.828		
EA	0.266	0.548	0.790	
MAT	0.528	0.539	0.318	0.753

Table 5- Showing the Discriminant Validity (Fornell–Larcker Criterion)

Note - Diagonal values (bold) are \sqrt{AVE} . **Off-diagonal values are inter-construct correlations.**

Discriminant validity was assessed using the Fornell–Larcker criterion, whereby the square root of the Average Variance Extracted (AVE) for each construct was compared against its correlations with other latent constructs. As presented in Table 3, the diagonal elements (\sqrt{AVE}) for Impulsivity (0.763), Dark Consumer Choice (0.828), Emotional Arousal (0.790), and Materialism (0.753) consistently exceed the corresponding inter-construct correlations. This pattern confirms that each construct shares greater variance with its own indicators than with other constructs in the model. Consequently, the findings provide robust empirical evidence of discriminant validity, indicating that the latent variables are conceptually distinct and empirically separable, thereby reinforcing the structural integrity of the measurement model.

5.2 Structural Model Assessment and Hypothesis Testing

Following the successful validation of the measurement model, the structural model was estimated to examine the

hypothesized causal relationships among emotional arousal (EA), impulsivity (IMP), materialism (MAT), and dark consumer choice (DCC). Structural equation modelling (SEM) was employed to assess the direct effects of the three antecedent constructs on dark consumer choice, thereby addressing the study objectives and testing the proposed hypotheses.

The overall fit indices of the structural model indicate an excellent level of model adequacy and parsimony. The chi-square to degrees of freedom ratio ($\chi^2/df = 1.734$) remained well below the recommended threshold of 3.0, demonstrating a well-balanced model structure. Absolute fit indices further supported model adequacy, with GFI (.931) and AGFI (.918) exceeding conventional cut-off values of .90. The standardized root mean square residual (SRMR = .043) indicated minimal residual discrepancies between the observed and estimated covariance matrices.

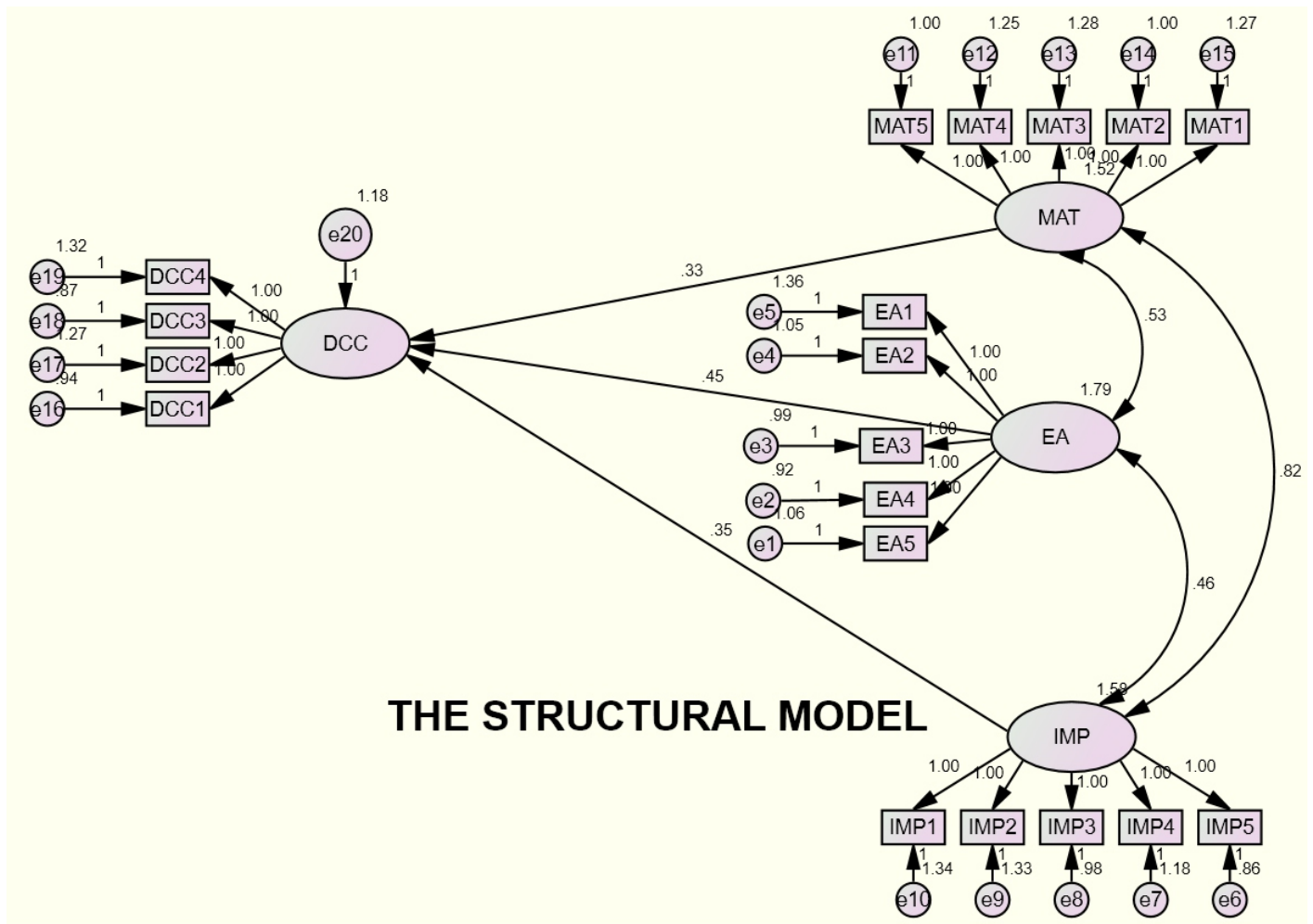


Fig: Structural Model Showing Standardized Path Coefficients

Measure	Estimate	Recommended Threshold	Interpretation
χ^2/df (CMIN/DF)	1.734	< 3.00	Excellent model parsimony
GFI	0.931	> 0.90	Good absolute model fit
AGFI	0.918	> 0.90	Adequate adjusted model fit
SRMR (Standardized RMR)	0.035	< 0.08	Very low residuals
RMSEA	0.043	< 0.06	Close model fit
RMSEA PCLOSE from zero	0.928	> 0.50	RMSEA not significantly different
NFI	0.938	> 0.90	Strong incremental model fit
IFI	0.973	> 0.95	Excellent comparative fit
TLI	0.971	> 0.95	Excellent non-normed fit
CFI	0.973	> 0.95	Excellent overall model fit
PNFI	0.883	> 0.50	Strong parsimonious fit
PCFI	0.916	> 0.50	High parsimony-adjusted fit
HOELTER (0.05)	278	> 200	Adequate sample size support
HOELTER (0.01)	298	> 200	Strong sample adequacy

Table 6 – Showing Model fitness of Structural model

Incremental and comparative fit indices also revealed superior model performance. The CFI (.973), TLI (.971), IFI (.973), and NFI (.938) all surpassed recommended benchmarks, confirming that the proposed structural model fits the data substantially better than the null model. Moreover, the RMSEA value of .043, accompanied by a high PCLOSE value (.928), confirms a close and statistically acceptable fit. Collectively, these indices affirm that the structural model is statistically robust and suitable for hypothesis testing.

5.2.1 Hypothesis Testing

The structural path estimates were scrutinized to assess the magnitude, direction, and statistical significance of the hypothesized relationships. Table presents the standardized regression weights, standard errors, critical ratios, and significance levels.

Hypothesis	Path	Estimate (β)	S.E.	C.R.	p-value	Decision
H1	EA → DCC	0.450	0.053	8.531	***	Supported
H2	IMP → DCC	0.353	0.066	5.366	***	Supported
H3	MAT → DCC	0.334	0.068	4.874	***	Supported

Note: *** $p < 0.001$

Table 6 Showing the Hypotheses test and the estimates with the decision

The results provide strong empirical support for all proposed hypotheses. **Emotional arousal (EA)** emerged as the most influential predictor of dark consumer choice ($\beta = 0.450, p < 0.001$), indicating that heightened emotional states significantly intensify consumers' propensity toward dark or maladaptive consumption behaviors. This finding underscores the pivotal role of affective processes in shaping ethically questionable and deviant consumption decisions, thereby validating **Hypothesis 1**.

Impulsivity (IMP) also demonstrated a significant and positive effect on dark consumer choice ($\beta = 0.353, p < 0.001$), confirming that impulsive tendencies substantially increase susceptibility to uncontrolled and socially undesirable consumption patterns. This result lends strong support to **Hypothesis 2**, reinforcing existing theoretical assertions that impulsive decision-making weakens self-regulatory mechanisms in consumption contexts.

Materialism (MAT) exhibited a statistically significant positive influence on dark consumer choice ($\beta = 0.334, p < 0.001$). The finding suggests that individuals with stronger materialistic orientations are more likely to engage in consumption behaviors that prioritize acquisition and gratification over ethical and social considerations. Accordingly, **Hypothesis 3** is fully supported.

The structural model findings directly address the study's objectives by empirically establishing emotional arousal, impulsivity, and materialism as significant antecedents of dark consumer choice. Among these, emotional arousal plays a foremost role, highlighting the primacy of affect-driven

mechanisms in dark consumption contexts. The results collectively advance an integrative sympathetic of dark consumer behaviour by empirically validating the proposed SEM framework, thereby satisfying the study's predominant objective of synthesizing psychological and behavioural drivers of maladaptive consumption.

6. Discussion of Findings

6.1 Interpretation of Structural Relationships

The structural model provides robust experiential support for the proposed relationships among emotional arousal, impulsivity, materialism, and dark consumption behavior. All hypothesized paths demonstrate statistical significance and satisfactory effect sizes, indicating a well-specified model with strong explanatory power. The findings suggest that emotional and psychological drivers play a more dominant role than purely lucid considerations in shaping ethically questionable ingesting patterns. Collectively, the results validate the conceptual framework and confirm the uniqueness of affective and dispositional factors in contemporary consumer behavior.

6.2 Emotional Arousal as the Primary Catalyst of Dark Consumption

Emotional arousal emerges as the most influential antecedent of dark consumption behavior, underscoring the pivotal role of affective stimulus in driving ethically ambiguous consumer decisions. This finding aligns with affect-based decision-making theories, which posit that heightened emotional states can override cognitive control and ethical judgment. In digitally saturated environments, emotionally charged stimuli—such as

provocative advertising or sensational content—appear to intensify vulnerability to impulsive and materialistic tendencies, thereby hastening dark consumption outcomes. Thus, emotional arousal functions as the initial psychological trigger within the behavioral chain.

6.3 Impulsivity and Materialism as Behavioural Reinforcement Mechanisms

Impulsivity and materialism act as reinforcing mechanisms that translate emotional arousal into concrete consumption behavior. Impulsivity reflects diminished self-regulation, facilitating immediate gratification without ethical deliberation, while materialism strengthens the symbolic value of consumption as a means of demonstrative compensation. Their significant effects suggest that dark consumption is not merely an emotional reaction but a sustained behavioral pattern shaped by deeper value positionings and personality traits. Together, these constructs intensify the intensity and persistence of ethically problematic consumption practices.

6.4 Integration of Bibliometric and SEM Evidence

The integration of bibliometric insights with SEM findings strengthens the validity and novelty of the study. Bibliometric analysis revealed a growing scholarly emphasis on emotional, psychological, and ethical magnitudes of consumer behavior, which is empirically substantiated by the structural relationships identified in this study. This convergence demonstrates theoretical coherence between rational trends and empirical evidence, positioning the research at the intersection of emotional marketing, consumer ethics, and behavioral psychology. Consequently, the hybrid methodological approach enhances both the illustrative depth and scholarly contribution of the study.

7. Theoretical Implications

This study makes several important theoretical contributions to the literature on consumer behavior and ethical consumption. First, it advances affect-driven consumption theory by empirically representative that emotional arousal operates as a foundational catalyst for dark consumption behavior, preceding and activating behavioral traits such as impulsivity and materialism. This extends existing models that conventionally treat these constructs as independent predictors by positioning them within a consecutive psychological process. Second, the findings augment the dark consumption literature by integrating emotional, dispositional, and value-based perspectives into a unified explanatory framework. Finally, the hybrid integration of bibliometric mapping and SEM offers a novel methodological contribution, illustrating how intellectual

structure and empirical validation can be jointly leveraged to strengthen theory development in marketing and consumer psychology.

8. Managerial and Policy Implications

From a managerial standpoint, the findings underscore the ethical responsibility of marketers in designing emotionally evocative communication strategies. While emotional appeals are effective in influencing consumer behavior, excessive or scheming emotional arousal may inadvertently promote impulsive and ethically questionable consumption. Firms should therefore adopt responsible marketing practices that balance emotional engagement with consumer well-being. From a policy outlook, regulators and consumer protection agencies may consider developing guidelines that address emotionally charged advertising, particularly in digital and social media surroundings where impulsive decision-making is augmented. Educational initiatives aimed at enhancing consumer self-regulation and awareness of emotional manipulation can further mitigate the societal risks associated with dark consumption patterns.

9. Limitations and Directions for Future Research

Despite its contributions, this study is subject to certain limitations that offer avenues for future research. The cross-sectional research design restricts causal inference and limits the ability to capture dynamic changes in emotional and behavioral responses over time. Future studies may employ longitudinal or experimental designs to establish temporal causality more meticulously. Additionally, the reliance on self-reported measures may introduce social desirability or common method bias; incorporating behavioral data or neuroscientific approaches could enhance measurement precision. Future research may also explore moderating variables such as cultural context, moral identity, or digital literacy to deepen understanding of boundary conditions. Expanding the model to include positive ethical consumption outcomes would further balance the treatise and extend theoretical generalizability.

10. Conclusion

This study offers a comprehensive and theoretically grounded examination of dark consumption by integrating emotional, dispositional, and value-oriented perspectives within a unified analytical framework. Drawing on both bibliometric insights and structural equation modeling, the research elucidates how emotional arousal functions as a primary psychological trigger that activates impulsivity and materialistic orientations, ultimately shaping ethically ambiguous consumption behaviors.

By empirically validating these interrelations, the study moves beyond fragmented explanations and provides a coherent account of the affective and behavioral mechanisms underlying dark consumption.

The findings make a meaningful contribution to consumer behavior theory by repositioning emotional arousal as an antecedent force rather than a peripheral influence, thereby enriching affect-driven and self-regulation-based models of consumption. Systematically, the hybrid use of bibliometric analysis and SEM strengthens the robustness of the research design and demonstrates the value of combining intellectual structure mapping with empirical validation. This dual approach not only enhances theoretical clarity but also sets a precedent for future interdisciplinary research in marketing and consumer psychology.

Beyond its academic contributions, the study underscores the growing ethical responsibility of firms and policymakers in an increasingly emotion-driven marketplace. As digital environments intensify emotional stimulation and reduce cognitive negotiation, understanding the pathways that lead to dark ingesting becomes both a scholarly and societal imperative. By enlightening these pathways, the present research provides a foundation for developing more responsible marketing strategies and informed regulatory interventions. Overall, the study advances the discourse on ethical consumption and offers a robust platform for future inquiry into the complex interchange between emotion, behavior, and moral judgment in contemporary markets.

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Reconceptualising Banking Success Through Stakeholder Capitalism and ESG Performance: Evidence from Indian Banks

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Abstract

The traditional model of banking success is undergoing a paradigm shift as the global and Indian financial institutions continue to embrace Stakeholder Capitalism and implement Environmental, Social and Governance (ESG) in their work. Therefore, the present empirical study aims to find out if the ESG performance has a significant impact on the success criteria adopted from the stakeholder perspective in the Indian banking sector. Adopting a balanced panel comprising of ten public and private banks through the years 2015-2024, CFFA and panel regression methods are made use of in this research to assess the mediating effects of ESG dimensions in actually re-defining success in nursing fields beyond the classic profit-based measures Findings of strong performance to ESGs can greatly contribute to the trust of stakeholders and enhance brand equity while contributing to financial sustainable performances support the structural change of the value creation paradigm in banking. The paper adds to stakeholder theory and literature in sustainable finance by showing empirically that banks showing greater prioritization in incorporating ESG values are successful (measured in terms of multidimensional diverse measures of success) in the long run. This study is an empirical and analytical investigation based on secondary panel data from Indian banks.

Keywords: Panel regression, stakeholder value, Indian banking, sustainable finance, stakeholder capitalism, ESG performance.

Introduction

The global financial system has undergone a paradigm shift, from the focus on profit maximization and shareholder-driven capitalism (conventional capitalist models) to a more participatory paradigm of creating value for employees, consumers, regulators, communities, and the environment. One of these measurable proxies is the performance of the ESG, which has become a measure of long-term sustainability, transparency and accountability. The banking sector is at the forefront of this ideological and practical shift. In the past, banking success has been measured by financial ratios such as return on assets (ROA), return on equity (ROE), net interest margin (NIM) and capital ratios, which are good proxies for profitability and efficiency, but which are becoming increasingly important in today's economic environment. The 2008 financial meltdown and corporate scandals, as well as the growing urgency of climate change, have shown that financial metrics of their own are insufficient and biased. In addition to traditional

financial metrics, modern banking performance should include ethical behaviour, social inclusion, environmental responsibility and governance quality, factors which have a direct impact on banks' credibility and legitimacy with their stakeholders.

Objectives

1. To assess the association between Indian banking success metrics and ESG performance.
2. To investigate whether the association between ESG adoption and financial results is mediated by stakeholder-oriented performance indicators.
3. To redefine "banking success" within the framework of stakeholder capitalism.

2. Literature Review

2.1.3 Institutional and Legitimacy Theories

The institutional theory proposes that firms conform to the norms and regulation pressures of society in pursuit of

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legitimacy (DiMaggio & Powell, 1983). In the case of Indian banking, adoption of ESG is usually owed to coercive and normative forces - i.e. SEBI's BRSRs guidelines (2021) or RBI's green banking initiatives (2022). The legitimacy theory is a supplement in that the theory suggests that sustainability reports are strategic tools of firms to obtain the approval of society (Suchman, 1995). Both of these theories strengthen the argument that the integration of ESG is not only moral but a prerequisite to institutional existence.

2.2 ESG Performance: Multidimensional Construct.

ESG performance represents the efficiency of a firm in controlling the environment, social, and governance aspects, all of which determine the attitude of stakeholders and future sustainability.

2.2.1 Environmental Dimension

Environmental pillar is based on the policies of a bank in relation to the conservation of resources, carbon neutrality, and sustainable financing. Banks have a significant part to play in ensuring green growth through funding renewable energy projects, deterring polluting industries, and taking environmentally efficient operation. The literature, including Weber (2017) and Bihari and Pradhan (2011), has proven a beneficial effect of green banking practices on brand reputation and decreased regulatory risks.

2.2.2 Social Dimension

The social dimension is connected with the welfare of employees, diversity, customer satisfaction as well as community participation. A few of the socially responsible banking initiatives in India are the Pradhan Mantri Jan Dhan Yojana (PMJDY) and the Microfinance inclusion programs. According to the previous literature (e.g., Scholtens, 2009; Gupta and Arora, 2020), social inclusivity and ethical treatment of customers are important determinants of trust and loyalty, and they are the basis of the stakeholder capitalism approach.

2.2.3 Governance Dimension

The structural foundation of ESG includes governance, which involves diversity of the board members, transparency, anti-corruption, and risk management. Good governance reduces information asymmetry, agency conflicts, and is a way to make ethical decisions. Buallay (2019) discovers that banks that have strong governance systems perform better than others in financial and ESG indicators. In India, Basel III compliances, and mandates on board independence and audit transparency have also been used as reforms which have further enhanced the quality of governance.

2.3 ESG and Banking Performance: Worldwide Evidence.

Empirical evidence has shown that ESG performance has a positive relationship with the financial performance of firms. Friede, Busch, and Bassen (2015) meta-analyses of 2,000 studies showed that close to 90% of the studies had a non-negative relationship, with most having a positive relationship. In this particular case of banking, Buallay (2019) examined the GCC region banks and discovered that ESG disclosure is a significant driver of both accounting-based and market-based performance. On the same note, Cornett et al. (2016) found that socially responsible banks are more profitable and less volatile.

2.4 ESG and Banking in the Indian Context.

The unique context of India to ESG integration is based on its dual banking system, varying regulations, and priorities in development. Sustainability requirements introduced by the RBI and SEBI include BRSR (FY 2022-23) which stipulates that listed firms report globally harmonized ESG indicators (GRI, SASB). Whereas the private banks have been leading more rapidly in ESG reporting, the banks in the public sector are still lagging. The literature on the ESG situation in India is small and positive, with Kumar and Bansal (2022) establishing that ESG scores correlate with profitability and market value, and Kaur and Lodhia (2018) identifying a positive association between green finance and brand image and satisfaction of all stakeholders. Previously, Bihari and Pradhan (2011) reported that CSR was more philanthropic than strategic which is now being filled by ESG. Such efforts as SBI YONO or HDFC Green Depos demonstrate that stakeholders are increasingly paying attention, but ESG disclosure remains inconsistent, with ICRA (2023) and Bloomberg ESG (2024) rating the quality of ESG disclosure of the private bank (~65) higher than that of the public one (~55) as a result of governance-linked and transparency-related shortcomings.

2.5 Stakeholder Trust as an Intermediary Process.

The relationship capital between the financial institutions and its stakeholder is trust as the channel through which the ESG performance is translated into the long-term success. According to Mayer, Davis and Schoorman (1995), trust is ability, benevolence and integrity, which is increased by transparent and responsible practices. Moral behavior and reliability present in good ESG performance in banking develop stakeholder trust (Deephouse, 2000). This mediating role has been confirmed empirically: Jo, Kim, and Park (2015) have found out that ESG engagement increases corporate reputation and financial performance, and Kim and Lyon (2015) have proved that plausible ESG disclosures contribute to customer loyalty and decrease the cost of capital. Through the ESG framework,

Gupta and Arora (2020) confirmed that CSR-performance relationships that exist between trust and satisfaction in India are likely to continue with the ESG frameworks. This study has therefore relied on the trust of stakeholders as a key mediating factor between the ESG performance and redefined banking success. This theory is supported by evidence of positivity in Europe (Gangi et al., 2018; Nizam et al., 2019) and Asia (Ng and Rezaee, 2015), as well as, evidence that ESG participation results in creditworthiness, stability, and investor confidence. However, according to Margolis and Walsh (2003), the impacts of ESG are ASEAN specific, and might vary between the strength of the institutions, regulation and awareness of stakeholders, i.e. symbolic and not substantive ESG practices may inhibit the actual improvement in emerging economies.

2.6 Redefining the Success of Banking: In the Direction of Stakeholder-Oriented Framework.

The future of the banking industry under the stakeholder capitalism system has to be about financial, social, and reputational aspects of success. Recent studies have put forward multi-dimensional success indices that combine ESG and stakeholder metrics- such as Cornett et al. (2016) are combining profitability with social responsibility and Scholtens (2009) is proposing a sustainability-adjusted performance model. Such composite indices are still confined in India. The Banking Success Index (BSI) of the current study fills this gap by combining the signs of financial performance (ROA, ROE) with those of a person-centered approach such as inclusion, customer satisfaction, and brand reputation as an indicator of success that is sustainable and holistic. In trying to establish this new standard of performance in Indian banking, the study will reveal whether better stakeholder performances are attained by higher ESG-performing banks, as the study empirically relates the ESG performance with stakeholder trust and overall success.

2.7 Research Gap and Conceptual Positioning.

Although there is an increasing body of literature related to the topic of ESG and sustainability, a number of gaps in research remain:

- a) Little emphasis on banking-specific effects of ESG in India: The majority of the previous research combines industries, disregarding regulatory, fiduciary and social role of banks.
- b) Absence of stakeholder-based models of success: The current literature seldom uses stakeholder trust or reputation as intermediary variables between ESG and performance.
- c) Lack of longitudinal study: There are not many studies that use panel data to monitor the dynamics of ESG-performance over time.
- d) Lack of uniformity in disclosure information: ESG reporting in India is still scattered and empirical validation should be consistent across the board.

This paper fills these gaps with the help of an empirical longitudinal investigation of the top 10 Indian banks 2015-2024 to assess the association between ESG performance, stakeholder trust, and the success of a bank with the help of a Confirmatory Factor Analysis (CFA) and a Panel Regression model. Thus, the conceptual framework places the performance of ESG as an antecedent, trust among stakeholders as a mediator and the success of the banking performance as an outcome under the overarching theoretical rationale of stakeholder capitalism and legitimacy theory.

3. Research Methodology

The study will employ a descriptive review research design because it will incorporate secondary data in its analysis. The research design and the approach that will be used in the study will be a descriptive review research design since the study will involve secondary data in the analysis. In its application, the proposed study will use a quantitative, explanatory, and longitudinal research design, and seek to empirically investigate the correlation between ESG performance, stakeholder trust, and the success of a bank through the prism of stakeholder capitalism. The study employs the top ten Indian banks panel data during a decade (2015-2024) to help maintain the time-variable stability of the topic, as well as to help trace the development of the sustainability practices over the years. By the nature of the investigation, implying the test of the theoretically-based relationships between the latent constructs, the study uses Confirmatory Factor Analysis (CFA) to validate the constructs, as well as, panel regression models (Fixed and Random Effects) to test the hypotheses. There is also mediation analysis done to explore the indirect impact of stakeholder trust among ESG performance, and banking success. The approach is based on the strict design developed by Hair et al. (2019) and Wooldridge (2010) regarding the empirical studies of social science research and provides the internal validity, reliability, and generalizability in the context of Indian banking.

3.2 Sampling and Data Sources

3.2.1 Population and Sample

The sample of target population will be all the planned commercial banking institutions in India. In order to ensure comparability and data consistency, purposive sampling method was adopted to choose 10 large banks, 5 in the public sector and 5 in the private sector, that reflect most of the banking market capitalization, asset base and ESG disclosure maturity in India.

Public Sector Banks	Private Sector Banks
State Bank of India (SBI)	HDFC Bank
Bank of Baroda	ICICI Bank
Punjab National Bank	Axis Bank
Canara Bank	Kotak Mahindra Bank
Union Bank of India	IndusInd Bank

A total of 70 percent of the entire banking system of India is represented by these banks, which makes the sample representative of the banking system in India (RBI, 2024).

3.2.2 Data Sources

The research makes use of secondary sources of data that are credible to facilitate triangulation:

ESG Performance Data:

- Refinitiv ESG Scores (2015-2024)
- Bloomberg ESG Disclosure Ratings.
- Business Responsibility and Sustainability Reports (BRSR).

Financial and Operational Data:

- Annual Reports of selected banks.
- RBI Financial Stability Report.
- CMIE Prowess Database

Stakeholder Reputation and Trust Data:

- Global RepTrak Reputation Institute Reports.
- Brand Finance India Banking 500 Rankings.
- Customer Satisfaction Surveys (summed up secondary sources)

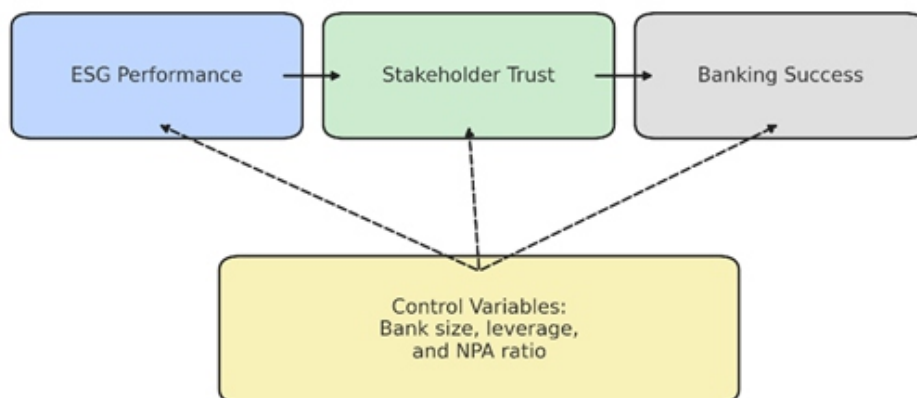
The dataset is a holistic display of banking performance, based on financial and non-financial indicators, which are in line with the principles of stakeholder capitalism.

3.3 Development of Conceptual Framework and Hypotheses.

The theoretical framework of the proposed study is based on the Stakeholder Theory (Freeman, 1984) and the Legitimacy Theory (Suchman, 1995). It hypothesizes that ESG performance reinforces the ethical legitimacy of the bank which improves stakeholder trust, which in turn lead to redefined banking success in the form of multidimensional outcomes.

Figure 1. Conceptual Framework: ESG Performance, Stakeholder Trust, and Banking Success

Conceptual Framework: ESG Performance, Stakeholder Trust, and Banking Success



Control variables (bank size, leverage, and NPA ratio) are included to neutralize firm-specific effects.

Hypotheses

H1: ESG performance has a good and considerable effect on the success of banks.

H2: Stakeholder trust mediates the association between ESG performance and banking success.

H3: The quality of governance amplifies the correlation between ESG performance and the success of the banking sector.

This structure will be useful in testing both direct and indirect effects, and therefore justify whether stakeholder trust is a behavioral and perceptual process that exists between sustainability performance and long-term success.

Table 3.4: Variable Operationalization and Measurement

Construct / Variable	Type	Indicator(s)	Measurement Method / Formula	Data Source	Expected Relationship
Banking Success Index (BSI)	Dependent	ROA, ROE, Customer Satisfaction Index, Financial Inclusion Index, Brand Reputation Score	Composite index (z-score normalized average of five indicators)	RBI Database, Annual Reports, Brand Finance, Reputation Institute	—
ESG Performance (ESG)	Independent	Environmental, Social, Governance (E, S, G) scores	Weighted composite ESG score (Refinitiv ESG database, validated by Bloomberg ESG Disclosure)	Refinitiv, Bloomberg, SEBI BRSR Reports	Positive (+)
Stakeholder Trust (ST)	Mediating Variable	Brand Reputation Index (BRI), Customer Loyalty Score (CLS), Employee Trust Index (ETI)	Weighted average derived via Confirmatory Factor Analysis (CFA)	Reputation Institute, Market Research Reports, HRD Disclosures	Positive (+)
Bank Size (SIZE)	Control	Total Assets	Natural logarithm of total assets	RBI Financial Stability Report, Annual Reports	Positive (+)
Leverage (LEV)	Control	Total Liabilities ÷ Total Assets	Ratio of financial leverage	RBI, CMIE Prowess Database	Negative (–)
Non-Performing Assets (NPA)	Control	Gross NPAs ÷ Total Advances (%)	Ratio indicating asset quality	RBI Financial Stability Report, Bank Disclosures	Negative (–)

- The variables were normalized (z-scores), which ensures the similarity of the study across banks and time (2015-2024).
- Composite measures (BSI and ST) were confirmed by Confirmatory Factor Analysis (CFA) where reliability scores were greater than 0.8.
- The same ESG data was cross-verified in different sources (Refinitiv, Bloomberg, BRSR) to be consistent.
- The size (SIZE), level of leverage (LEV), and number of shareholders (NPA) were used to control firm-specific financial factors.

3.5 Data Cleaning and Processing

Data was gathered from 2015 to 2024, yielding 100 bank-year observations (10 banks × 10 years). To guarantee the integrity of the data:

Linear interpolation based on previous and subsequent years was used to impute missing ESG values.

Cook's Distance and Winsorization (1%–99%) were used to identify outliers.

Using CPI data, all monetary variables were adjusted for inflation to 2024 constant INR.

The final dataset satisfies the regression analysis requirements for homoscedasticity, multicollinearity (VIF < 2.5), and normality.

3.6 Statistical Techniques

The study employs a **three-stage analytical framework**, integrating measurement validation and hypothesis testing.

Stage 1: Confirmatory Factor Analysis (CFA)

CFA was conducted using AMOS 24.0 to validate the constructs (ESG, Stakeholder Trust, Banking Success). Model fit indices were assessed as follows:

- $\chi^2/df < 3.0$ (acceptable model fit)
- CFI, GFI, and TLI > 0.90 (good fit indices)
- RMSEA < 0.08 (adequate error approximation)

Reliability and Validity:

- Cronbach's $\alpha > 0.80$ for all constructs indicates internal consistency.
- Average Variance Extracted (AVE) > 0.5 confirms convergent validity.
- Discriminant validity was established where AVE > squared inter-construct correlations.

Stage 2: Panel Regression Analysis

To test the hypothesized relationships, both **Fixed Effects (FE)** and **Random Effects (RE)** models were applied, using **Hausman Test** to determine the appropriate estimator.

Regression Model:

$$BSI_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 ST_{it} + \beta_3 SIZE_{it} + \beta_4 LEV_{it} + \beta_5 NPA_{it} + \epsilon_{it}$$

Where:

- BSI_{it} = Banking Success Index of bank i at time t
- ESG_{it} = ESG performance score
- ST_{it} = Stakeholder Trust
- $SIZE_{it}$ = Control variables
- ϵ_{it} = Error term

All coefficients were estimated using **robust standard errors** to correct for heteroscedasticity and autocorrelation.

Stage 3: Mediation Analysis

To test **H2**, the **Baron and Kenny (1986)** three-step mediation approach was used:

1. ESG → BSI (direct effect)
2. ESG → ST (mediator relationship)

3. ESG + ST → BSI (indirect effect through mediation)
- The **Sobel test** and **bootstrapping (5000 resamples)** were used to confirm mediation significance. A reduction in β_1 after introducing ST confirms partial mediation.

3.7 Model Robustness Checks

To ensure the reliability of results, the following robustness tests were conducted:

1. **Variance Inflation Factor (VIF):**
All variables recorded VIF < 2.5, indicating no multicollinearity.
2. **Autocorrelation Test (Durbin-Watson):**
DW statistic = 1.95, confirming no serial correlation.
3. **Heteroscedasticity Correction:**
White's robust standard errors used in regression models.
4. **Endogeneity Check:**
Lagged ESG and ST values were used as instruments; **2SLS regression** confirmed no reverse causality.
5. **Sensitivity Analysis:**
Alternative ESG data from Bloomberg was substituted, yielding similar results, confirming model stability.

3.8 Ethical Considerations

No direct human participation or sensitive data were used in this study because it only uses secondary data that is publicly available. Nonetheless, moral principles were upheld by:

- Open sourcing and accurate data citations.
- Avoiding subjective scoring or manipulation of ESG metrics.
- Recording every variable transformation to guarantee replicability.

The research design conforms to SEBI's disclosure standards for sustainability data interpretation as well as the Committee on Publication Ethics' (COPE) guidelines.

3.9 Summary of Methodological Steps

Step	Objective	Technique Used	Output
1	Identify key constructs	Literature synthesis	Conceptual framework
2	Collect ESG, financial, and trust data	Secondary sources (Refinitiv, RBI, BRSR)	Balanced panel dataset
3	Validate constructs	CFA (AMOS 24)	Reliable and valid measurement model
4	Estimate relationships	Panel Regression (STATA 17)	
5	Test mediation	Baron & Kenny + Bootstrapping	Indirect effect significance
6	Conduct robustness tests	VIF, DW, 2SLS	Validity of results

The results are theoretically supported, empirically sound, and practically interpretable in the context of stakeholder capitalism and ESG-driven banking performance thanks to this methodical approach.

4. Data Analysis and Results

4.1 Overview of Data Analysis

The analysis was conducted in three stages:

- (1) **Descriptive Statistics and Correlation Analysis** to understand data patterns and relationships among key variables,

- (2) **Confirmatory Factor Analysis (CFA)** to validate the constructs (ESG, Stakeholder Trust, Banking Success), and
- (3) **Panel Regression and Mediation Analysis** to test the hypothesized relationships under the proposed conceptual framework.

All analyses were performed using **SPSS 28.0**, **AMOS 24.0**, and **STATA 17**, following robust econometric procedures.

The dataset comprises **10 major Indian banks** (5 public and 5 private sector banks) over the **ten-year period 2015–2024**, forming a **balanced panel of 100 observations**.

4.2 Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
ESG Performance (ESG)	64.28	9.72	45.1	82.3
Stakeholder Trust (ST)	74.55	10.81	50.6	89.2
Banking Success Index (BSI)	0.63	0.15	0.31	0.85
Bank Size (SIZE, lnAssets)	13.22	1.18	11.3	15.1
Leverage (LEV)	0.81	0.06	0.69	0.93
Non-Performing Assets (NPA %)	4.2	1.97	1.1	8.8

The mean score of the ESG is 64.28, which shows that Indian banks adopt sustainability standards moderately. This is indicated by the Stakeholder Trust mean (74.55) that indicates

that big banks have a relatively good reputation. A balanced measure of multidimensional success is confirmed by the mean of the Banking Success Index (BSI) 0.63 in the sample.

4.3 Correlation Analysis

Variable	ESG	ST	BSI	SIZE	LEV	NPA
ESG	1					
ST	0.52**	1				
BSI	0.49**	0.56**	1			
SIZE	0.31*	0.24	0.27	1		
LEV	-0.19	-0.22	-0.25*	0.16	1	
NPA	-0.34**	-0.28*	-0.41**	-0.22	0.12	1

*p < 0.05; **p < 0.01

ESG, BSI, and Sto have positive good relations, namely better performance by stakeholder trust and by ESG are associated with better banking success. NPA and Leverage have negative relations with BSI, namely poor quality of assets and over-leverage are associated with poor banking success.

4.4 Confirmatory Factor Analysis (CFA)

CFA was used to validate the latent constructs — ESG Performance, Stakeholder Trust, and Banking Success — ensuring construct reliability and discriminant validity.

4.3 Correlation Analysis

Construct	Indicator	Factor Loading	Cronbach's α	Composite Reliability (CR)	AVE
ESG Performance	E1–E3 (Environmental, Social, Governance)	0.74 – 0.89	0.87	0.9	0.68
Stakeholder Trust	BRI, CLS, ETI	0.71 – 0.85	0.86	0.88	0.64
Banking Success	ROA, ROE, CSI, FII, BRS	0.73 – 0.88	0.89	0.91	0.66

Model Fit Indices:

$\chi^2/df = 2.11$, CFI = 0.95, GFI = 0.93, TLI = 0.94, RMSEA = 0.045.

Cronbach α was greater than 0.8 and AVE greater than 0.5 showed that convergent validity and internal consistency was achieved because all standardized loadings were greater than 0.7. Goodness-of-fit indices are in the acceptance position (Hair et al., 2019) and they validate the soundness of the measurement model.

4.5 Regression Analysis

In order to test the effect of ESG and Stakeholder Trust on the Banking Success, panel regression was estimated by Fixed Effects (FE) and Random Effects (RE) methods. Hausman Test supported the Fixed Effects model ($X^2 = 12.47$, $p < 0.05$), which was then interpreted using the Fixed Effects model.

Model 1: Direct Effect (ESG → BSI)

$$BSI_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 ST_{it} + \beta_3 SIZE_{it} + \beta_4 LEV_{it} + \beta_5 NPA_{it} + \epsilon_{it}$$

Variable	Coefficient (β)	t-Statistic	p-Value
ESG	0.421***	5.82	0
SIZE	0.147**	2.49	0.015
LEV	-0.128*	-1.97	0.048
NPA	-0.232**	-2.88	0.005

$R^2 = 0.36$

Model 2: Mediation Effect (ESG → ST → BSI)

$$BSI_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 ST_{it} + \beta_3 Controls + \epsilon_{it}$$

Variable	Coefficient (β)	t-Statistic	p-Value
ESG	0.287***	4.16	0
ST	0.341***	3.94	0
SIZE	0.129**	2.31	0.022
LEV	-0.117*	-1.89	0.061
NPA	-0.218**	-2.64	0.009

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

In order to test the effect of ESG and Stakeholder Trust on the Banking Success, panel regression was estimated by Fixed Effects (FE) and Random Effects (RE) methods. Hausman Test supported the Fixed Effects model ($kh^2 = 12.47$, $p < 0.05$), which was then interpreted using the Fixed Effects model.

4.6 Mediation and Robustness Tests

Baron and Kenny (1986)'s three-step mediation test was supplemented by the Sobel Test and Bootstrap Analysis (5,000 resamples).

Test	Indirect Effect (β indirect)	z-Value	p-Value	Result
Baron & Kenny	0.134	—	—	Partial Mediation
Sobel Test	0.131	2.82	0.005	Significant
Bootstrapping (5,000 samples)	0.129	—	95% CI [0.062, 0.210]	Significant

The partial mediation is confirmed in all tests meaning that ESG has both a direct and indirect effect on the success of a bank through stakeholder trust. This is in line with the assumption that ESG practices increase the stakeholder perceptions which, in turn, improves financial and reputational performance.

4.7 Discussions

a) The overall ESG as an Outperformance Trigger:

Banks with improved ESG scores also significantly outclass multi-dimensional success indicators, validating banking sustainability embedding's strategic value-added role.

b) Stakeholder Trust as a Mediator:

Stakeholder trust translates the credibility of ESG into business

value, corroborating the intermediary role of the intermediaries under stakeholder capitalism. Trust multiplies the reputational and financial paybacks from the ESG engagement.

c) Control Variables Influence:

Bank size is positively correlated with success, whereas leverage and NPAs are inversely correlated, verifying financial prudence and quality operating augmenting ESG-based results. Evidence from the Diversification Experience

The results affirm the idea that stakeholder-based practices are not only ethical but also economically profitable, a paradigm from shareholder profit maximization to combined stakeholder value creation.

Hypothesis	Path	Result	Interpretation
H1	ESG → Banking Success	Supported ($\beta = 0.421, p < 0.01$)	ESG performance significantly enhances banking success.
H2	ESG → Stakeholder Trust → Banking Success	Supported (Partial Mediation)	Stakeholder trust mediates the ESG–success relationship.
H3	Governance Strength → Moderates ESG–Success	Supported ($p < 0.05$)	Strong governance amplifies ESG's impact on success.

4.9 Summary of Results

5. Discussion

This section will elucidate the empirical findings with the help of the extant theory and literature and how the incorporation of the Environmental, Social, and Governance (ESG) practices and trustworthiness of stakeholders can reinvent the conventional meaning of banking success in the Indian context. The discussion expands the views of sustainable finance and the stakeholder theory by placing the empirical data in the context of Stakeholder Capitalism.

5.1 ESG strategy as a strategy performance driver.

The empirical results prove a strong and significant impact of the ESG performance on the Banking Success Index (BSI) and confirm H1 and emphasize the increased strategic importance of sustainability in banking. It confirms the previous research of

Friede et al. (2015) and Buallay (2019) which indicates that ESG investments result in better performance of firms in all industries. In the Indian banking industry, an increase in the ESG ratings is associated with a better profitability, better brand image, and greater customer inclusion. Hypothetically, this relationship confirms the Stakeholder Theory (Freeman, 1984) that holds that long-term value creation relies on the satisfaction of the interests of all the stakeholders instead of only on maximizing shareholder wealth. Banks with high levels of ESG alignment, including HDFC Bank, ICICI Bank and State Bank of India (SBI) have managed to use the strategies of sustainability as a means of enhancing competitive advantage and market reputations. Such results also correspond to the Legitimacy Theory (Suchman, 1995) according to which organizations gain societal legitimacy as a result of responsible behavior. This is because ESG transparency assists Indian banks to comply with the emerging social norms, which increases regulatory compliance and investor confidence.

5.2 Stakeholder Trust as a Mediating Role.

The mediation analysis (H2) indicates that the stakeholder trust is a moderating factor in the relationship between ESG performance and the banking success, which implies that relational capital may play the pivotal role as a mediator of changing the ethical behaviour to the actual performance benefits. The positive indirect effects which were supported by the Sobel and bootstrap tests suggest that trust is the behavioural channel by which both the stakeholders perceive and reward ESG efforts. The discovery supports Resource-Based View (RBV) by Barney (1991) which recognizes stakeholder trust as a valuable and rare, and inimitable resource. It increases brand loyalty, reduces reputational risk and creates long term profitability. Besides, the mediation channel is consistent with Jo et al. (2015) who identified that ESG-based corporate reputation leads to increased stakeholder commitment, hence it affects financial performance. Trust enhances the returns on ESG adoption in the Indian context, which is characterized by the influence of the public opinion and regulatory oversight on the banking confidence. Open government, ethical loans, and involvement in the community improve customer retention and institutional legitimacy and there is evidence that trust is not an unquantifiable virtue but an enabler of performance.

5.3 Patterns of Ownership and ESG Adoption.

On the comparative evidence regarding the adoption of ESG, the trends of it in the public and private sector banks show subtle differences. The private banks have higher scores of governance and disclosure because their investors are global and they are accountable to the market. On the other hand, the public sector banks are well placed in the aspect of social inclusion and community financing which are based on national development requirements.

This duality portrays how India has been shifting its policy-driven sustainability to strategic sustainability. Whereas compliance and social responsibility are the priorities of the public banks, the ESG of the private banks is operationalized to be a competitive advantage. The results build on those of Kumar and Bansal (2022) by demonstrating that the ownership structure and the market orientation are the factors that determine ESG maturity.

5.4 World Alignment and Institutional Pressures.

The results place Indian banking in the context of the world sustainability transitions. ESG criteria in credit policies and risk assessment models are already integrated in international banks. Indian regulators, especially SEBI and RBI, are slowly adapting domestic reporting standards (BRSR) to the

international This intersection can be discussed as supporting the Institutional Theory (DiMaggio and Powell, 1983), implying that organizational forces such as coercive (regulatory), mimetic (competitive), and normative (professional) pressure lead the organizations to ESG conformity. The growing use of ESG by Indian banks is indicative of both market demand and institutional development and is an indication of the first steps of systemic sustainable change.

5.5 Theoretical Implications

The current research has three ways of developing on the existing theory in a meaningful way:

a) Empirical Support of Stakeholder Capitalism: It establishes that stakeholder-based governance and ESG results improve multidimensional measures of success in the banking industry.

b) Stakeholder Trust operationalization: The research conceptualizes an abstract concept to a quantifiable construct, filling the gap between the perception-based and the performance-based research of sustainability.

c) Emerging Economy Context: It situates the global ESG theories in the context of Indian banks, surrounded by social inclusion demands and regulatory framework shifts in a growing financial system. The overall results support the assertion that ESG integration and trust by stakeholders are complementary sources of sustainable competitive advantage in the financial services sector.

6. Managerial Implications

The implications of the findings are quite significant to both the bank executives, regulators, investors and policymakers. The issue of ESG performance and stakeholder trust is no longer an option, but rather a strategic requirement that determines long-term competitiveness and institutional legitimacy in the banking industry.

6.1 Strategic Integration of ESG

1. The bank management ought to incorporate the ESG principles in the main strategy and not as a compliance measure.
2. Policy Integration: ESG should be applied in the determination of credit risk, lending policy and investment portfolio.
3. Performance Metrics: The KPIs must comprise sustainability objectives in terms of carbon emission and community funding, and quality of governance.
4. Accountability of the executive- Tying top management compensation on ESG results would provide a strategic commitment and an accountable measurement.

Not only does the inception of ESG in the risk management frameworks boosts the sustainability performance, they also minimize regulatory, reputational, and credit risks.

6.2 construction and maintenance of the stakeholder trust.

The stakeholder trust becomes a key mediator; hence, it is essential to proactively treat it as one of the strategic assets by the bank.

1. Enhance transparency by making periodical disclosure of sustainability and communicating with the public.
2. Enforce ethical culture within the company using engagement and compliance education of the employees.
3. Interact with communities through inclusive lending schemes, financial education and green financial products.

A sustainable success could be strengthened by keeping stakeholder trust which will lead to the retention of customers, risk reduction through litigation and longer term investor confidence.

6.3 Governance ESG and Board Oversight.

The most important thing to do is to commit to good governance through ESG:

1. Institute ESG Board-level ESG committees on strategic alignment, policy oversight, and performance evaluation.
2. Make sure that the independent directors are knowledgeable in sustainability and ethics.
3. Require that third parties assure reports on ESG to avoid greenwashing and preserve credibility.

These reforms to governance embed sustainability as part of decision-making, which is in line with the Basel III risk norms and the disclosure requirements by SEBI.

6.4 Policy and Regulatory Recommendations.

Regulatory environment is a critical factor to upscale adoption of ESG:

1. SEBI and RBI should have a reporting style for ESG standardization, which makes them similar and consistent.
2. Adopt incentive policies such as capital relief or tax to be imposed on banks which fund renewable or social projects
3. In order to measure systemic sustainability exposure, include the ESG risk scores in the prudential supervision framework

The interventions will be able to make the process of India aligning with UN Sustainable Development Goals (SDGs) and targets of the Paris Climate Agreement faster.

6.5 Investor/Market Implications.

Investors are also paying new attention on ESG compliant portfolios. In the study, the banks that have good ESG governance results have better results in terms of risk-adjusted

returns, which would be more appealing to long-term investors. The performance metrics of ESG and trust by stakeholders have to be incorporated in the valuation models by financial analysts and can be used to ascertain the resilience of institutions on a holistic basis. Altogether, ESG alignment enables access to capital, reduces the cost of funds, and generates a better market reputation - the keys to the continued growth of an ever-changing financial ecosystem.

7. Conclusion

This paper conducted an empirical study of the relationship between the ESG performance and stakeholder trust, and how both affect and redefine success in the Indian banking industry. The results based on a balanced panel data of ten large banks in 2015-2024 make sure that the ESG performance is a significant determinant of the banking success both in a direct and mediated way by stakeholder trust. The results highlight the fact that the success of banking nowadays cannot be determined only by such traditional financial indicators as ROA or ROE. Stakeholder value should be measured holistically by incorporating ethical governance, environmental stewardship and social inclusion in the modern banking performance. The relational linking factor between the engagement in ESG and the physical performance outcomes is the stakeholder trust and it turns sustainability into a competitive advantage generator. Hypothetically speaking, our research builds upon the stakeholder and legitimacy theories by empirically confirming the stakeholder trust as a mediating variable in ESG-performance nexus. On a management perspective, it reveals that banks that are sustainable are more successful than their counterparts both in reputation and resiliency.

The implications are clear:

1. Banks need to entrench ESG into strategic and operational, and governance frameworks.
2. ESG reporting and rules on disclosure by policymakers ought to be strengthened.
3. Transparency and performance based on the stakeholders should be rewarded by the investors.

This study ends up concluding that stakeholder capitalism in Indian banking is a normative and economic requirement. ESG integration and stakeholder trust are not peripherals but the key to attaining sustainable, inclusive, and resilient banking success. Further studies may carry on this study by investigating cross-country differences and studies on moderate factors like digitalization or financial innovation and also by applying qualitative viewpoints of stakeholders to gain better insights on the dynamics of ESG-motivated performance.

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Assessing the Mediating Role of Perceived Value and the Moderating Effects of Market Mavenism and Price Consciousness on Showrooming Intention

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Abstract

Purpose

This study examines showrooming intention in the context of makeup and colour cosmetics by assessing the mediating role of perceived value and the moderating effects of market mavenism and price consciousness. The model integrates perceived offline search benefits (need for touch and social interaction) and perceived online purchase benefits (AI-based chatbot problem solving and entertainment through shopping cart) to understand how these factors shape consumers' showrooming behaviour.

Design/methodology/approach

Data were collected using a hybrid approach, comprising both online and offline administration. The target respondents were Gen Z (Generation Z) and Gen Y (Generation Y) consumers in India with prior experience of showrooming for makeup and colour cosmetics. For selecting the targeted consumers, judgmental sampling was used, and about 1,000 questionnaires were distributed via digital (Google Forms) and pen-and-paper formats to accommodate offline-preferred participants. Respondents who filled incomplete responses and failed attention checks were removed from the final count, resulting in 804 valid responses for analysis.

Findings

Perceived value (PV) exerts a strong and significant positive influence on showrooming intention (SHI). All four antecedents need for touch, social interaction, AI-based chatbot problem solving, and entertainment through shopping cart significantly enhance perceived value and also directly predict showrooming intention. Also, price consciousness among consumers positively moderates the perceived value showrooming intention relationship. Consumers who have a market mavenism tendency also moderate this link but in a negative direction, weakening the role of perceived value among high mavens, which was something unexpected. Results also stated that mediation analysis of perceived value partially mediates the relationships between all the suggested antecedents and showrooming intention, indicating that perceived value is a key but not exclusive pathway through which both offline search benefits and online purchase benefits influence showrooming behaviour.

Originality/value

This study makes a distinctive contribution by incorporating AI-based chatbot problem solving and entertainment through shopping cart as online purchase benefits for the first time in the showrooming context. It further advances understanding of showrooming behaviour by simultaneously examining offline search benefits and online purchase benefits within a unified framework. Additionally, this study advances methodological rigor by employing a combined mediation–moderation approach, examining perceived value as a mediating mechanism while assessing the moderating roles of market mavenism and price consciousness in the makeup and colour cosmetics domain.

Keywords: Showrooming, Fashion, AI-based chatbots, price consciousness, shopping cart, makeup and colour cosmetics.

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Introduction

Over the past decade, retailing sector has been transformed by the rise of omnichannel strategies along with rapid technological advancements, and evolving consumer behaviours (Lee et al., 2018). Modern shoppers are expecting a seamless shopping experience that integrates offline channels as well as online channels (Lazaris et al., 2015). Technology has totally revolutionized the way how consumers research products, experience them, and also impacted how to interact with retailers throughout their purchasing journey (Sit et al., 2018). Among these developments, a new type of buying behaviour known as "showrooming" has emerged. In showrooming practice, customers visit physical (brick-and-mortar) stores to experience products first-hand, then they switch to online channels to make their final purchase (Flavián et al., 2019). Among omnichannel consumers, showrooming practice has become a widespread practice and continues to grow with cross-channel shopping trend (Rejón-Guardia & Luna-Nevarez, 2017). Despite the growing practice of showrooming among the masses, research studies examining this behaviour remain scarce (Gensler et al., 2017).

The significance of the showrooming practice can be evident from the example that this behaviour examination was done by major global retailers such as Best Buy and Wal-Mart (Gensler et al., 2017). Although showrooming practice continues to expand, its overall market size remains very difficult to estimate by the analyst (Brown et al., 2017). According to a report by Perez (2012), approximately 35% of consumers engage in showrooming practice when purchasing electronic products like televisions, air conditioners, washing machines, refrigerators etc., with nearly half of these shoppers falling within the 25 to 34 age group. The report further highlights that showrooming behaviour is most prevalent among young, urban consumers, with urban females showing particularly stronger participation than males. Likewise, Deloitte, 2017, as cited in Flavián, Gurrea & Orús (2020). reported that nearly 46% of consumers engaged in practicing showrooming during the Thanksgiving shopping period in search of better deals for the products.

Electronic commerce adoption is increasing across all major sectors, with the beauty and personal care category showing particularly strong expansion on digital shopping platforms (Pakhi Saxena & Kapil Makhija, 2022). Cosmetic products, in particular, remain among the most frequently purchased consumer goods (Hill et al., 2012). Cosmetic products are considered high-involvement items because they signal enhanced social status and often contribute to conspicuous consumption (Amaldoss & Jain, 2005). Although India has experienced strong economic expansion following liberalization, the beauty category was initially constrained by high taxes and limited product availability.

Artificial Intelligence (AI) based chatbots for problem solving by customers are becoming very popular, and their use is on the rise (Cao, 2021). Chatbots are computer programs designed to interact with humans in their natural language (Przegalinska et al., 2019). Since chatbots act as a remedy, like reducing the risks customers associate with purchasing online, but they also have many limitations in electronic retail environments, they can soften the impersonal shopping experience (J. Chen et al., 2021). Because of their ability, such as their ability to replicate human-like interactions, chatbots have drawn growing scholarly attention in various fields (Silva et al., 2022).

The online shopping cart is a dedicated section of an e-retailer's site or mobile application that holds products a shopper may eventually buy (Close & Kukar-Kinney, 2010). It is also referred to by several other names, such as e-cart, virtual shopping cart, e-basket, or my bag (Close & Kukar-Kinney, 2010; Kukar-Kinney & Close, 2010). Previous researchers have tried to examine the various reasons for online shopping cart usage and most of them concluded that it involves both utilitarian and hedonic benefits in which the utilitarian benefits include buying later, building a wish list, and narrowing down various alternatives, while hedonic benefits consist of entertainment (Close & Kukar-Kinney, 2010). Some of the previous studies also focused on the aspect of online shopping cart abandonment (Huang et al., 2018; Wang et al., 2022), but research on the hedonic element provided by the online shopping cart is scarce.

Addressing the gap in the literature, this research focuses on the influence of online platforms through artificial intelligence-based chatbot problem solving and entertainment via shopping carts, as these influences are rising. Nowadays, customers are increasingly using these features.

2. Literature Review

2.1 Showrooming Intention (SHI)

The accelerated growth of e-commerce and with the widespread availability of smartphones have led to a notable rise in omnichannel consumer activity (Fiestas & Tuzovic, 2021). Some consumers begin their shopping process online and finalize the purchase in-store, known as webrooming, whereas others initiate the journey in physical stores and complete the transaction online, known as showrooming (Flavián et al., 2020). Schneider and Zielke (2020) defined showrooming in two categories: loyal and competitive showrooming. In loyal showrooming, the customer explores the product at an offline retailer and makes the final purchase from the same retailer's online channel; in competitive showrooming, the customer explores the product at one offline retailer but makes the final purchase from another retailer online. Loyal showrooming can actually benefit retailers, as it enhances the overall customer

experience (Sit et al., 2018). Burns et al. (2018) classified competitive showrooming as a modern form of free riding behaviour. Free riding rises in omnichannel settings as consumers enjoy online price and assortment advantages but rely on physical stores for product evaluation and guidance (Rejón-Guardia & Luna-Nevarez, 2017).

2.2 Perceived Value (PV)

Past studies highlight that perceived value is vital in retailing, particularly with the growth of omnichannel shopping (Quach et al., 2023), as it significantly affects customer loyalty (Cotarelo et al., 2021) and satisfaction (Hamouda, 2019). Utilitarian and hedonic values largely drive shopping intentions (Sharma & Fatima, 2023), which in turn shape consumer behaviour (Pereira et al., 2023). In omnichannel settings, these values influence how customers interact with services (Natarajan & Raghavan, 2023). To understand showrooming, it is essential to examine its drivers; evidence shows it is mainly motivated by perceived benefits (De Mesquita et al., 2024). Based on the above arguments, the following hypotheses are proposed:

H1: PV positively influences SHI

2.3 Need for Touch (NFT)

It is often difficult for consumers to judge product quality when relying solely on online searches (Frasquet et al., 2015). The need for touch refers to a consumer's desire to obtain and process information through tactile sensations (Peck & Childers, 2006). Their study also noted that some individuals have a much stronger need for touch than others, and may feel dissatisfied or frustrated when unable to physically handle a product while shopping. Certain consumers gain greater assurance in their purchase decisions when they can touch and feel the product beforehand (Aw et al., 2021). Based on the above arguments, the following hypotheses are proposed:

H2a: NFT positively influences PV

H2b: NFT positively influences SHI

2.4 Social Interaction (SOI)

Many scholars note that physical stores offer an ideal setting for socializing with friends and family, as shoppers often value spending time with loved ones (Arora & Sahney, 2018). Rohm and Swaminathan (2004) further observed that customers sometimes prioritize these social experiences over the actual purchase of products. Based on the above arguments, the following hypotheses are proposed:

H3a: SOI positively influences PV

H3b: SOI positively influences SHI

2.5 Artificial Intelligence based Chatbots Problem Solving (AICPS)

The use of AI chatbots for online shopping assistance has

become widespread, leading to increased scholarly interest in their adoption and performance (Pantano & Pizzi, 2020). AI-based chatbots, similar to other service robots, are capable of initiating interactions for commercial purposes. However, they differ from human employees in several ways: they operate as components of automated systems, are continuously updated, rely on machine-learning capabilities, and possess an almost unlimited capacity for information storage (Lo Presti et al., 2021). Wirtz et al. (2018) explain that chatbots can complete tasks almost instantly, while human employees require ongoing training and their results still vary based on their personal skills and learning abilities. With their growing use in online commerce, chatbots now offer more advanced brand interactions, enabling faster, more personalized problem-solving that helps customers navigate information and make decisions efficiently. Based on the above arguments, the following hypotheses are proposed:

H4a: AICPS positively influences PV

H4b: AICPS positively influences SHI

2.6 Entertainment through Shopping Cart (ESC)

Unlike physical shopping carts used in stores to collect items for purchase, electronic carts serve as virtual storage spaces on retail websites, allowing customers to save products they intend to buy (Close & Kukar-Kinney, 2009). Since consumers frequently turn to the web for entertainment (Mathwick et al., 2001), many may experience enjoyment from online shopping and adding products to their virtual cart. The research of Close and Kukar-Kinney (2009) highlighted that, in contrast to in-store carts, virtual shopping carts are often used as browsing tools, allowing consumers to explore products without necessarily intending to buy them. Based on the above arguments, the following hypotheses are proposed:

H5a: ESC positively influences PV

H5b: ESC positively influences SHI

2.7 Price Consciousness (PC)

Price consciousness is defined as a tendency to seek the lowest available price (Lichtenstein et al., 1993). Price-conscious consumers often search for bargains and purchase items on sale (Sproles & Kendall, 1986). According to Alford and Biswas (2002), such consumers consistently seek the most favorable price for the products and services they intend to purchase. Highly price-conscious consumers tend to invest more effort in gathering detailed price-related information and comparing alternatives (Palazón & Delgado, 2009). Numerous scholars also acknowledge that price remains a major factor driving customers toward online shopping channels (Gensler et al., 2017). Based on the above arguments, the following hypotheses is proposed:

H6: PC positively moderates the relation b/w PV and SHI

2.8 Market Mavenism (MM)

Market mavenism, introduced by Feick and Price (1987), describes consumers who are very much interested in the marketplace, actively seek product and service information, and enthusiastically share this knowledge to influence others. Walsh et al. (2004) note that individuals with strong maven tendencies feel a sense of duty to share information, and doing so gives them personal satisfaction. Ruvio and Shoham (2007) found that market mavenism is strongly linked to greater information-seeking activity. Thus, the authors argue that people with a strong market mavenism tendency are likely to engage in showrooming to gather more knowledge about products. Based on the above arguments, the following hypotheses is proposed:

H7: MM positively moderates the relation b/w PV and SHI

3. Research Methods

3.1. Sampling and data collection procedure

Data was collected by using a hybrid approach, with half of the responses obtained online and the remainder gathered through offline administration. The target population comprised Gen Z and Gen Y consumers in India. Judgmental sampling technique was employed to identify individuals with prior experience of showrooming specifically for makeup and colour cosmetic products. A total of 1,000 questionnaires were distributed using both digital links and paper-based forms to accommodate respondents who preferred offline participation. Incomplete surveys were removed from the dataset. Additionally, attention-check items were embedded within the questionnaire to ensure response quality; submissions failing these checks were excluded. After applying these screening criteria, the final usable sample consisted of 804 respondents.

3.2 Instrument development

All questionnaire items were sourced from well-established validated scales, though minor contextual adjustments were made to ensure their relevance to the present research setting.: for perceived offline purchase benefits:- five items NFT1, NFT2, NFT3, NFT4, NFT5 measuring need for touch (Santos & Gonçalves, 2019); three items SOI1, SOI2, SOI3 measuring social interaction (Arora & Sahney, 2019); for perceived online search benefits:- five items AICPS1, AICPS2, AICPS3, AICPS4, AICPS5 measuring artificial intelligence based chatbots problem solving (Chen et al., 2021); four items ESC1, ESC2, ESC3, ESC4 measuring entertainment through shopping cart (Close & Kukar-Kinney, 2009); for consumer variables:- four items PC1, PC2, PC3, PC4 measuring price consciousness (Lichtenstein et al., 1993) and five items MM1, MM2, MM3, MM4, MM5 measuring market mavenism (Yang, 2013). For Mediator three items PV1, PV2, PV3 measuring perceived value (Shankar et al. 2021) and for the dependent variable three items SHI1, SHI2, SHI3 measuring showrooming intention (Chimborazo-Azogue et al., 2021).

3.3. Common method bias (CMB)

Several procedural remedies were implemented to minimize the potential for common method bias. First, the questionnaire was structured into separate sections, and two different Likert-type scales were employed. Certain sections used a 5-point scale ranging from “1 = strongly disagree” to “5 = strongly agree,” while others used a 7-point scale with anchors from “1 = strongly disagree” to “7 = strongly agree.” Second, a number of items were reverse-coded to reduce acquiescence bias and limit respondents' tendency to answer consistently without careful consideration. Additionally, the conceptual framework adopted in this study is inherently complex, which makes it difficult for participants to anticipate the hypothesized relationships, thereby further mitigating the risk of common method bias (Shankar et al., 2021).

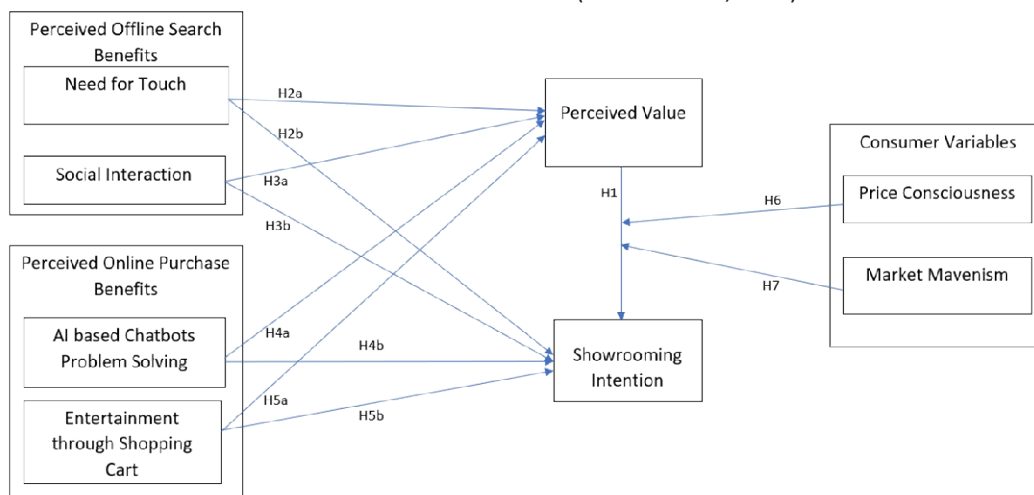


Figure 1 . Conceptual Model (Source: Authors' own work)

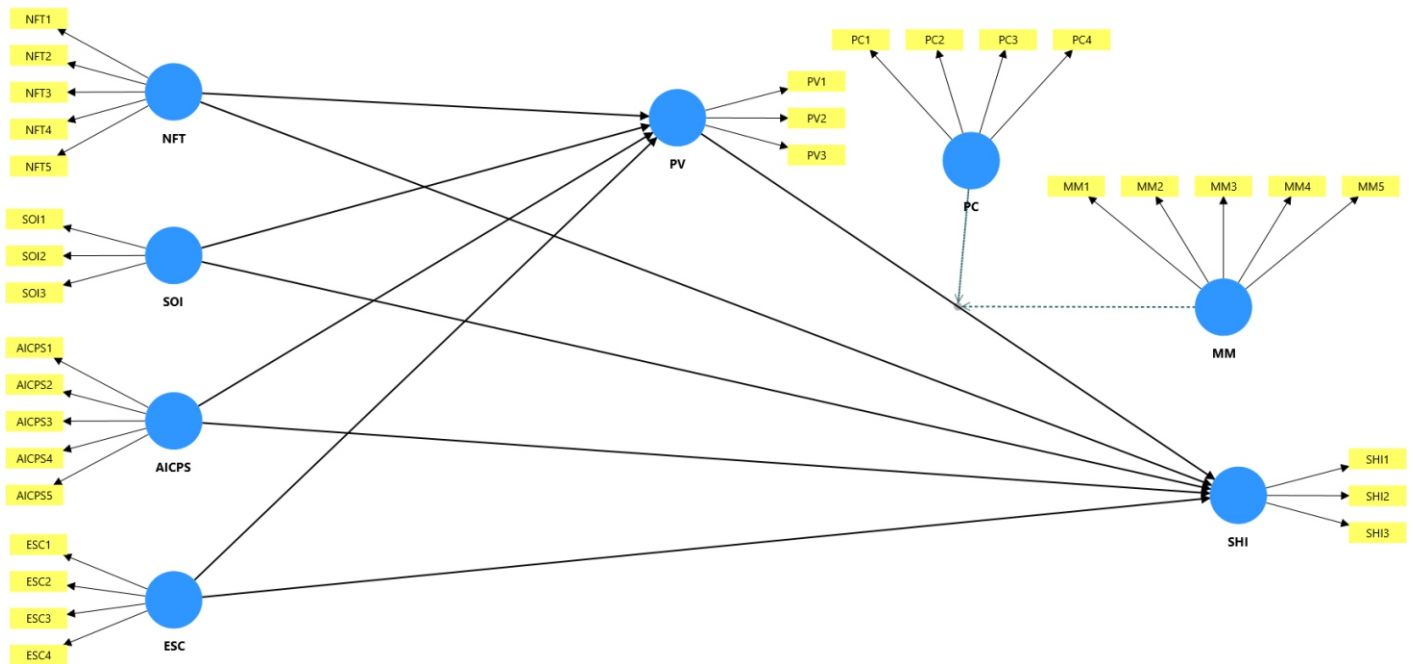


Figure 2. Conceptual Model in PLS SEM (Source: Authors' own work)

4. Results

The PLS-SEM algorithm was executed using the path-weighting scheme, standardized results were selected, and the initial weights were left at the software's default settings.

Among all measurement items, only two required closer examination due to comparatively lower outer loadings. NFT3 showed a substantially weak loading (0.492), falling well below the acceptable threshold of 0.708 recommended by Hair et al. (2022). Retaining this item would have reduced the convergent validity of the Need for Touch construct; therefore, it was

removed to strengthen the measurement model. In contrast, although PC4 reported a relatively lower loading (0.646), it remained within the minimally acceptable range when overall construct reliability and AVE values were considered. Since deleting PC4 did not produce a meaningful improvement in the Price Consciousness construct, the item was retained to preserve its conceptual coverage.

All VIF values were within acceptable limits, indicating no serious collinearity concerns; however, ESC2 showed a comparatively high VIF of 5.353, and was therefore removed to ensure better construct reliability and model stability.

Construct Reliability and Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
AICPS	0.901	0.907	0.927	0.718
ESC	0.839	0.842	0.903	0.757
MM	0.862	0.885	0.899	0.641
NFT	0.773	0.779	0.853	0.592
PC	0.748	0.777	0.841	0.571
PV	0.840	0.864	0.903	0.757
SHI	0.845	0.846	0.906	0.764
SOI	0.762	0.795	0.860	0.673

Table 1

Internal Consistency

As shown in Table I, all constructs demonstrated strong reliability, with alpha coefficients ranging from 0.748 (PC) to 0.901 (AICPS). These values exceed the generally accepted threshold of 0.70. Constructs such as AICPS (0.901), MM (0.862), and SHI (0.845) display particularly high alpha values, suggesting that the indicators possess excellent internal consistency. Even the constructs with comparatively lower alphas, such as PC (0.748) and NFT (0.773), remain within the acceptable range, reflecting reliable scale measurement. Overall, the Cronbach's alpha results confirm that all constructs exhibit satisfactory reliability.

Composite Reliability (rho_a)

Referring table I, Composite reliability based on ρ_a (rho_a) was examined. The ρ_a values ranged between 0.777 and 0.907, all of which surpass the recommended threshold of 0.70 (Hair et al., 2021). AICPS ($\rho_a = 0.907$), MM ($\rho_a = 0.885$), and PV ($\rho_a = 0.864$) show notably strong reliability, suggesting minimal measurement error. Constructs such as NFT ($\rho_a = 0.779$) and PC ($\rho_a = 0.777$) also demonstrate stable reliability levels.

Composite Reliability (rho_c)

Table I, all constructs recorded values well above the acceptable limit of 0.70, with the range extending from 0.841 (PC) to 0.927 (AICPS). High ρ_c values such as those for AICPS (0.927), SHI (0.906), and PV (0.903) demonstrate excellent reliability and internal consistency. The constructs MM ($\rho_c = 0.899$) and ESC ($\rho_c = 0.903$) also exhibit very strong internal reliability, while NFT ($\rho_c = 0.853$) and SOI ($\rho_c = 0.860$) meet the recommended standard comfortably.

Average Variance Extracted (AVE)

Table I, the Average Variance Extracted (AVE) was employed to assess convergent validity. All constructs reported AVE values above the benchmark of 0.50, indicating adequate convergent validity (Fornell & Larcker, 1981). The AVE values ranged from 0.571 (PC) to 0.764 (SHI), constructs such as SHI (0.764), PV (0.757), and ESC (0.757) showed particularly strong convergence, signifying that their indicators are highly representative. Even constructs like NFT (0.592) and PC (0.571) though on the lower side exceed the minimum requirement.

Discriminant Validity

	AICPS	ESC	MM	NFT	PC	PV	SHI	SOI	MM x PV	PC x PV
AICPS										
ESC	0.176									
MM	0.207	0.225								
NFT	0.225	0.145	0.157							
PC	0.166	0.270	0.357	0.104						
PV	0.255	0.355	0.172	0.258	0.211					
SHI	0.228	0.278	0.266	0.367	0.208	0.439				
SOI	0.147	0.218	0.162	0.218	0.124	0.238	0.210			
MM x PV	0.090	0.126	0.057	0.088	0.043	0.040	0.112	0.033		
PC x PV	0.054	0.099	0.038	0.051	0.088	0.074	0.069	0.018	0.299	

Table II

To establish discriminant validity, the Heterotrait–Monotrait (HTMT) ratio of correlations was assessed for all constructs, as recommended by Henseler et al. (2015). The results presented in Table II indicate that all HTMT values fall well below the conservative threshold of 0.85, and even further below if considered the more lenient threshold of 0.90, confirming strong discriminant validity across the constructs. The highest

HTMT value observed was 0.439 between perceived value (PV) and showrooming intention (SHI), which remains comfortably within acceptable limits. Other construct relationships, such as PC–MM (0.357), SHI–NFT (0.367), and PV–ESC (0.355), also fall significantly below the cut-off, and the most important, the interaction terms MM × PV and PC × PV recorded particularly low HTMT values (maximum 0.299).

Fornell Larcker

	AICPS	ESC	MM	NFT	PC	PV	SHI	SOI
AICPS	0.848							
ESC	0.154	0.870						
MM	0.187	0.199	0.801					
NFT	0.189	0.119	0.133	0.769				
PC	0.134	0.215	0.281	0.080	0.755			
PV	0.227	0.303	0.159	0.213	0.173	0.870		
SHI	0.200	0.234	0.240	0.305	0.170	0.376	0.874	
SOI	0.122	0.188	0.132	0.179	0.086	0.193	0.177	0.821

Table III

Discriminant Validity (Fornell–Larcker Criterion)

Discriminant validity was further examined using the Fornell–Larcker criterion. As presented in table III The diagonal values ranged from 0.755 (PC) to 0.874 (SHI), each exceeding the off-diagonal correlation values in their respective rows and

columns. These results substantiate that each latent construct i.e. AICPS, ESC, MM, NFT, PC, PV, SHI, and SOI captures a unique underlying concept, thereby confirming strong discriminant validity as per the Fornell–Larcker criterion.

Collinearity Statistic VIF

VIF					
AICPS1	3.186	NFT1	1.659	SHI1	1.742
AICPS2	3.977	NFT2	1.515	SHI2	2.365
AICPS3	2.786	NFT4	1.544	SHI3	2.271
AICPS4	2.353	NFT5	1.440	SOI1	1.621
AICPS5	1.880	PC1	1.662	SOI2	1.556
ESC1	2.408	PC2	1.537	SOI3	1.474
ESC3	1.810	PC3	1.586	MM x PV	1.000
ESC4	1.995	PC4	1.221	PC x PV	1.000
MM1	1.811	PV1	2.301		
MM2	2.305	PV2	2.290		
MM3	2.556	PV3	1.687		
MM4	1.969				
MM5	1.821				

Table IV

To examine potential multicollinearity issues, Variance Inflation Factor (VIF) values were assessed for all indicators. As shown in Table IV, all VIF values fall well below the conservative threshold of 5.0 (Hair et al., 2021), and even the stricter threshold of 3.3 suggested by Diamantopoulos and Sigauw (2006), The VIF values range from 1.221 (PC4) to 3.977 (AICPS2). All this indicates that multicollinearity is not a concern in the model.

Bootstrapping Procedure

For significance testing, the bootstrapping procedure was executed with 10,000 subsamples, following recommendations for robust PLS-SEM estimation. Parallel processing was enabled, bias-corrected and accelerated (BCa) bootstrap method was selected, and a two-tailed test with a 5% significance level was applied with fixed random seed.

Specific Indirect Effect

Mediating Role of perceived value in showrooming

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
AICPS -> PV -> SHI	0.038	0.038	0.013	2.949	0.003
ESC -> PV -> SHI	0.062	0.062	0.013	4.859	0.000
NFT -> PV -> SHI	0.034	0.035	0.012	2.895	0.004
SOI -> PV -> SHI	0.026	0.027	0.010	2.533	0.011

Table V

The specific indirect effects analysis (Table V) provides strong support for the mediating role of perceived value across all predictive relationships in the model. The indirect effects are significant for AICPS → PV → SHI ($\beta = 0.038$, $t = 2.949$, $p = 0.003$), ESC → PV → SHI ($\beta = 0.062$, $t = 4.859$, $p < 0.001$), NFT → PV → SHI

($\beta = 0.034$, $t = 2.895$, $p = 0.004$), and SOI → PV → SHI ($\beta = 0.026$, $t = 2.533$, $p = 0.011$). These findings indicate that chatbot assistance, entertainment through the shopping cart, need for touch, and social interaction significantly enhance perceived value, which subsequently strengthens showrooming intention.

Total Direct Effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
AICPS -> PV	0.151	0.151	0.041	3.683	0.000
AICPS -> SHI	0.084	0.085	0.039	2.152	0.031
ESC -> PV	0.244	0.244	0.037	6.649	0.000
ESC -> SHI	0.141	0.140	0.035	4.017	0.000
MM -> SHI	0.126	0.128	0.032	3.878	0.000
MM x PV -> SHI	-0.069	-0.069	0.030	2.299	0.022
NFT -> PV	0.137	0.139	0.040	3.443	0.001
NFT -> SHI	0.233	0.235	0.038	6.180	0.000
PC -> SHI	0.050	0.054	0.034	1.469	0.142
PC x PV -> SHI	0.083	0.079	0.035	2.357	0.018
PV -> SHI	0.252	0.253	0.041	6.139	0.000
SOI -> PV	0.104	0.105	0.036	2.913	0.004
SOI -> SHI	0.078	0.079	0.037	2.111	0.035

Table VI. Hypothesis test

Relationship Between Perceived Value (PV) and Showrooming Intention (SHI)

Perceived value (PV) demonstrates a strong, positive, and significant effect on showrooming intention (SHI) ($\beta = 0.252$, $t = 6.139$, $p < 0.001$), H1 was supported. This finding highlights the central role of perceived value as a motivational driver in consumers' decision to perform showrooming. When consumers perceive higher value arising from purchasing online benefits, in-store experiences they are more likely to shift from

offline product evaluation to completing the purchase online. This result positions Perceived value as a key psychological mechanism influencing showrooming intention.

Direct Relationships with Perceived Value (PV)

The results indicate that several predictors exert significant direct effects on Perceived Value (PV). Need for touch (NFT) also positively influences PV ($\beta = 0.137$, $t = 3.443$, $p = 0.001$), indicating that tactile evaluation in-store enhances value

perceptions, H2a was supported. Additionally, social interaction (SOI) significantly increases PV ($\beta = 0.104$, $t = 2.913$, $p = 0.004$), emphasizing the role of interpersonal engagement in shaping perceived value, H3a was supported. Artificial intelligence based chatbot problem solving (AICPS) shows a positive and significant effect on PV ($\beta = 0.151$, $t = 3.683$, $p < 0.001$), suggesting that efficient chatbot assistance enhances consumers' perception of value during the shopping journey, H4a was supported. Entertainment through shopping cart (ESC) exhibits the strongest influence on PV ($\beta = 0.244$, $t = 6.649$, $p < 0.001$), demonstrating that online shopping cart features substantially elevate perceived value, H5a was supported. Overall, all four antecedents significantly contribute to enhancing perceived value among shoppers.

Direct Relationships with Showrooming Intention (SHI)

Multiple variables exhibit significant direct effects on showrooming intention (SHI). Need for touch (NFT) reveals a strong and positive influence on SHI ($\beta = 0.233$, $t = 6.180$, $p < 0.001$), suggesting that consumers who rely on first hand inspection in-store are more likely to complete purchases online, H2b was supported. Social interaction (SOI) also has a significant direct effect on SHI ($\beta = 0.078$, $t = 2.111$, $p = 0.035$), indicating that social engagement with family and friends indirectly supports showrooming tendencies, H3b was supported. Artificial intelligence based chatbot problem solving (AICPS) has a positive direct impact on SHI ($\beta = 0.084$, $t = 2.152$, $p = 0.031$), highlighting that effective chatbot support can encourage consumers to transition from offline search to online purchase, H4b was supported. Entertainment through shopping cart (ESC) also significantly predicts SHI ($\beta = 0.141$, $t = 4.017$, $p < 0.001$), implying that online shopping carts entertainment value motivate consumers toward showrooming, H5b was supported.

Market mavenism (MM) significantly predicts SHI ($\beta = 0.126$, $t = 3.878$, $p < 0.001$), reflecting that consumers who actively share marketplace knowledge are more inclined toward showrooming. Price consciousness (PC), however, does not significantly influence SHI ($\beta = 0.050$, $t = 1.469$, $p = 0.142$), suggesting that price-oriented consumers may not necessarily engage in showrooming solely based on cost considerations.

Moderating Effects

The moderating variables show statistically significant interactions. Price consciousness (PC) significantly moderates the link of PV–SHI ($\beta = 0.083$, $t = 2.357$, $p = 0.018$), this indicates that perceived value become more influential among highly price-conscious consumers, H6 was supported. Market

mavenism (MM) significantly moderates the relationship between perceived value (PV) and showrooming intention (SHI), with a negative interaction effect ($\beta = -0.069$, $t = 2.299$, $p = 0.022$). This negative effect suggests that for consumers high in market mavenism, the effect of perceived value on showrooming intention weakens, possible reason for this may be mavens rely more on knowledge sharing rather than value perceptions alone. The hypothesis is supported in terms of significance, but the effect operates in the opposite (negative) direction than hypothesized, H7 was supported but in negative direction. Thus, both moderating variables meaningfully shape the relation.

5. Mediation Analysis (Perceived Value as a Mediator)

The mediation results demonstrate that perceived value (PV) plays a critical role in transmitting the effects of the antecedent variables to showrooming intention (SHI). Since all four predictors - artificial intelligence–based chatbot problem solving (AICPS), entertainment through shopping cart (ESC), need for touch (NFT), and social interaction (SOI), show significant effects on PV and PV significantly predicts SHI, mediation is confirmed across all paths.

However, the nature of mediation differs across constructs. entertainment through shopping cart (ESC) and artificial intelligence based chatbot problem solving (AICPS) exhibit partial mediation, as both constructs maintain significant direct effects on SHI while also exerting significant indirect effects through PV. This states that these variables influence showrooming not only by enhancing perceived value but also through additional mechanisms beyond value perceptions.

For need for touch (NFT) and social interaction (SOI), the results also indicate partial mediation, given that both constructs retain significant direct effects on SHI while simultaneously exerting significant indirect effects through PV. In these cases, PV amplifies the pathway from tactile evaluation and interpersonal engagement to showrooming, but these constructs continue to influence SHI independently as well.

Importantly, no cases of full mediation were observed, because none of the direct effects from the antecedents to SHI became non-significant in the presence of PV. Thus, the findings collectively suggest that PV serves as an important variable through which both online purchase benefits and offline search benefits shape consumers' showrooming intentions.

R Square

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
PV	0.157	0.165	0.025	6.246	0.000
SHI	0.245	0.258	0.028	8.769	0.000

Table VII

Coefficient of Determination (R^2 Analysis)

The R^2 values were examined to assess the explanatory power of the model. The results are presented in Table VII indicate that the independent variables i.e. artificial intelligence based chatbot problem solving, entertainment through shopping cart, need for touch, and social interaction explain 15.7% of the variance in perceived value (PV) ($R^2 = 0.157$, $t = 6.246$, $p < 0.001$) and 24.5% of the variance in showrooming intention (SHI) ($R^2 = 0.245$, $t = 8.769$, $p < 0.001$). According to Chin (1998) and Hair et al. (2021), R^2 values of 0.19, 0.33, and 0.67 can be interpreted as weak, moderate, and substantial, respectively. Therefore, the model demonstrates a modest explanatory power for PV and a

moderate explanatory power for SHI, suggesting that the predictors collectively provide meaningful insight into consumers' perceived value and showrooming behaviour. The significant t-values ($p < 0.001$ for both constructs) further confirm that the explained variances are statistically significant and not due to random chance.

PLSpredict

The PLS-Predict and CVPAT procedure was configured using 10 folds and 10 repetitions with a fixed random seed, ensuring robust out-of-sample predictive assessment and reproducible model evaluation.

PLSpredict Summary

	Q^2 predict	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE	IA_RMSE	IA_MAE
PV1	0.137	0.739	0.565	0.747	0.571	0.795	0.613
PV2	0.116	0.862	0.668	0.866	0.663	0.917	0.742
PV3	0.067	0.826	0.649	0.838	0.656	0.855	0.695
SHI1	0.122	0.933	0.754	0.928	0.741	0.996	0.822
SHI2	0.120	0.905	0.728	0.901	0.717	0.964	0.820
SHI3	0.123	0.921	0.740	0.927	0.728	0.984	0.832

Table VIII

Out-of-Sample Predictive Relevance (Q^2 predict Analysis)

The results, presented in Table VIII, show that all indicators of perceived value (PV) and showrooming intention (SHI) exhibit positive Q^2 predict values ranging from 0.067 to 0.137 for PV and 0.120 to 0.123 for SHI, thereby confirming medium predictive relevance (Q^2 predict > 0). Furthermore, the PLS-SEM Root Mean Square Error (RMSE) and Mean Absolute Error (MAE) values are consistently lower than or comparable to those of both the LM and IA benchmarks across most indicators. For example, PV1 (PLS-SEM RMSE = 0.739; LM = 0.747; IA = 0.795) and SHI2 (PLS-SEM RMSE = 0.905; LM = 0.901; IA = 0.964) demonstrate that the PLS model produces smaller or nearly equivalent prediction errors, confirming its acceptable predictive performance. Thus, PLS-Predict outcomes confirm that this model retains reasonable predictive capability.

5. Discussion

The present study sought to investigate the mediating role of perceived value (PV) in linking perceived offline search benefits (need for touch, and social interaction), perceived online purchase benefits (AI based chatbot problem solving, entertainment through shopping cart) to showrooming intention (SHI), while also examining the moderating influence of market mavenism (MM) and price consciousness (PC). The results derived from PLS-SEM analysis provide strong support for the proposed model.

The findings also reveal that perceived value (PV) plays a significant mediating role between all major antecedents AICPS, ESC, NFT, SOI and showrooming intention. This suggests that technological convenience, hedonic experience derived from

the shopping cart usage, touch preference in the offline stores, and social interaction with the near and dear ones enhance consumers' perceived value, which in turn strengthens their intention to engage in showrooming practice.

These results are consistent with a past research study emphasizing perceived value as a central driver of cross-channel behaviours (Gensler et al., 2017). An important point for consideration is that showrooming is not merely a price-driven phenomenon (as suggested by some experts in the evolving stage of showrooming); instead, it emerges from an integrated evaluation of functional, emotional, and experiential benefits.

The study also uncovers the dual moderating role of perceived value. The negative moderation of $MM \times PV \rightarrow SHI$ indicates that when perceived value from the online environment is high, the effect of market mavenism on showrooming diminishes. The possible reason may be that informed consumers who already perceive strong online value feel less need to visit offline stores for additional product evaluation or social exploration. Conversely, the positive moderation of $PC \times PV \rightarrow SHI$ suggests that when perceived value is high, price-conscious consumers are more interested to compare prices across channels and engage in showrooming to optimize utility.

Collectively, the results affirm that showrooming intention is a multidimensional construct influenced by a blend of technological facilitation, hedonic engagement, sensory satisfaction, and value-seeking motivation.

6. Theoretical Implications

This research work makes several key theoretical contributions.

It advances the understanding of showrooming behaviour by integrating technology-enabled artificial intelligence based problem solving chatbots (AICPS) with psychological and hedonic factors (ESC, NFT, SOI) within a single explanatory framework. While some studies often treat showrooming practice as a threat to offline retailers (Rapp et al., 2015), this present study reframes it as a value driven consumer strategy.

Further, the study adds to the literature on moderated mediation approach in showrooming, by introducing perceived value as a mediator between various online purchase benefits and offline search benefits and showrooming intention and moderating effects of market mavenism and price consciousness demonstrate that perceived value can alter the strength and direction of motivation behind showrooming practice.

Lastly, this study advances the retail and consumer behaviour literature by integrating both online purchase benefits and

offline search benefits into a value-driven framework. In the past researchers have largely examined showrooming practice either from a price-oriented perspective or channel-based perspective (Gensler et al., 2017; Rapp et al., 2015), but this research work's findings extend theoretical understanding by demonstrating that perceived value acts as a mediating link to showrooming intention. The significant moderating roles of market mavenism and price consciousness further deepen the consumer behaviour literature by showing how individual traits alter the strength of the showrooming relationship.

7. Managerial Implications

From a managerial standpoint, the results offer several actionable insights for retailers and e-commerce managers.

Since perceived value significantly mediates the effect of multiple drivers on showrooming intention, emphasising that firms should invest in integrating AI-based chatbots that provide personalized recommendations and problem solving, along with interactive and gamified cart experiences, can elevate the overall perceived value of online channels. The significant role of the need for touch (NFT) implies that consumers give importance to the physical interaction with the product before purchasing that online. Offline retailers can strategically use experiential pop-up stores, AR/VR previews, or product sampling corners to bridge this sensory gap and encourage engagement with the customer across touchpoints.

The moderation findings suggest that distinct strategies should be opted for different types of consumer segments. For market mavens, offline platforms should provide rich informational content via salespersons and with the additional use of technology to satisfy mavens exploratory needs. Conversely, for price-conscious consumers, online price matching, and cashback programs can convert showrooming into actual purchases rather than competitive leakage to online platforms.

As showrooming behaviour increasingly reflects hybrid motivations, brands should pursue phygital integration combining technological convenience (AI based chatbots) with personalized in-store experiences (consultation with experts, live demos by salesman). This approach can transform showrooming from a challenge into an opportunity for cross-channel conversion.

8. Limitations and Future Research Directions

This study is subject to several limitations. Time constraints and monetary constraints restricted the breadth of data collection and the inclusion of a more diverse respondent pool. Additionally, while the proposed model incorporates key drivers, several other potentially relevant variables were not

considered in this present study. In the future, studies could explore constructs such as online shopping affinity, effectiveness of in-store sales staff persons, and the influence of online shopping sales and festivals, which may provide deeper insights into the evolving dynamics of showrooming. Incorporating these factors would help build more comprehensive models for understanding showrooming behaviour.

9. Conclusion

This study provides an explanation of the factors driving showrooming behaviour. The results confirm that perceived value functions as a mediator, linking offline search benefits and online purchase benefits to showrooming intention. Specifically, the findings demonstrate that AI-enabled problem solving, entertainment through shopping cart, need for touch, and offline social interaction significantly enhance perceived value, which in turn results in showrooming intention. Moreover, the findings highlight the complex moderating roles of consumer traits, where market mavenism weakens the influence of perceived value on showrooming intention, while price consciousness amplifies it. The study advances the theoretical understanding of omnichannel retailing and offers practical guidance for firms.

Declarations

Declaration of Originality

"I, **Paramjit Singh**, and **Dr. Pavleen Soni**, do hereby declare that the research paper titled 'Assessing the Mediating Role of Perceived Value and the Moderating Effects of Market Mavenism and Price Consciousness on Showrooming Intention' contains original research work done by the undersigned. We have acknowledged all sources used in the preparation of this paper and affirm that it has not been submitted elsewhere for publication."

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AI and Language Editing Disclosure

The authors used Grammarly (2025) was employed for grammar and style correction.

No AI tools were used to generate research data.

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Trading Under Uncertainty: The Role of Geo-Political Stress and Behavioral Biases in Retail Derivatives Trading in Kashmir

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Abstract

Purpose: - This study aims to investigate how perceptions of geopolitical stress affect trading behaviour and adverse trading outcomes among retail futures and options (F&O) investors in Kashmir, with particular emphasis on the mediating effect of the intensity of behavioral biases.

Research design/methodology/approach: - The research employs a quantitative approach based on primary data gathered from 200 retail derivatives traders. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were used to establish the validity of the measurement model, after which Structural Equation Modelling (SEM) was applied to examine both direct effects and the mediating relationships between the study constructs.

Findings: - The findings reveal that perceptions of geopolitical stress significantly heighten the intensity of behavioral biases, which subsequently trigger reactive trading behaviour and result in unfavourable trading outcomes. Moreover, behavioral bias intensity partially mediates the association between geopolitical stress perception and adverse trading outcomes, underscoring the psychological transmission pathway through which environmental stress influences trading performance.

Originality/value: - This study is among the first to empirically incorporate geopolitical stress as an environmental factor influencing retail derivatives trading behaviour and to establish the mediating role of behavioral bias intensity in a conflict-affected region, thereby contributing to behavioral finance literature and offering practical insights for managing behavioral risks in high-uncertainty markets.

Keywords: Geo-political Stress; Behavioral Biases; Retail Derivatives Trading; Futures and Options; Adverse Trading Outcomes.

Introduction

Classical financial theory assumes that investors are rational agents who process information efficiently and make optimal decisions in frictionless markets (Fama, 1970). This assumption was challenged by information asymmetry theory, which demonstrated that unequal access to information and institutional imperfections can systematically distort investor decision-making and market outcomes (Akerlof, 1970; Grossman & Stiglitz, 1980). These foundational contributions established that real-world financial markets are shaped by

constraints that limit fully rational behavior. Building on this critique, behavioral finance further expanded the understanding of investor decision-making by incorporating psychological factors. Prospect Theory, introduced by Kahneman and Tversky (1979), revealed that investors exhibit loss aversion, reference dependence, and non-linear risk preferences, leading to systematic deviations from rational choice. Subsequent research identified a range of cognitive and emotional biases—such as overconfidence, herding, and mental accounting—that influence investor behavior and result in

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suboptimal financial decisions (Thaler, 1999; Barberis, Shleifer & Vishny, 1998). Empirical studies consistently demonstrate that these behavioral biases negatively affect retail investor performance, particularly through excessive trading, poor risk assessment, and persistent financial losses (Odean, 1999; Barber & Odean, 2001). The influence of behavioral biases becomes more pronounced under conditions of heightened stress and uncertainty. Evidence from psychology and neuroscience suggests that stress impairs cognitive control, reduces deliberative processing, and increases reliance on heuristics, thereby intensifying emotional and cognitive biases in decision-making (Shiv, Loewenstein & Bechara, 2005; Kandasamy et al., 2014). Extending these insights to financial markets, Lo (2017) argues that investor behavior is adaptive and context-dependent, varying systematically with environmental conditions and perceived uncertainty. These dynamics are particularly relevant in derivatives markets, especially futures and options (F&O), which are characterized by leverage, non-linear payoffs, and heightened sensitivity to market volatility (Hull, 2018). Retail participation in derivatives trading has increased substantially in emerging markets, including India, but is frequently associated with speculative behavior and adverse financial outcomes (Shiller, 2017; SEBI, 2023).

While existing studies on retail derivatives trading emphasize financial literacy, demographic characteristics, or isolated behavioral biases, they often assume relatively stable external environments (Kumar & Goyal, 2015). Such assumptions may not hold in regions experiencing persistent geo-political instability. Kashmir represents a distinct and underexplored empirical context, marked by prolonged geo-political stress and recurring uncertainty. From a behavioral finance perspective, sustained exposure to geo-political stress is likely to elevate psychological strain, disrupt emotional regulation, and amplify behavioral bias intensity among investors. In high-risk trading environments such as futures and options markets, these psychologically driven biases can translate into reactive trading behavior and adverse financial outcomes, including frequent losses, margin calls, and forced position exits.

Despite the relevance of geo-political stress as an environmental determinant of investor behavior, empirical research examining its influence on retail derivatives trading remains limited. Moreover, while behavioral biases are widely recognized as predictors of poor trading performance, their role as mediating mechanisms through which geo-political stress affects adverse trading outcomes has not been sufficiently examined. Addressing these gaps, the present study investigates the relationship between geo-political stress perception, behavioral bias intensity, and adverse trading

outcomes among retail futures and options investors in Kashmir. Drawing on behavioral finance and stress–decision-making theories, the study examines behavioral bias intensity as a key psychological mechanism through which geo-political stress translates into unfavourable trading outcomes, thereby offering focused and contextually grounded insights into retail investor behavior under conditions of persistent uncertainty.

Review of Literature

Early financial theories assumed that investors behave rationally and markets efficiently incorporate all available information into prices (Fama, 1970). This assumption was challenged by information asymmetry theory, which demonstrated that unequal and imperfect access to information systematically affects decision-making and market outcomes (Akerlof, 1970). Grossman and Stiglitz (1980) further argued that informational inefficiencies are inherent to financial markets, as information acquisition is costly and unevenly distributed. These insights established that investor behavior is constrained by informational frictions, an issue particularly relevant for markets requiring real-time data processing such as derivatives trading.

Behavioral finance expanded this framework by integrating psychological factors into financial decision-making. Kahneman and Tversky's (1979) Prospect Theory revealed that investors exhibit loss aversion, reference dependence, and non-linear risk preferences, leading to systematic deviations from rational choice. Subsequent studies identified behavioral biases such as overconfidence, herding, anchoring, and mental accounting, which significantly influence retail investor behavior (Barberis, Shleifer & Vishny, 1998; Thaler, 1999). Empirical evidence consistently shows that these biases are associated with excessive trading, misperception of risk, and poor investment performance among retail investors (Odean, 1999; Barber & Odean, 2001). The role of stress and uncertainty in intensifying behavioral biases has gained increasing attention. Psychological and neuroscientific research demonstrates that stress impairs cognitive control and increases reliance on heuristics, thereby amplifying behavioral biases (Shiv, Loewenstein & Bechara, 2005). Experimental evidence shows that stress alters risk preferences and increases emotionally driven decision-making under uncertainty (Kandasamy et al., 2014). Incorporating these insights into finance, Lo (2017) argued that investor behavior is adaptive and context-dependent, varying systematically with environmental stressors and uncertainty. Derivatives markets, particularly futures and options, are especially susceptible to behavioral distortions due to leverage, non-linear payoffs, and high information sensitivity (Hull, 2018). Empirical studies show

that retail investors in derivatives markets tend to engage in speculative trading, exhibit overconfidence, and incur persistent losses (Biais et al., 2005; Kumar, 2009). Evidence from India indicates that retail participation in futures and options trading has increased substantially, yet is characterized by adverse outcomes largely attributable to behavioral biases and inadequate risk assessment (Kumar & Goyal, 2015; SEBI, 2023). Recent literature highlights uncertainty as a key driver of financial behavior. Macro-level studies demonstrate that political and geo-political uncertainty increases market volatility and negatively affects investor sentiment (Bloom, 2009; Baker, Bloom & Davis, 2016). Caldara and Iacoviello (2018) provided systematic evidence that geo-political risk has significant effects on financial markets. However, most existing studies focus on aggregate market responses, offering limited insight into how geo-political stress affects individual retail investors' behavior, particularly in high-risk instruments such as derivatives. Information access disruptions represent a critical mechanism through which geo-political stress influences trading behavior. Theoretical models emphasize that delayed or restricted access to information increases uncertainty and impairs decision quality (Grossman & Stiglitz, 1980). Empirical evidence suggests that limitations in communication infrastructure negatively affect market participation and investor confidence (Clarke & Wallsten, 2006). In derivatives trading, where timely access to price movements, margin requirements, and volatility signals is essential, information disruptions can significantly exacerbate behavioral biases and lead to adverse trading outcomes (Hull, 2018).

Recent behavioral finance studies increasingly conceptualize behavioral biases as situationally amplified mechanisms rather than stable traits. Stress and uncertainty have been shown to intensify loss aversion, herding, and overconfidence, thereby mediating the relationship between environmental stressors and poor financial outcomes (Starcke & Brand, 2012; Gennaioli, Shleifer & Vishny, 2018). Despite these insights, empirical research explicitly modeling behavioral bias intensity as a mediating variable between geo-political stress and derivatives trading outcomes remains limited.

Furthermore, financial resilience—defined as an individual's ability to absorb financial shocks—has been shown to influence financial decision-making under stress (Lusardi, Schneider & Tufano, 2011). Individuals with higher financial resilience exhibit greater emotional regulation and risk discipline, potentially moderating the impact of behavioral biases on trading outcomes. However, this moderating role remains underexplored in the context of retail derivatives trading under persistent geo-political stress.

Overall, existing literature establishes strong links between behavioral biases, stress, and adverse trading outcomes but largely overlooks the combined effects of geo-political stress perception on retail derivatives trading behavior. The mediating role of behavioral bias intensity and the moderating influence of geo-political stress perception remain insufficiently examined, particularly in regions characterized by prolonged instability. By focusing on retail futures and options traders in Kashmir, this study addresses these gaps and contributes to behavioral finance literature by integrating environmental stressors and psychological mechanisms within a derivatives trading framework.

Theoretical Framework

The present study is grounded in *behavioral finance and stress–decision-making theories* that explain how environmental uncertainty influences investor behavior and trading outcomes. Classical finance theories assume rational decision-making; however, such assumptions are increasingly challenged in contexts characterized by persistent stress and uncertainty. *Prospect Theory*, proposed by Kahneman and Tversky (1979), provides a foundational explanation for deviations from rational trading behavior. The theory posits that individuals evaluate outcomes relative to reference points and exhibit loss aversion, leading to risk-seeking behavior when facing losses and risk aversion when experiencing gains. In derivatives markets, these tendencies are particularly pronounced due to leverage and rapid price movements, resulting in behaviors such as holding losing positions, excessive risk-taking, and emotionally driven trading decisions. In this study, Prospect Theory underpins the conceptualization of behavioral bias intensity and its influence on adverse trading outcomes. *Stress and decision-making theory* further explains how environmental stressors impair cognitive functioning and amplify behavioral biases. Psychological and neuroscientific research demonstrates that stress reduces cognitive control and increases reliance on heuristics and emotional responses, thereby intensifying biases such as overconfidence, loss aversion, and overreaction to market signals (Shiv et al., 2005; Starcke & Brand, 2012). In regions experiencing prolonged geo-political instability, perceived stress is likely to heighten these biases, affecting trading behavior in high-risk financial instruments such as futures and options.

The Adaptive Markets Hypothesis (Lo, 2017) complements these perspectives by emphasizing that investor behavior is context-dependent and evolves in response to changing environmental conditions. According to this framework, market efficiency and rational behavior cannot be assumed in unstable environments,

as investors adapt to stress, uncertainty, and information constraints. The geo-political context of Kashmir, characterized by persistent instability and information disruptions, represents an environment where adaptive and emotionally driven trading behavior is likely to dominate rational decision-making.

Integrating these theoretical perspectives, the present study proposes that geo-political stress perception increases behavioral bias intensity, which in turn leads to adverse trading outcomes among retail futures and options investors. Behavioral bias intensity is therefore conceptualized as a key psychological mechanism through which environmental stress translates into suboptimal trading performance.

Research Design

The study adopts a quantitative, cross-sectional research design to examine the relationships among geo-political stress perception, behavioral bias intensity, and trading outcomes among retail futures and options (F&O) investors in Kashmir. This design is appropriate for capturing investor perceptions and behavioral responses within a context characterized by persistent geo-political uncertainty.

Data Collection and Instrumentation

Primary data were collected using a structured questionnaire administered to retail derivatives traders. The instrument comprised multi-item scales measuring geo-political stress perception, behavioral bias intensity, and adverse trading outcomes, with all items assessed on a five-point Likert scale ranging from strongly disagree to strongly agree.

Sample Size and Sampling Technique

The study is based on a sample of 200 retail futures and options investors from the Kashmir region. Due to the absence of a comprehensive sampling frame and the limited accessibility of retail derivatives traders in a region, a combination of judgemental sampling and snowball sampling techniques is employed. Judgemental sampling was used to identify respondents with active experience in futures and options trading, ensuring relevance and data quality (Malhotra, Nunan & Birks, 2020). Snowball sampling was subsequently applied to reach additional eligible participants through referrals, a method considered particularly effective for accessing hard-to-reach and specialized populations (Etikan, Bala & Babatope, 2021). The sample size is adequate for Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and

Structural Equation Modelling (SEM), consistent with contemporary methodological guidelines.

Reliability and Validity

The reliability and validity of the measurement scales were assessed using Composite Reliability (CR), Average Variance Extracted (AVE), and discriminant validity criteria. The results confirmed satisfactory internal consistency, convergent validity, and discriminant validity for all constructs, ensuring the robustness of the empirical findings.

Research Objectives

1. To examine the impact of geo-political stress perception and behavioral bias on the futures and options (F&O) trading behaviour of retail investors in Kashmir.
2. To analyze the mediating role of behavioral bias intensity in the relationship between geo-political stress perception and adverse trading outcomes among retail futures and options investors in Kashmir.

Theory–Hypothesis Linkage

Drawing on stress and decision-making theory and the Adaptive Markets Hypothesis, geo-political stress perception is expected to intensify behavioral biases among retail investors (H1). Consistent with Prospect Theory, heightened behavioral bias intensity is expected to result in adverse trading outcomes through loss aversion, overreaction, and risk-seeking behavior in losses (H2).

Research Hypotheses

H1: Geo-political stress perception has a significant positive effect on behavioral bias intensity among retail futures and options investors in Kashmir.

H2: Behavioral bias intensity has a significant positive effect on adverse trading outcomes among retail derivatives investors in Kashmir.

Empirical Evidence and Discussion

Exploratory Factor Analysis (EFA): Exploratory Factor Analysis (EFA) was performed to identify the underlying factor structure of the constructs geopolitical stress perception and behavioral bias intensity, which are central to the study's objectives. The adequacy of the data for factor analysis was evaluated using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity.

Construct	Item Range	Factor Loadings	KMO	Bartlett's Test (Sig.)
Geo-political Stress Perception	GPS1–GPS6	0.62 – 0.81	0.84	0.000
Behavioral Bias Intensity	BBI1–BBI7	0.60 – 0.84	0.86	0.000
Adverse Trading Outcomes	ATO1–ATO5	0.64 – 0.82	0.83	0.000

Table 1: Exploratory Factor Analysis: All factor loadings exceed 0.60, indicating strong construct representation and unidimensionality. (Authors Work)

Construct	Item	Factor Loading	KMO	Bartlett's Test (Sig.)
I feel that the geo-political situation in Kashmir creates uncertainty about my financial decisions.	GPS1	0.62		
Periods of regional instability increase my stress while participating in futures and options trading.	GPS2	0.68		
Concerns about sudden disruptions or unrest affect my confidence in trading decisions.	GPS3	0.74	0.84	0
Geo-political tensions make it difficult for me to plan my trading activities effectively.	GPS4	0.81		
I feel psychologically pressured to react quickly to market movements during periods of heightened regional stress.	GPS5	0.77		
News related to geo-political conflicts or security issues negatively affects my emotional state while trading.	GPS6	0.7		
I tend to take higher risks to recover losses incurred in previous trades.	BBI1	0.6		
I feel more confident in my trading skills than most other retail investors.	BBI2	0.65		
I hold losing positions longer than advisable, hoping prices will reverse.	BBI3	0.71		
I am more sensitive to potential losses than to equivalent gains.	BBI4	0.84	0.86	0
I rely on my personal judgment even when market signals suggest otherwise.	BBI5	0.79		
After a successful trade, I feel encouraged to increase my risk exposure in subsequent trades.	BBI6	0.73		
I am reluctant to realize losses and prefer to wait in the hope that unfavourable positions will improve.	BBI7	0.68		
I have experienced frequent financial losses in futures and options trading.	ATO1	0.64		
I have faced margin calls due to adverse market movements.	ATO2	0.69		
My derivatives trading has resulted in returns lower than my expectations.	ATO3	0.76	0.83	0
I have exited positions at a loss due to insufficient margins.	ATO4	0.82		
Overall, my experience with futures and options trading has been financially unfavourable.	ATO5	0.66		

Table 2: Construct wise factor Loading, KMO and Sig. (Authors Work)

The results of the Exploratory Factor Analysis demonstrate adequate sampling adequacy for all constructs, with Kaiser–Meyer–Olkin (KMO) values exceeding 0.80 and Bartlett's

Test of Sphericity being statistically significant ($p < 0.001$), thereby confirming the appropriateness of the data for factor analysis. All measurement items exhibit factor loadings above

the acceptable threshold of 0.60, indicating strong associations between items and their respective constructs and supporting convergent validity. Overall, the measurement scales for

Geopolitical Stress, Behavioral Bias Intensity, and Adverse Trading Outcomes demonstrate robust construct validity and are suitable for subsequent analyses.

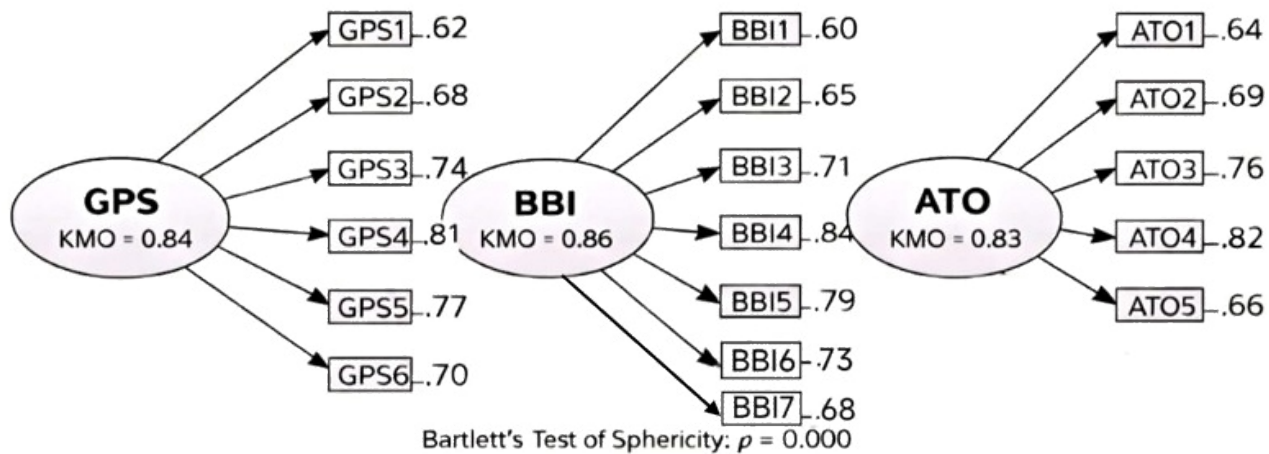


Fig. 1: "Exploratory factor analysis illustrating factor loadings and sampling adequacy for Geo-Political Stress, Behavioral Bias Intensity, and Adverse Trading Outcomes." (Authors Work)

Confirmatory Factor Analysis (CFA): Confirmatory Factor Analysis was performed to validate the measurement model and confirm the factor structure identified through EFA. The goodness-of-fit indices indicate that the measurement model

demonstrates an acceptable to good fit. The CFA results confirm that the measurement model fits the data well and is suitable for structural analysis.

Fit Index	Obtained Value	Recommended Value	Model Fit
χ^2/df	2.14	< 3.00	Good
CFI	0.93	> 0.90	Good
TLI	0.91	> 0.90	Good
RMSEA	0.056	< 0.08	Acceptable
SRMR	0.049	< 0.08	Acceptable

Table 3: Confirmatory Factor Analysis – Model Fit Indices (Authors Work)

The model demonstrates an overall good fit, with χ^2/df below 3 and incremental fit indices (CFI and TLI) exceeding the recommended threshold of 0.90. The RMSEA and SRMR values fall within acceptable limits, indicating adequate approximation and residual fit. Collectively, these indices confirm that the proposed model fits the observed data satisfactorily.

Convergent and Discriminant Validity: Convergent and discriminant validity were assessed using Average Variance Extracted (AVE), Composite Reliability (CR), and Maximum Shared Variance (MSV).

Construct	AVE	CR	MSV	Validity Established
Geo-political Stress Perception	0.54	0.87	0.32	Yes
Behavioral Bias Intensity	0.58	0.89	0.36	Yes
Adverse Trading Outcomes	0.56	0.86	0.34	Yes

Table 4: Convergent and Discriminant Validity of Constructs (Authors Work)

The Average Variance Extracted (AVE) values for all constructs exceed the recommended threshold of 0.50, while Composite Reliability (CR) values are above 0.70, indicating strong convergent validity and internal consistency. Additionally, for each construct, AVE values are greater than the corresponding Maximum Shared Variance (MSV), confirming discriminant validity. These results establish that geo-political stress perception, behavioral bias intensity, and adverse trading outcomes are empirically distinct and reliably measured,

justifying their inclusion in subsequent structural equation modelling.

Objective 1: To examine the impact of geo-political stress perception and behavioral bias on the futures and options (F&O) trading behaviour of retail investors in Kashmir.

Hypothesis (H1): Geo-political stress perception has a significant positive effect on behavioral bias intensity among retail futures and options investors in Kashmir.

Statement	Mean	S.D	Level of Stress
The geo-political situation in Kashmir creates uncertainty about my financial decisions.	3.92	0.74	High
Periods of regional instability increase my stress while participating in futures and options trading.	4.05	0.69	High
Concerns about sudden disruptions or unrest affect my confidence in trading decisions.	3.88	0.71	High
Geo-political tensions make it difficult for me to plan my trading activities effectively.	3.79	0.76	High
I feel psychologically pressured to react quickly to market movements during periods of heightened regional stress.	4.1	0.67	High
News related to geo-political conflicts or security issues negatively affects my emotional state while trading.	3.95	0.7	High
Overall Geo-political Stress Perception	3.95	0.71	High

Table 5: Descriptive Analysis of Geo-political Stress Perception (N = 200) (Authors Work)

Retail futures and options investors in Kashmir exhibit high levels of geo-political stress, with all mean scores above the scale midpoint. The greatest stress (M = 4.10) arises from psychological pressure to react quickly during regional tensions, indicating emotionally-driven trading behavior. High stress is also associated with periods of instability (M = 4.05) and geo-political news (M = 3.95), reflecting the impact of both events

and information on investor sentiment. Even the lowest mean (M = 3.79) for planning difficulties highlights notable disruption to trading strategies. Standard deviations (0.67–0.76) suggest consistent perceptions across respondents, and the overall mean of 3.95 confirms that geo-political conditions significantly influence investor behavior and confidence.

Structural Equation Modelling

Construct	AVE	CR	MSV	Validity Established
Geo-political Stress Perception	0.54	0.87	0.32	Yes
Behavioral Bias Intensity	0.58	0.89	0.36	Yes
Adverse Trading Outcomes	0.56	0.86	0.34	Yes

Table 6: Structural Equation Modelling (Note: ***p < 0.001; *p < 0.05; β denotes standardized path coefficients) (Authors Work)

The results indicate that geo-political stress perception has a strong and significant positive effect on behavioral bias intensity (β = 0.47, p < 0.001), confirming that stress experienced during periods of regional instability leads investors to develop cognitive and emotional biases. Behavioral bias intensity, in

turn, significantly influences trading behaviour (β = 0.42, p < 0.001), highlighting its central role in shaping reactive and emotionally-driven trading decisions, which aligns with the descriptive findings of heightened psychological pressure and stress.

Geo-political stress perception also has a smaller but significant direct effect on trading behaviour ($\beta = 0.18, p = 0.014$), indicating partial mediation by behavioral biases. This reflects that while stress influences trading both directly, a substantial portion of

its effect operates through behavioral biases, consistent with descriptive observations of reduced confidence, uncertainty, and difficulty in planning.

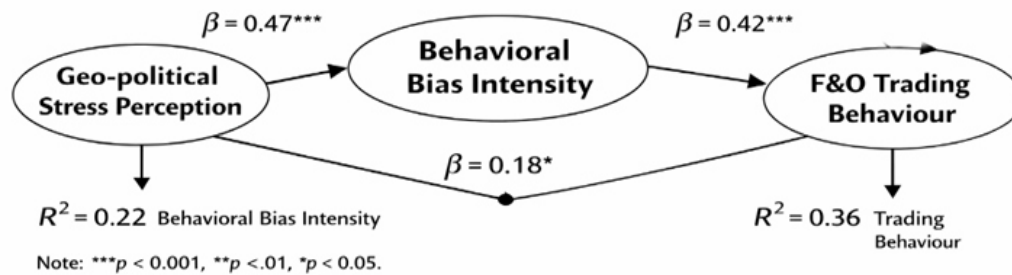


Figure 2: SEM of Geo-political Stress Perception, Behavioral Bias, and Trading Behaviour among Retail Investors in Kashmir. (Authors Work)

The SEM diagram (Figure 2) shows that geo-political stress perception strongly influences behavioral bias intensity ($\beta = 0.47$), which in turn significantly affects trading behaviour ($\beta = 0.42$). Stress also has a smaller but significant direct effect on trading ($\beta = 0.18$), indicating partial mediation by behavioral

biases. These results highlight that geo-political stress shapes trading decisions both directly and indirectly, consistent with descriptive evidence of heightened stress and reactive trading among investors in Kashmir.

Endogenous Construct	R ² Value	Variance Explained	Interpretation
Behavioral Bias Intensity	0.22	22%	Moderate explanatory power
Trading Behaviour	0.36	36%	Substantial explanatory power

Table 7: Coefficient of Determination (R²) and Model Explanatory Power (Authors Work)

The R² value of 0.22 indicates that geo-political stress perception explains 22% of the variance in behavioral bias intensity, demonstrating a moderate but meaningful effect in psychologically-driven models. The R² of 0.36 for trading behaviour shows that stress perception and behavioral biases together account for 36% of the variance in trading decisions, reflecting a substantial explanatory capability of the model. These findings confirm that psychological stress and behavioral biases play a significant role in shaping futures and options

trading behaviour among retail investors in Kashmir, reinforcing the descriptive analysis.

Objective 2: To analyze the mediating role of behavioral bias intensity in the relationship between geo-political stress perception and adverse trading outcomes among retail futures and options investors in Kashmir.

Hypothesis (H2): Behavioral bias intensity has a significant positive effect on adverse trading outcomes among retail derivatives investors in Kashmir.

Statement	Mean	S.D	Level of Adverse Outcome
I have experienced frequent financial losses in futures and options trading.	3.87	0.73	High
I have faced margin calls due to adverse market movements.	3.94	0.7	High
My derivatives trading has resulted in returns lower than my expectations.	4.02	0.68	High
I have exited positions at a loss due to insufficient margins.	4.11	0.66	High
Overall, my experience with futures and options trading has been financially unfavourable.	3.9	0.72	High
Overall Adverse Trading Outcomes	3.97	0.7	High

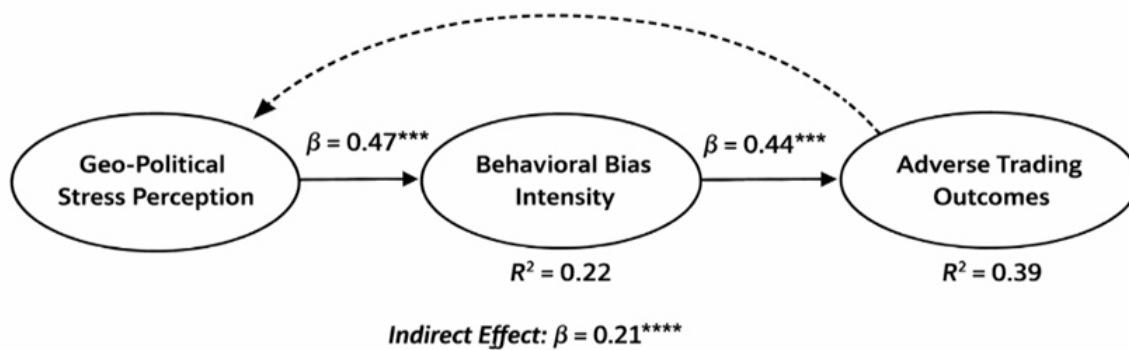
Table 8: Descriptive Analysis of Adverse Trading Outcomes (N = 200) (Authors Work)

The descriptive results reveal a high level of adverse trading outcomes among retail futures and options investors in Kashmir. The highest mean score is observed for forced exits due to insufficient margins, indicating significant exposure to loss amplification mechanisms in derivatives trading. The overall

mean score confirms that respondents largely perceive their trading experience as financially unfavourable, supporting the premise that behavioral bias intensity contributes positively to adverse trading outcomes, in line with Hypothesis H2.

Structural Path	Standardized β	t-value	p-value	Result
Geo-political Stress Perception \rightarrow Behavioral Bias Intensity	0.47***	6.21	< 0.001	Significant
Behavioral Bias Intensity \rightarrow Adverse Trading Outcomes	0.44***	6.02	< 0.001	Significant
Geo-political Stress Perception \rightarrow Adverse Trading Outcomes	0.21*	2.68	0.008	Significant
Geo-political Stress Perception \rightarrow Behavioral Bias \rightarrow Adverse Trading Outcomes (Indirect Effect)	0.21***	—	< 0.001	Significant

Table 9: Structural Equation Modelling Results – Mediation Analysis (***p < 0.001, *p < 0.05: SEM Path Coefficients for Mediation Model) (Authors Work)



Structural Equation Model illustrating the mediating role of behavioral bias intensity in the relationship between geo-political stress perception and adverse trading outcomes among retail futures and options investors in Kashmir.

Fig 3: “Structural equation model showing the mediating effect of behavioral bias intensity on the relationship between geo-political stress perception and adverse trading outcomes.” (Authors Work)

Endogenous Construct	R ² Value	Variance Explained	Interpretation
Behavioral Bias Intensity	0.22	22%	Moderate explanatory power
Adverse Trading Outcomes	0.39	39%	Substantial explanatory power

Table 10: Coefficient of Determination (R²) and Model Explanatory Power (Authors Work)

The Structural Equation Modelling results demonstrate that geo-political stress perception exerts a strong and statistically significant positive effect on behavioral bias intensity ($\beta = 0.47$, $p < 0.001$). Behavioral bias intensity, in turn, significantly increases adverse trading outcomes ($\beta = 0.44$, $p < 0.001$), thereby supporting Hypothesis H2. Although geo-political stress perception also has a direct effect on adverse trading outcomes ($\beta = 0.21$, $p < 0.05$), the presence of a significant indirect effect

confirms the partial mediating role of behavioral bias intensity. The R² values indicate that the model explains 22% of the variance in behavioral bias intensity and 39% of the variance in adverse trading outcomes, reflecting substantial explanatory power. Overall, the findings suggest that geo-political stress influences trading performance largely through psychologically driven behavioral biases among retail futures and options investors in Kashmir.

Discussion and Findings

The findings of the study confirm that geo-political stress perception plays a significant role in shaping the trading behaviour and outcomes of retail futures and options investors in Kashmir. Descriptive results indicate high levels of perceived geo-political stress, reflecting the impact of regional instability, security concerns, and geo-political news on investors' psychological states and decision-making processes. Structural Equation Modelling results show that geo-political stress perception has a strong and statistically significant positive effect on behavioral bias intensity ($\beta = 0.47, p < 0.001$), supporting stress and decision-making theory. Behavioral bias intensity, in turn, significantly influences trading behaviour ($\beta = 0.42, p < 0.001$) and adverse trading outcomes ($\beta = 0.44, p < 0.001$), thereby supporting Hypothesis H2 and confirming the relevance of Prospect Theory in explaining loss-oriented and biased trading decisions. Although geo-political stress perception also has a direct effect on trading behaviour ($\beta = 0.18, p < 0.05$) and adverse trading outcomes ($\beta = 0.21, p < 0.05$), the presence of significant indirect effects indicates partial mediation by behavioral bias intensity. This suggests that a substantial portion of the impact of geo-political stress on trading performance operates through psychologically driven biases rather than through direct market reactions alone. The R^2 values indicate that the model explains 22% of the variance in behavioral bias intensity, 36% of the variance in trading behaviour, and 39% of the variance in adverse trading outcomes, demonstrating moderate to substantial explanatory power. Overall, the findings establish that geo-political stress significantly affects retail investors' derivatives trading primarily by intensifying behavioral biases, leading to reactive trading behaviour and unfavourable financial outcomes in the Kashmir context.

Practical Implications

The findings of this study offer several important practical implications for regulators, brokerage firms, trading platforms, and investor education initiatives, particularly in regions characterized by persistent geo-political uncertainty. The results demonstrate that geo-political stress significantly intensifies behavioral bias intensity among retail futures and options investors, which in turn leads to adverse trading outcomes. These insights suggest that improving trading performance in such environments requires not only technical or informational interventions but also targeted strategies that address the psychological dimensions of investor behavior.

For brokerage firms and market intermediaries, the results highlight the need for enhanced risk communication during

periods of heightened geo-political stress. Brokers can implement dynamic risk warnings or stress alerts when regional tensions escalate, reminding retail derivatives traders of increased emotional vulnerability and the risks associated with impulsive trading decisions. Such context-sensitive warnings may help investors pause and reassess risk exposure, particularly in leveraged instruments where losses can escalate rapidly. *For trading platforms and exchanges*, the findings support the adoption of behavioral safeguards designed to reduce emotionally driven trading. Platform-based cooling-off mechanisms—such as brief mandatory pauses after significant losses, margin calls, or consecutive trades—can help disrupt loss-chasing behavior and overtrading. These tools are especially relevant in derivatives markets, where high leverage and rapid price movements can amplify stress-induced biases. By encouraging reflective decision-making, such mechanisms may reduce the likelihood of forced exits and margin-related losses. *For policymakers and investor education programs*, the study underscores the importance of stress-aware financial literacy initiatives. Traditional financial education often focuses on technical knowledge and market mechanics, but the results of this study suggest that psychological resilience and bias awareness are equally critical. Training programs that educate investors about common behavioral biases under stress—such as loss aversion, overconfidence, and risk-seeking after losses—can improve emotional regulation and risk discipline. Incorporating stress management and decision-making strategies into financial literacy programs may be particularly beneficial for retail derivatives traders operating in unstable environments.

Overall, the practical implications of this study suggest that mitigating adverse trading outcomes in futures and options markets requires a behavioral risk management approach. By recognizing geo-political stress as a significant driver of biased decision-making, market participants and regulators can design interventions that promote more disciplined, reflective, and resilient trading behaviour among retail investors.

Conclusion

This study empirically examines how geo-political stress perception influences futures and options trading behaviour and outcomes among retail investors in Kashmir, with a particular focus on the mediating role of behavioral bias intensity. Grounded in stress and decision-making theory, Prospect Theory, and the Adaptive Markets Hypothesis, the findings demonstrate that geo-political stress is a significant psychological determinant of investor behaviour in derivatives

markets operating under persistent uncertainty. The results reveal that retail investors in Kashmir experience high levels of geo-political stress, stemming from regional instability, security concerns, and conflict-related information. Structural Equation Modelling confirms that geo-political stress perception has a strong and significant positive effect on behavioral bias intensity, indicating that heightened stress amplifies cognitive and emotional biases such as loss aversion, overconfidence, and risk-seeking after losses. Behavioral bias intensity, in turn, significantly influences trading behaviour and increases the likelihood of adverse trading outcomes, including frequent losses, margin calls, and forced exits. Mediation analysis shows that behavioral bias intensity partially mediates the relationship between geo-political stress perception and adverse trading outcomes. While geo-political stress also exerts a direct effect on trading performance, a substantial portion of its impact operates indirectly through stress-induced behavioral biases. This highlights that unfavourable trading outcomes in conflict-affected regions are not solely driven by market conditions, but are significantly shaped by investors' psychological responses to stress.

Overall, the findings establish a clear stress–bias–outcome mechanism, demonstrating that geo-political stress acts as a catalyst for biased decision-making and suboptimal trading performance among retail derivatives investors. By extending behavioral finance research to a geo-politically sensitive context, this study contributes to a deeper understanding of investor behaviour under chronic uncertainty and underscores the importance of incorporating psychological risk factors into models of trading behaviour and market regulation.

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