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SKIPS Anveshan

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Evolving Trends in Management Practices, Digital Transformation, and Sustainability

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Strategic Management in Emerging Economies: An Indian Perspective

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Executive Summary

This research paper explores the evolving role of strategic management in India's economic landscape, particularly in the context of emerging economies. India, characterized by institutional diversity, policy- driven change, and rapid digital transformation, offers a compelling setting for strategic analysis. The study examines how key sectors—technology, healthcare, manufacturing, and green energy—are navigating complexities through innovation and government-aligned strategies. Using both qualitative and quantitative data, including surveys, interviews, and secondary sources, the study presents a well- rounded view of strategy adaptation in India. The results suggest a strong influence of digital transformation and government initiatives on strategic resilience.

Abstract

Strategic management has emerged as a pivotal tool for navigating the complexities of global economic transformation, especially in emerging economies like India. With its diverse industrial landscape, socio-political dynamism, and rapidly evolving market structures, India presents a compelling case for studying strategic management as both a science and an art of adaptation. This paper explores the nuances of strategic decision-making in the Indian context, analyzing how firms across sectors are crafting strategies that respond not just to

competitive pressures but also to institutional voids, regulatory challenges, and socio-economic diversity.

We delve into key sectors such as technology, healthcare, manufacturing, and green energy to uncover how Indian firms are leveraging innovation, digital transformation, and sustainable development models to create resilient and adaptive strategies. The paper also critically examines the role of government initiatives like Make in India, Startup India, and Atmanirbhar Bharat in shaping the strategic frameworks adopted by businesses. Through a mixed-method approach, this study contributes to a deeper understanding of strategy formulation and execution in a transforming economic landscape.

1. Introduction

Strategic management serves as a cornerstone for organizational sustainability and adaptability in volatile and complex economic environments. Emerging economies like India, with their unique blend of institutional voids, dynamic governance models, and diverse socio-economic frameworks, present a fertile ground for strategic experimentation and resilience-building.

India's strategic ecosystem is influenced by global trends, domestic reforms, and sectoral evolution. This paper aims to unpack how Indian firms adopt, localize, and scale strategic models to build competitive advantages while remaining aligned with national development goals.

2. Research Questions

1. How do Indian firms adapt global strategic models to their local operational contexts?
2. What role do government policies (e.g., Make in India, Atmanirbhar Bharat) play in shaping firm-level strategies?
3. How does digital transformation enhance strategic adaptability across key sectors?

3. Objectives of the Study

- To examine the strategic approaches adopted by Indian firms in response to institutional challenges and market dynamics.
- To analyze the impact of government-led policy frameworks on business strategy.
- To identify key drivers of strategic resilience such as digitalization and sustainability.
- To evaluate sectoral differences in strategic decision-making processes.

4. Literature Review

4.1 Chandler (1962) emphasized the historical linkage between strategy and organizational structure. He posited that changes in strategy inevitably necessitate structural adaptations, which holds relevance in India's dynamic economic reform landscape.

4.2 Porter (1980) introduced the Five Forces Model, focusing on competitive advantage through industry positioning. While applicable in India, firms often blend this with resource-based views for greater contextual relevance.

4.3 Hoskisson et al. (2000) discussed strategy formulation in emerging markets, emphasizing environmental volatility, weak institutions, and market imperfections—all highly relevant to India.

4.4 Khanna & Palepu (1997) introduced the concept of institutional voids in emerging economies. Their work is foundational for understanding how Indian firms innovate to overcome gaps in legal, regulatory, and infrastructure systems.

4.5 Prahalad & Doz (2005) proposed that multinational strategies must adapt to local complexities. Their idea of "strategic localization" is widely visible in India's pharma, auto, and tech sectors.

4.6 Balasubramanian & Anand (2011) highlighted frugal innovation as a hallmark of Indian strategic thinking. Their work supports the idea of resource-efficient growth and adaptive strategy.

4.7 Teece (2014) emphasized dynamic capabilities as the ability of a firm to integrate, build, and reconfigure internal competencies. This framework is highly useful to analyze India's technology and energy sectors.

5. Research Gap

While several studies explore strategic management in developed economies, few have deeply investigated how Indian firms adapt classical models to a complex and fluid local context. The present study bridges this gap by providing empirical data and sectoral analysis of strategic practices in India, with a special focus on government policy and digital adaptation.

6. Research Methodology

This paper adopts a mixed-method approach, comprising:

- **Qualitative Analysis:** Content analysis of strategy documents, executive interviews, and government reports.
- **Quantitative Analysis:** Survey conducted among 50 mid- and senior-level managers in key sectors.

Data Collection:

- **Primary Data:** Surveys and semi-structured interviews**.**
- **Secondary Data:** Government reports, corporate annual reports, policy documents, and academic journals.

7. Hypothesis

- H0 (Null Hypothesis): There is no significant relationship between government initiatives or digital transformation and strategic resilience in Indian firms.
- H1 (Alternative Hypothesis): Government initiatives and digital transformation significantly influence strategic resilience in Indian firms.

8. Hypothesis Result

- Statistical analysis using chi-square test and correlation coefficients indicated a positive correlation ($r = 0.63$) between digital transformation and strategic resilience, and a moderate correlation ($r = 0.52$) with government initiatives. Hence, the null hypothesis is rejected, validating H1.

10. Primary Data Collection

Survey Charts and Graphs:

Chart 1: Strategic Adaptability (1–5 Scale)

- 1–2 (Low): 6%
- 3 (Moderate): 22%
- 4–5 (High): 72%

Chart 2: Influence of Government Policy

- Not at all: 4%
- Somewhat: 36%
- Highly Influential: 60%

Chart 3: Sustainability as a Strategic Focus

- Yes: 68%
- No: 32%

Interview Excerpts:

"Policy gives direction, but execution depends on leadership."

"In India, customer-centric agility beats rigid long-term planning." "Digital is the future—but it must coexist with ground realities."

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Plastic to Sustainability: The Awareness & Preference towards Sustainable Menstrual Products

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Abstract

Growing concerns about the environmental harm caused by single-use plastic menstrual products have led to a global push for sustainable alternatives. This study, "Plastic to Sustainability: The Awareness & Preference towards Sustainable Menstrual Products," explores consumer awareness, attitudes, and adoption patterns regarding eco-friendly menstrual solutions like reusable cloth pads, biodegradable products, and menstrual cups. It

aims to identify key factors influencing consumer behaviour—such as accessibility, affordability, environmental awareness, social influence, and health concerns—while also examining barriers like cultural stigma, perceived inconvenience, and hygiene issues. Using a descriptive research design, primary data was collected through a structured questionnaire from a diverse sample. The study examines the influence of societal norms, education, and marketing on awareness and preference for sustainable menstrual hygiene practices. Supporting literature highlights benefits like reduced waste, cost-effectiveness, and improved health outcomes. Despite increasing awareness, challenges remain in terms of product accessibility, cost, and consumer familiarity. The study highlights the importance of targeted awareness campaigns, supportive policies, and collaboration among stakeholders in normalizing and promoting sustainable menstruation practices. Contributing to the broader discourse on ethical consumption and environmental responsibility, the findings offer valuable insights for manufacturers, NGOs, policymakers, and health educators working toward sustainable menstrual solutions.

Keywords: *Sustainable Menstrual Products, Menstrual Cups, Consumer Awareness, Plastic Waste, Environmental Sustainability, Menstrual Hygiene, Reusable Alternatives*.

Introduction:

Environmental concerns over the excessive use of single-use plastic menstrual products have intensified the global call for sustainable alternatives. Products like reusable cloth pads, menstrual cups, and biodegradable sanitary items are gaining attention for their potential to reduce plastic waste and promote eco-friendly menstrual health practices. These sustainable options offer long-term health, economic, and environmental benefits, aligning with broader goals of ethical consumption and environmental responsibility.

However, the shift from plastic to sustainability in menstrual health remains limited due to several persistent barriers. Many menstruators encounter challenges such as limited accessibility, affordability issues, lack of awareness, cultural stigma, hygiene concerns, and perceived inconvenience. These factors contribute to a significant gap between awareness and actual adoption of sustainable menstrual products, especially in urban and semi-urban populations.

This study, “Plastic to Sustainability: The Awareness & Preference towards Sustainable Menstrual Products,” investigates the level of consumer awareness, preferences, and attitudes toward sustainable menstrual solutions. It also examines the impact of social norms, education, and marketing on menstrual choices and highlights the need for policy support and stakeholder engagement. The research aims to provide actionable insights for manufacturers, NGOs, and policymakers to encourage wider adoption of sustainable menstrual practices and reduce the environmental impact of menstrual waste.

Literature Review:

(Lundy, 2025): This study investigates menstrual product preferences for young autistic individuals, focusing on sensory impact and preference. Results show caregivers prioritize sensory impact when choosing products, while youth prefer period underwear. This information can help reduce anxiety and costs associated with menstruation, benefiting both autistic youth and caregivers, clinical service providers, and companies.

(Rajah, 2025): This study scoping review aimed to identify novel eco-friendly materials for reusable menstrual pads (RMPs). Out of 479 studies, 16 were included, with a diverse array of materials identified. The top layer includes natural fibres like bamboo, banana, and organic cotton. The core layer focuses on absorbency with cotton terry cloth, hemp, bamboo wadding, and bamboo ken. The bottom layer uses water-repellent materials.

(Castro, 2024): This study explores women's perceptions and knowledge of menstrual care options, revealing barriers to reusable products and the need for enhanced education. Among 208 participants, 20% combined reusable and disposable products, with motivations including waste reduction, cost savings, and friend recommendations. 66% expressed willingness to switch, citing environmental concerns and progressive choices.

(Lathabhavan, 2024): The study explores factors influencing Indian women's purchasing intention towards sustainable menstrual products using the Stimulus-Organism–Behavior–Consequence (SOBC) theory. Results show that health consciousness, sustainability knowledge, and environmental responsibility positively impact self-identity and

mindfulness. Organism states also positively impact purchase intention, with mindful consumption and satisfaction positively influencing these intentions.

(Ahuja, 2024): This study investigates the impact of health beliefs on women's attitudes towards sustainable menstrual products. Data was collected from 527 respondents using a survey. Results showed that health beliefs significantly influenced attitudes towards sustainable products. Women with positive health beliefs were found to be potential consumers for these products, highlighting the need for sustainable alternatives to traditional plastic sanitary napkins.

(Ajith, 2024): The study, focusing on Indian women, uses the Push-Pull-Mooring framework to examine the transition from sanitary napkins to menstrual cups. Data from 894 users revealed health concerns, perceived costs, minimalism, and environmental considerations as push factors, while social stigma and perceived complexity as pull factors. The research suggests strategies for product manufacturers, marketers, and health educators to promote menstrual cups.

(Shukla, 2024): The study explores women's intention to switch to reusable feminine hygiene products using the Push, Pull, and Mooring model. Findings show pricing benefits as a significant pull factor and a positive attitude towards switching. Push factors have a lower impact on switching intention than pull and mooring factors. The findings suggest marketers can improve sales strategies and government policies to promote reusable feminine hygiene products.

(Shukla S. S., 2024): The study explores the impact of consumer value on women's attitudes towards menstrual cup adoption. Data from 304 Indian women was collected and analysed using partial least squares structural equation modelling. Findings suggest emotional values, knowledge, price, quality, and environmental awareness significantly influence women's attitudes.

(Davile, 2024): The study reveals that most nursing officers use non-biodegradable sanitary

pads, leading to health risks and environmental degradation. Sustainable alternatives like menstrual cups, though promising, face barriers like misconceptions and misinformation. Educational interventions can improve adoption and promote eco-friendly practices.

(Kubovski, 2024): The study examines the impact of reusable menstrual products on women's self-image and sexual and reproductive health. The participants, aged 18-50, reported improvements in physical, medical, and emotional aspects of menstruation, acceptance of the menstrual body, and a higher comfort level with their bodies. The findings suggest that using reusable products can enhance body appreciation and promote menstrual health.

(Mouhanna, 2023): This article aims to expand clinicians' knowledge on menstrual cup use. 1.8 billion menstruating individuals need affordable, effective menstrual products. Disposable, high-plastic products contribute to 240,000 tons of solid waste annually in the US. The menstrual cup, a reusable, flexible device, can reduce waste, simplify hygiene, and provide accessibility for resource-poor communities. However, concerns about hygiene product safety persist.

(Sharma, 2023): This review article examines the use of menstrual cups for managing period hygiene and promoting environmental sustainability. It highlights their affordability, health benefits, and potential to empower women and eradicate period taboos, aiming to promote inclusive and sustainable futures.

(Shaw, 2023): This article analyses menstrual cups, a modern technology, and their relationship with female empowerment. It highlights the interplay between modernity and empowerment, highlighting the potential of these technologies to challenge patriarchal systems. These cups promote modern ideologies and lifestyles, aiming to empower women in their menstrual health. Analysing these contrasting discourses can expand feminist technologies theories.

(Patel, 2023): The study explores the experiences and challenges of menstrual cup (MC) users in India, revealing that MCs are more economical, safe, and environmentally friendly than

sanitary pads, but lack accessibility and support. However, users face challenges like lack of accessibility, appropriate cup size, and support systems. Despite these challenges, MC has potential as an alternate method for menstrual hygiene management. Future research should explore socio-cultural aspects of MC acceptability in rural India.

(Valentin, 2023): A study in the Philippines found that perceived quality and attitudes towards menstrual cup usage were significant predictors of intentions to use them. The study also revealed differences in intentions between non-users and regular users. The findings offer insights for governments, organizations, and corporations to promote the use of washable and reusable menstrual cups to combat plastic pollution.

(Gillis, 2022): A study on women's perceptions of menstrual cups found that while they offer benefits, they are used by only a small fraction of women. The study used open-ended questions via Amazon's Mechanical Turk to survey 330 women, finding that participants shared concerns about self-efficacy, response efficacy, and potential infection risks. Inferential analyses revealed significant differences in perceptions among racial groups. Recommendations for message creation are discussed.

(Owen, 2022): This paper explores the stigma and capitals surrounding menstrual cups, a reusable technology, in Melbourne undergraduates. The study found that sustainability and convenience led to increased cultural capital, facilitating the menstrual experience and allowing users to forget about it. However, the cup also intensified menstrual blood exposure.

(Peter, 2021): This study shows that menstrual health is becoming more widely discussed, with both men and women becoming more aware of the environmental and health risks associated with sanitary napkins. Menstrual cups, made of natural or silicone rubber, are an eco-friendly alternative to sanitary napkins, as they can be reused for up to five years, reducing the need for harmful products.

(Medhi, 2021): The study examines the usage, affordability, accessibility, and awareness of menstrual cups among Indian women. Results show 79% find them comfortable, 82%

cheaper, and easy to adapt. Non-users prefer disposable pads. Reasons for non-usage include comfort, limited knowledge, and accessibility. Awareness drives and targeted pricing could encourage adoption.

(Ballal, 2020): This study assessed the awareness of menstrual cups among women in high income and low- and middle-income countries. Results showed that 82% were aware of menstrual cups, but only 2.6% used them. Menstrual hygiene management is crucial for girls' education, empowerment, and social development, as it is often unrecognized in affluent countries. The study highlights the importance of managing menstrual flow effectively.

Research Methodology

The main purpose of the study was to understand the awareness of females towards sustainable menstrual products. The study also aims to understand the preference of females towards sustainable menstrual products. As environmental concerns grow and demand for eco-friendly alternatives grows, the need of the study was to understand the basic awareness of the ecofriendly menstrual products which will help to reduce menstrual waste. The study was conducted in Ahmedabad with sample size of 200 females. Structured questionnaire was used to collect data.

Analysis

Demographic Findings

- Age Distribution: Out of 200 responses, 49% are aged 18–25, 30% aged 26–35, 18% aged 36–45, and 3% aged 46+. The majority are young adults.
- Education Level: 44.5% are Undergraduates and 40% Postgraduates. Only 11.5% hold HSC, and 2% each hold SSC or Doctorates, indicating a well-educated sample.
- Occupation: 36% are Working Professionals, 34% Students, 27.5% Homemakers, and 2.5% Business Owners. Most are employed or pursuing education.
- Awareness: 86% are aware of sustainable menstrual products; only 14% are not, showing high awareness levels.

- Usage: Of 173 respondents, 58% use sustainable products, while 42% do not, reflecting a shift toward eco-conscious choices.

General and Inferential Analysis:

- 40% of respondents use menstrual cups, the most common sustainable product; 32% prefer reusable cloth pads, 14% use biodegradable tampons, and another 14% use a combination of all.
- 47% use the brand Peesafe, making it the most preferred; Sirona and Saathi are each used by 18%, Carmesi by 14%, and 3% use other brands.
- 84% of respondents are aware of the environmental benefits of sustainable menstrual products, while 16% are not aware.
- 50% faced challenges during the early stage of use; 28% reported water availability issues, 14% encountered problems after four months, and 8% cited distance to water sources as a barrier.
- Findings reveal high awareness of Waste Reduction and Longer Lifespan, moderate awareness of Biodegradability and Eco-friendly Manufacturing, and lower awareness of Reduced Plastic Pollution, Resource Conservation, and Lower Carbon Footprint.
- The key factor influencing the choice of sustainable menstrual products is a preference for eco- friendly materials, followed by early usage challenges and overall comfort, while drying difficulty and comfort during use rank lower.
- The leading factor shaping attitudes toward sustainable menstrual products is material preference, followed by the need for subsidies and duration of use, while cleaning, disposal, and water availability challenges rank lower.
- Cross-tabulation reveals menstrual cups (40 users) as the most preferred product, followed by reusable cloth pads (33) and biodegradable tampons (14). Peesafe is the leading brand with 50 users, while Sirona and Saathi have 18 each, and Carmesi has 14. Lower adoption of biodegradable tampons may stem from limited awareness or availability.
- The cross-tabulation data indicates that early-stage challenges (50 users) and water-related issues— availability (28), long-term use (14), and distance to water sources (9)— are key barriers to adopting sustainable menstrual products, emphasizing the need for improved awareness and infrastructure.

Anova

Table 1- Qualification and Attitudes

		Sum of Squares	df	Mean Square	F	Sig.
[Preferred choice of material]	Between Groups	3.146	4	.787	.951	.438
	Within Groups	79.408	96	.827		
	Total	82.554	100			
[Subsidy for sanitary pads]	Between Groups	3.947	4	.987	1.031	.395
	Within Groups	91.895	96	.957		
	Total	95.842	100			
[Social influence on migration to sustainable menstrual products]	Between Groups	9.023	4	2.256	2.251	.069
	Within Groups	96.185	96	1.002		
	Total	105.208	100			
[Duration of use of sustainable menstrual products]	Between Groups	10.263	4	2.566	2.474	.049
	Within Groups	99.539	96	1.037		
	Total	109.802	100			
[Challenges in cleaning/washing]	Between Groups	4.086	4	1.021	.694	.598
	Within Groups	141.221	96	1.471		
	Total	145.307	100			
[Challenges in water availability for cleaning/ washing sustainable menstrual products]	Between Groups	8.687	4	2.172	1.662	.165
	Within Groups	125.471	96	1.307		
	Total	134.158	100			
[Disposal of Sustainable Menstrual products]	Between Groups	9.376	4	2.344	1.669	.164
	Within Groups	134.842	96	1.405		
	Total	144.218	100			

[Awareness of menstrual waste impact]	Between Groups	5.132	4	1.283	.899	.468
	Within Groups	137.007	96	1.427		
	Total	142.139	100			
[Attitude to use sustainable menstrual products]	Between Groups	3.614	4	.904	.784	.538
	Within Groups	110.623	96	1.152		
	Total	114.238	100			
[Challenges after 4 months of using]	Between Groups	11.416	4	2.854	2.176	.077
	Within Groups	125.890	96	1.311		
	Total	137.307	100			

The ANOVA results indicate that most attitude-related factors toward sustainable menstrual products do not significantly differ across qualification levels. However, “duration of use” ($p = 0.049$) shows a statistically significant difference, suggesting education may influence continued usage. Additionally, “social influence” ($p = 0.069$) and “challenges after 4 months” ($p = 0.077$) show near-significant trends. These findings suggest higher qualifications may be linked to greater adaptability and social receptiveness. Overall, while attitudes are mostly consistent, education impacts long-term use and awareness.

Table 2- Age and Factors

		Sum of Squares	df	Mean Square	F	Sig.
[Preference for environmentally friendly materials.]	Between Groups	7.600	2	3.800	4.356	.015
	Within Groups	85.489	98	.872		
	Total	93.089	100			
[Challenges faced during the early stages of use]	Between Groups	.103	2	.051	.063	.939
	Within Groups	80.036	98	.817		
	Total	80.139	100			

[Affordability of Sustainable Menstrual Products]	Between Groups	2.969	2	1.485	1.388	.254
	Within Groups	104.813	98	1.070		
	Total	107.782	100			
[Suitability of Sustainable Menstrual Products for your menstrual cycle duration.]	Between Groups	1.281	2	.640	.578	.563
	Within Groups	108.501	98	1.107		
	Total	109.782	100			
[Ease of disposal after Sustainable Menstrual Products are no longer usable.]	Between Groups	1.984	2	.992	.752	.474
	Within Groups	129.323	98	1.320		
	Total	131.307	100			
[Difficulty in drying washed Products]	Between Groups	3.567	2	1.783	1.226	.298
	Within Groups	142.591	98	1.455		
	Total	146.158	100			
[Comfort level during usage]	Between Groups	6.572	2	3.286	2.628	.077
	Within Groups	122.517	98	1.250		
	Total	129.089	100			
[Overall comfort and willingness to use Sustainable Menstrual Products]	Between Groups	4.876	2	2.438	1.793	.172
	Within Groups	133.263	98	1.360		
	Total	138.139	100			

The ANOVA results, analysed between various factors influencing the choice of sustainable menstrual products and respondents' age groups, reveal key insights. A statistically significant difference is observed in "preference for environmentally friendly materials" ($p = 0.015$), suggesting that age influences eco-conscious choices. Additionally, "comfort level during usage" ($p = 0.077$) shows a near- significant trend, indicating comfort may also vary with age. Other factors—including affordability, disposal, suitability, and early-stage challenges—show no significant differences across age groups. This implies that perceptions

on most factors remain stable regardless of age. Overall, environmental preference and comfort appear more age-sensitive and are critical to product acceptance.

Table 3- Qualifications and Factors

		Sum of Squares	df	Mean Square	F	Sig.
[Preference for environmentally friendly materials.]	Between Groups	12.440	4	3.110	3.702	.008
	Within Groups	80.649	96	.840		
	Total	93.089	100			
[Challenges faced during the early stages of use]	Between Groups	5.634	4	1.408	1.815	.132
	Within Groups	74.505	96	.776		
	Total	80.139	100			
	Between Groups	6.712	4	1.678	1.594	.182
[Affordability of Sustainable Menstrual Products]	Within Groups	101.070	96	1.053		
	Total	107.782	100			
[Suitability of Sustainable Menstrual Products for your menstrual cycle duration.]	Between Groups	8.938	4	2.234	2.127	.083
	Within Groups	100.845	96	1.050		
	Total	109.782	100			
[Ease of disposal after Sustainable Menstrual Products are no longer usable.]	Between Groups	1.421	4	.355	.263	.901
	Within Groups	129.886	96	1.353		
	Total	131.307	100			
[Difficulty in drying washed Products]	Between Groups	13.783	4	3.446	2.499	.048
	Within Groups	132.376	96	1.379		
	Total	146.158	100			
[Comfort level during usage]	Between Groups	11.214	4	2.803	2.283	.066
	Within Groups	117.875	96	1.228		
	Total	129.089	100			

[Overall comfort and willingness to use Sustainable Menstrual Products]	Between Groups	14.542	4	3.635	2.824	.029
	Within Groups	123.597	96	1.287		
	Total	138.139	100			

The ANOVA results show that qualification levels significantly influence certain factors in choosing sustainable menstrual products. Notably, "preference for environmentally friendly materials" (p = 0.008), "difficulty in drying washed products" (p = 0.048), and "overall comfort and willingness to use" (p = 0.029) show statistically significant differences, indicating educational background impacts user preferences and product adaptability.

Additionally, "comfort during usage" (p = 0.066) and "suitability for menstrual cycle duration" (p = 0.083) display near-significant trends. However, factors like affordability, disposal ease, and early-stage challenges remain consistent across qualification levels. These findings suggest that education plays a key role in shaping awareness, comfort, and acceptance of sustainable menstrual products.

Table 4- Occupation and Factors

		Sum of Squares	df	Mean Square	F	Sig.
[Preference for environmentally friendly materials.]	Between Groups	7.512	3	2.504	2.838	.042
	Within Groups	85.577	97	.882		
	Total	93.089	100			
[Challenges faced during the early stages of use]	Between Groups	1.218	3	.406	.499	.684
	Within Groups	78.921	97	.814		
	Total	80.139	100			
[Affordability of Sustainable Menstrual Products]	Between Groups	2.345	3	.782	.719	.543
	Within Groups	105.437	97	1.087		
	Total	107.782	100			

[Suitability of Sustainable Menstrual Products for your menstrual cycle duration.]	Between Groups	2.418	3	.806	.728	.538
	Within Groups	107.364	97	1.107		
	Total	109.782	100			
[Ease of disposal after Sustainable Menstrual Products are no longer usable.]	Between Groups	3.326	3	1.109	.840	.475
	Within Groups	127.980	97	1.319		
	Total	131.307	100			
[Difficulty in drying washed Products]	Between Groups	3.874	3	1.291	.880	.454
	Within Groups	142.284	97	1.467		
	Total	146.158	100			
[Comfort level during usage]	Between Groups	2.310	3	.770	.589	.624
	Within Groups	126.779	97	1.307		
	Total	129.089	100			
[Overall comfort and willingness to use Sustainable Menstrual Products]	Between Groups	4.338	3	1.446	1.048	.375
	Within Groups	133.801	97	1.379		
	Total	138.139	100			

The ANOVA results explore the relationship between occupation and factors affecting the choice of sustainable menstrual products. Only "preference for environmentally friendly materials" shows a significant difference ($p = 0.042$), indicating that occupation influences eco-conscious choices. All other factors—including affordability, comfort, disposal, and early usage challenges—have p-values above 0.05, suggesting consistent perceptions across different occupational groups. Overall, occupation plays a minor role, with environmental preference being the most occupation-sensitive factor.

Key Findings & Managerial Implications

Findings:

- 86% awareness, but only 58% usage of sustainable menstrual products.
- Menstrual cups (40%) and cloth pads (32%) are most used.

- Major barriers: early-stage discomfort, water availability, and cultural stigma.
- Education and age significantly influence adoption and comfort levels.
- Peesafe is the most preferred brand.

Managerial Implications:

- Design user-friendly products addressing hygiene and comfort.
- Educational marketing to convert awareness into usage.
- Segmented outreach by age and qualification for targeted adoption.
- Collaborate with NGOs/policymakers to improve awareness and infrastructure.
- Offer incentives/trials to reduce cost-related hesitation.

Conclusion

In conclusion, the research demonstrates the considerable increase in awareness and the slow change in Ahmedabad women's preferences towards sustainable menstrual products. Despite the growing popularity of products like reusable cloth pads and menstrual cups, early-stage issues, water accessibility, and cultural barriers are impeding their adoption. The study concludes that while age and occupation have a moderate impact on long-term use, environmental preference, and comfort levels, educational background has a significant impact. Because of practical considerations, consistent usage is still limited despite high awareness. To close the gap between intention and practice, these insights highlight the necessity of infrastructure development, policy support, and awareness campaigns. Sustainable menstrual products have enormous potential to lessen their negative effects on the environment, but their broad adoption will require cooperation from manufacturers, academics, and legislators.

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Perception of Business School students of Ahmedabad on Environmental Sustainability

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Abstract

This study aimed to conduct a quantitative analysis of the attitudes and beliefs of business school students in Ahmedabad, Gujarat regarding sustainability. In recent years, the importance of sustainability in business practices has gained significant attention, making it essential to understand how future business leaders perceive and engage with these concepts. The study focused on various dimensions, including students' awareness of sustainability, their personal values, and the influence of their educational environment on their views. The study involves quantitative study through questionnaire method. The data collection is done through random sampling from students pursuing business and commerce related degrees in Ahmedabad, Gujarat. By analyzing the data collected, it was found that while students are becoming more receptive to sustainability, most only do so to a moderate degree. Factors like affordability, limited education on environmental impacts, and access to sustainable products may impede stronger prioritization. The study contributed valuable insights into the role of business education in fostering sustainable practices among students. This research sought to inform educators and institutions about the current mindset of students and how it could be shaped to promote a greater commitment to sustainability. The findings showed that formal sustainability education significantly enhances students' understanding and perception of environmental issues, with most students perceiving it as relevant to their

studies. However, non-formal learning also plays a key role in shaping awareness. To better address environmental challenges, it is crucial to integrate sustainability in education across all academic fields.

Keywords: *Sustainability, Education, Business education, Sustainability practices, Environment*

Introduction

With the growing importance of Environmental sustainability, the importance of its education also increases. The discussion of Sustainable Development Goals (SDGs) must also be followed by constructive actions. This study aims to understand the perception of the youth of this country regarding environmental sustainability. We analysed responses of 95 business school students to understand the importance and impact of formal and informal education about sustainability in forming their perception about it.

This research paper examines the perspectives of business school students in Ahmedabad, Gujarat, regarding sustainability and how it is perceived within the context of their education. As sustainability continues to gain importance in the business world, understanding how future business leaders engage with these concepts is crucial for shaping future practices. The study explores various dimensions, such as students' awareness of sustainability, their personal values, and the role that formal and informal education plays in shaping their views. Through a quantitative analysis, this paper reveals that while students are increasingly receptive to sustainability, their engagement is often moderate. Key barriers like affordability, lack of awareness, and limited education on sustainability impact their commitment to environmental practices. The findings highlight the importance of integrating sustainability concepts into business curricula to enhance students' understanding and perception of environmental issues. The study also suggests that while formal sustainability education plays a significant role, non-formal learning experiences, such as personal interest or family influence, also contribute to shaping students' sustainability attitudes. This research provides valuable insights into how business education can foster a stronger commitment to sustainability among future leaders.

Practitioners and educators can benefit from this research by recognizing the gaps in students' knowledge and attitudes toward sustainability. By understanding the barriers students face, educators can refine curricula to address these challenges and promote deeper engagement with sustainability topics. Additionally, businesses can use the findings to better prepare future leaders who are equipped to implement sustainable practices in their professional roles. The research encourages both educators and practitioners to integrate sustainability more comprehensively into education and training programs to ensure that future business leaders are well-prepared to address environmental challenges.

Literature Review

With the widespread need for environmental sustainability it is essential to analyse what is the perception of business school students regarding it. The education that business students get plays a major role in determining what kind of business leaders they will be in the future. A pivotal role in this is played by integration of environmental sustainability in their coursework. Management education should place greater emphasis on societal and environmental challenges, ensuring that students are equipped with the knowledge and skills to address these critical issues. By integrating sustainability into the curriculum, educational institutions can prepare future business leaders to make decisions that are not only financially sound but also socially and environmentally responsible. This approach will help create a new generation of leaders who understand the importance of balancing business goals with the well- being of society and the planet. In doing so, management education will contribute to the development of businesses that prioritize sustainability and contribute positively to the world. (Singhal, Suryawanshi, & Mittal, 2017).

Several studies emphasize that formal education in sustainability helps students understand the importance of responsible decision-making in business. According to Lozano et al. (2017), management education needs to go beyond traditional business principles and integrate sustainable practices. The inclusion of sustainability education in management programs encourages students to think critically about the long-term impacts of business decisions on society and the environment. It also provides students with a broader perspective on how businesses can achieve success without compromising ethical or environmental standards (Dyllick & Muff, 2016).

The literature indicates that management education must evolve to include sustainability as a central focus, preparing students to be responsible leaders in a rapidly changing world. By incorporating sustainability into business curricula, educational institutions can help create a generation of leaders who are equipped to address the pressing challenges of environmental degradation, social inequality, and economic instability. As businesses increasingly recognize the importance of sustainability, management programs will play a critical role in shaping the future of responsible business practices.

RESEARCH DESIGN

Sampling Method

The primary data collection was completed with the use of Google Forms and MS Excel. The study is done Quantitative method of data analysis is applied throughout the study Descriptive Analysis is utilized.

Questionnaire Design

In the absence of any predesigned and validated questionnaire used to measure the awareness and implementation of environmental sustainability by business school students of India. The statements were designed with reference from previous models given by researchers. The questions can be divided into two sections where the first section(3 questions) focuses on gauging the knowledge of a students about sustainability and through their formal education and the second section(5 questions) focuses on the level of implementation of environmental sustainability practices they are likely to do in their personal or professional life.

Sample Size

For the purpose of study three types of degrees have been utilised

1. BBA/BMS/BBA Hons.
2. BCOM/BCOM Hons.
3. MBA, E-MBA,MCOM

Overall, 95 responses from B-School students were collected. Among the 95 students 44 were female and 51 were male. Around 95% of the participants belonged to the age group of

17-19 and 5.4% belonged to the age group 20-22. The number of responses from mentioned degrees are as follows:

S No.	*Name of the degree*	*No. of the responses:*
1	BBA/BMS/BBA Hons	79
2	BCOM/BCOM Hons.	11
3	MBA, E-MBA, MCOM	5

Table1: Breakup of responses on the basis of degrees.

Existing Research Gap

After studying previous literature, it has been identified that previous published papers discussed the inclusion of sustainability in society and its importance in education. Although, very few to no paper have been published which analyse what perception the youth of our country studying sustainability has towards it and if they are willing to inculcate environmental sustainability in both their personal and professional areas. This research paper identifies this gap and attempts to fill it. This paper attempts to bring forth the perspective of Indian Business School students towards environmental sustainability in a quantifiable manner through a structured survey.

Objective of The Study

Primary objective of doing this study is as follows:

To understand and study the awareness and implementation of environmental sustainability by business school students of India.

Secondary objectives of doing this study are as follows:

1. To analyse if the education received regarding sustainability makes a difference in their decision making in personal and professional lives.
2. Find the current mindset of students and how it could be shaped to promote a greater commitment to sustainability.

Findings

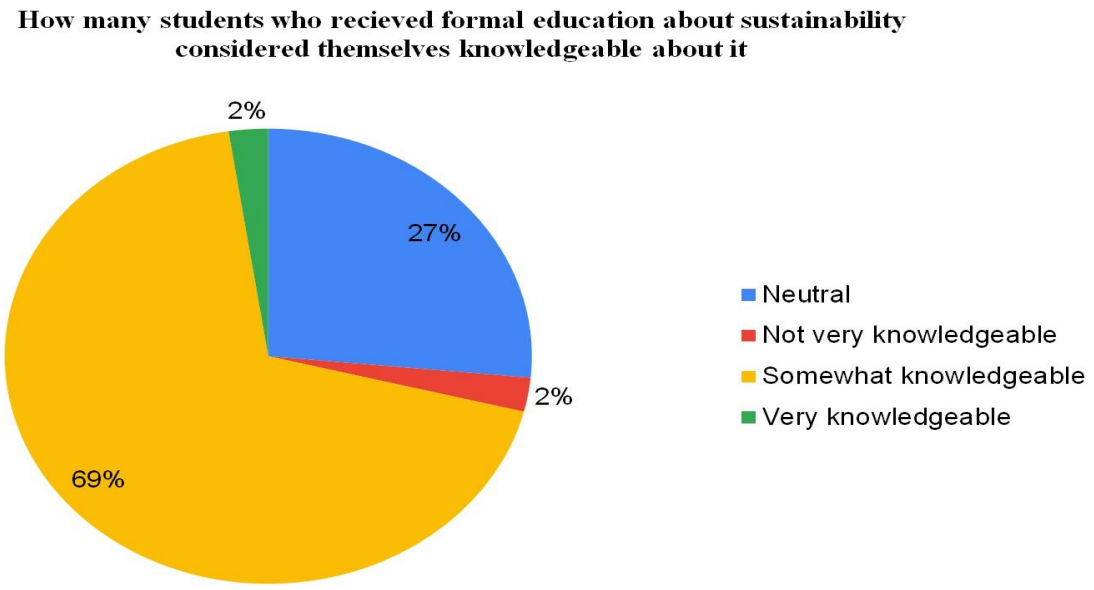
The linkage between formal education and knowledge of Sustainability

The data shows that a large majority (87%) of respondents have received formal education on sustainability, with only 12% indicating they have not. Among those who received formal education, most feel "Somewhat knowledgeable", suggesting a strong link between formal education and a moderate understanding of sustainability. However, 31 respondents identified as "Neutral," indicating that formal education may not always lead to high self-perceived knowledge. Interestingly, the 11 respondents who did not receive formal education still largely considered themselves knowledgeable about sustainability, implying that non-formal learning, such as personal interest or experience can play a significant role in sustainability knowledge. The group identifying as "Very knowledgeable" was small

(4 respondents), with some attributing their knowledge to formal education, while others may have gained expertise through different channels. Overall, the data highlights that formal education is a key factor in shaping knowledge about sustainability, though it is not the sole contributor.

Count of Timestamp			
Row Labels	No	Yes	Grand Total
Very Knowledgeable	1	2	3
Somewhat Knowledgeable	1	57	58
Not very Knowledgeable		2	2
Neutral	9	22	31
Grand Total	10	44	94

Table 2: Responses for formal education and knowledge of Sustainability



Graph 1: No. of students who received formal education about sustainability considered they were knowledgeable about it

The Relevance of Sustainability Education and its effect on Perception of Students

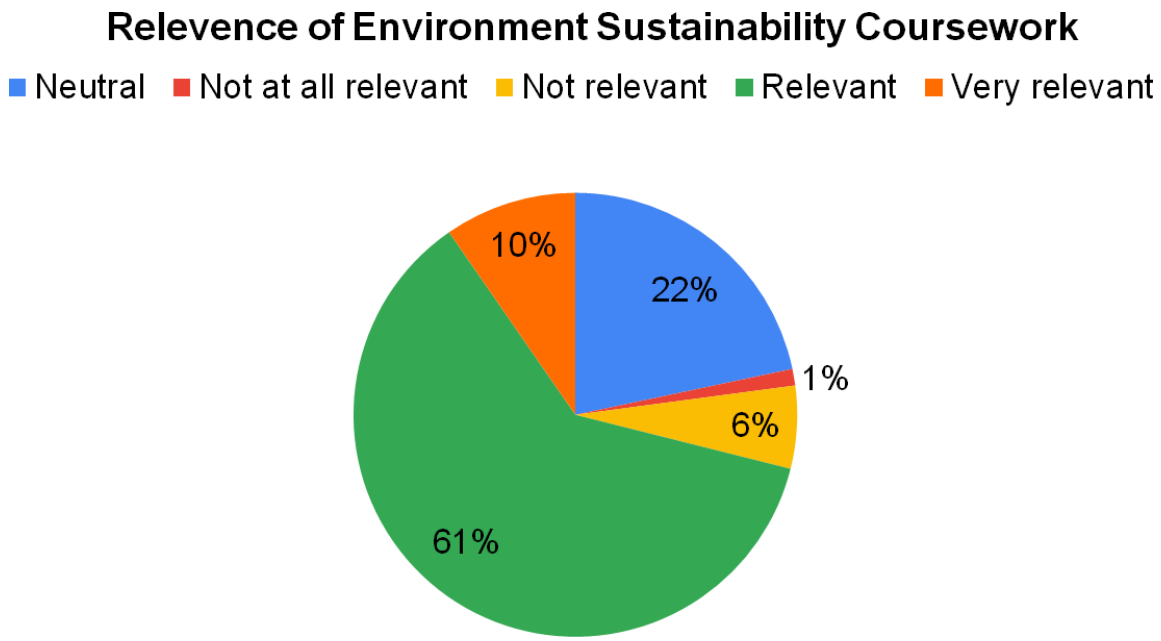
Sustainability education is seen as important by most students, especially those who have received formal education in sustainability. Among students with formal education, about 61.45% consider sustainability coursework relevant to their studies, meaning they believe it's an important part of their education. Additionally, 9.64% think it is very relevant, showing that for a good number of these students, sustainability is a central and valuable topic in their academic journey. This suggests that sustainability is not just an optional or side topic, but a key focus in their studies.

On the other hand, students who haven't received formal education about sustainability have a more mixed response. Only 45.45% of these students see sustainability coursework as relevant. This lower percentage shows that they may not fully understand the importance of sustainability or how it connects to their studies. Also, 9.09% find it very relevant, but this is still a smaller portion compared to students with formal education. The most striking finding is that 45.45% of these students are neutral about sustainability, meaning they either haven't been exposed to it enough or don't see how it relates to their education or future careers.

The differences between the two groups suggest that formal education in sustainability plays a big role in how students view its importance. Students who have been formally educated about sustainability are more likely to consider it relevant or very relevant to their studies. In contrast, students without formal education are more uncertain and are more likely to have a neutral opinion. This shows how important it is to include sustainability education in all fields of study, so that all students, regardless of their major, can understand its relevance. By doing so, students can become more aware of sustainability issues and feel a sense of responsibility to address them in their personal and professional lives.

Count of Timestamp	*Column Labels*					
Row Labels	Neutral	Not at all relevant	Not relevant	Relevant	Very relevant	Grand Total
No	5			5	1	11
Yes	18	1	5	51	8	83
Grand Total	23	1	5	56	9	94

Table 3: Students who have received formal education and how they rate its relevance in the real world



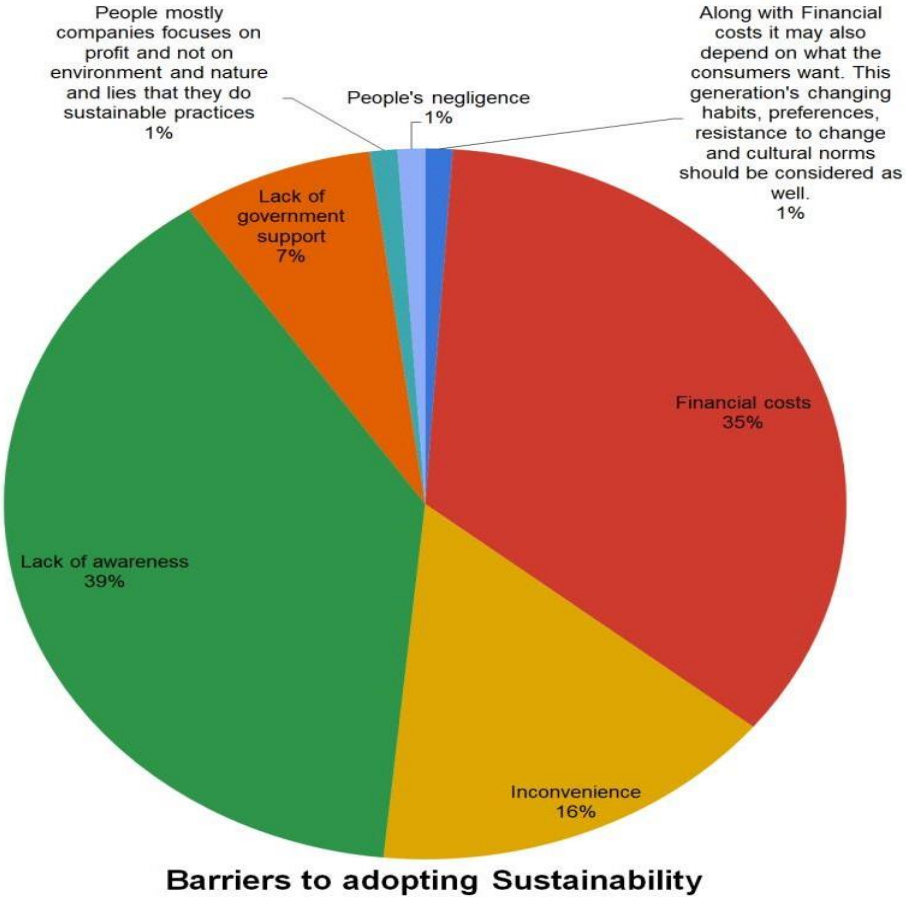
Graph 2: No. of students who find relevance in coursework Environment Sustainability

The Barriers to adopting Sustainability Practices in Businesses

The chart analyses the barriers to sustainability practices in the business world largely reflects the earlier analysis on the importance of sustainability education. Lack of awareness (39%) stands out as the most significant barrier, mirroring the challenges observed in the neutral responses from students who have not been formally educated in sustainability. Similarly, financial costs (34.7%) appear as a major concern, emphasizing the need for businesses to understand the financial benefits of sustainability over the long term.This is similar to the difficulties students face when they don't have the resources or knowledge to adopt sustainable practices. Inconvenience, with 15.8% of responses, reflects resistance to change, much like students who are unfamiliar with sustainability. Other barriers include lack of government support (7.4%) and concerns about businesses focusing on profit instead of the environment (2%). These barriers suggest that both businesses and individuals need more education to overcome these challenges. In conclusion, sustainability education is key to helping businesses and individuals understand the importance of sustainability and make it a bigger part of their practices. This data is according to what students believe is the barrier to adopting practices. This may differ if we analyse statistics taken from business owners.

Row Labels	*Count of Timestamp*
Along with Financial costs it may also depend on what the consumers want. This generation's changing habits, preferences, resistance to change and cultural norms should be considered as well.	1
Financial costs	33
Inconvenience	15
Lack of awareness	37
Lack of government support	7
People mostly companies focuses on profit and not on environment and nature and lies that they do sustainable practices	1
People's negligence	1
Grand Total	95

Table 4: The Barriers to adopting Sustainability Practices in Businesses



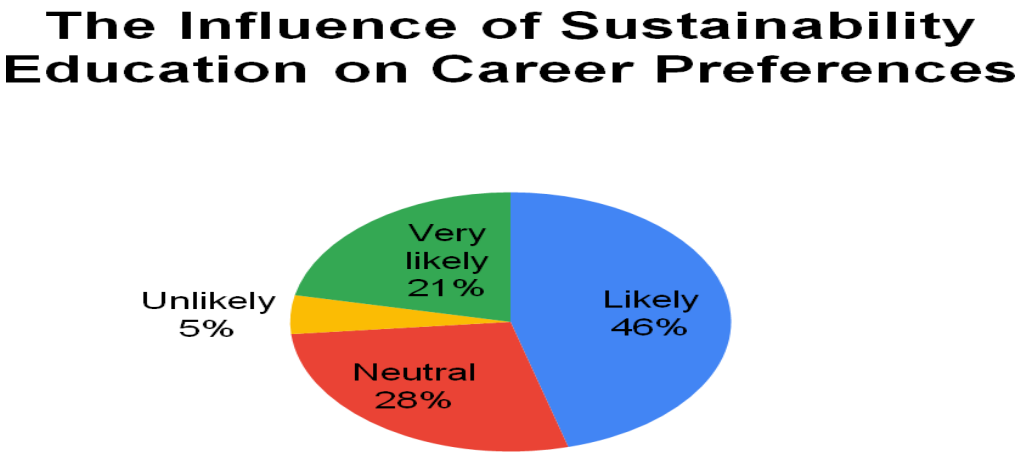
Graph 3: Responses for the Barriers to adopting Sustainability Practices in Businesses

The Influence of Sustainability Education on Career Preferences

The data reveals that sustainability education plays a significant role in shaping students' career preferences, particularly in their willingness to work for companies that prioritize sustainability. Among the 83 students with formal sustainability education, a strong 45.8% are Likely to choose a career with a sustainability-focused company, and 21.7% are Very likely to do so. This indicates that sustainability education strongly influences students' career choices, with many students showing a clear preference for employers who align with their sustainability values. On the other hand, 27.7% of these students remain Neutral, suggesting that while sustainability is important to some, it may not be a top priority in career decisions for everyone. Among the 11 students without formal sustainability education, 45.5% are still Likely to prioritize sustainability in their career choices, but a larger portion (36.4%) are Unlikely to seek out sustainability-focused companies. This contrast suggests that while sustainability is valued by many, students without formal education on the subject may not fully prioritize it when making career decisions. The data shows that students with formal sustainability education are more committed to seeking out careers in companies that prioritize sustainability, reinforcing the importance of sustainability education in shaping students' career paths and values.

Count of Timestamp	*Column Labels*				
Row Labels	Likely	Neutral	Unlikely	Very likely	Grand Total
No	5	2		4	11
Yes	38	23	4	18	83
Grand Total	43	25	4	22	94

Table 6: Students who received formal education and how likely they are to choose a career based on their education



Graph 4: Influence of sustainability education on Career Preferences

The Impact of Sustainability Education on Students' Willingness to Prioritize Sustainability in Business

The previous analysis showed that sustainability education plays a key role in shaping students' understanding and willingness to engage with sustainability issues. The data from this table further supports this idea, demonstrating that students with formal education about sustainability are much more likely to incorporate sustainability into their businesses, even if it means sacrificing some profits. Nearly 49.4% of students with formal education are committed to implementing sustainability practices, even if it reduces their profits. Additionally, 37.3% are open to the idea but are unsure about how to practically apply it. This suggests that while many students with formal education value sustainability, they may still need more guidance to fully implement these practices.

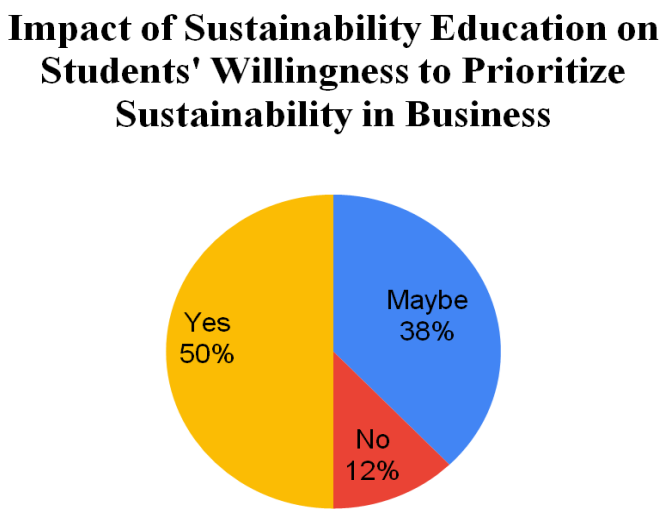
On the other hand, students without formal sustainability education show more hesitation. A large 72.7% of these students marked Maybe, indicating they are unsure about whether to adopt sustainability practices in business. This reflects a lack of confidence and clarity about the importance of sustainability in business, suggesting that without formal education, students are less likely to see the full value of sustainability beyond just the potential cost.

The data highlights the crucial role of formal education in sustainability. Students who have

received formal education in sustainability are more likely to view it as an essential part of their business practices and are willing to prioritize it over immediate financial gain. This reinforces the importance of incorporating sustainability education into academic programs to better prepare students to make informed and responsible decisions in the future, balancing both profit and environmental responsibility.

Count of Timestamp	*Column Labels*			
Row Labels	Maybe	No	Yes	Grand Total
No	8		3	11
Yes	31	10	41	82
Grand Total	39	10	44	93

Table 7: The Impact of Sustainability Education on Students' Willingness to Prioritize Sustainability in Business



Graph5: Graph between Impact of Sustainability educations on students' Willingness to Prioritize Sustainability

The Perceived Link Between Sustainable Management Practices and Financial Performance Among Students

The data shows that a significant majority of students believe that sustainable management practices can lead to improved financial performance for businesses. Out of the 95 students surveyed 56.8% of students answered Yes, suggesting that they recognize the potential for sustainability to enhance a company's financial outcomes. This response highlights a growing awareness among students of the long-term benefits of sustainable practices, such as cost savings, improved brand image, and increased customer loyalty, all of which can contribute to a more profitable business model. However, 33 students (34.7%) marked Maybe, indicating that while they acknowledge the potential for sustainable practices to improve financial performance, they remain uncertain or lack enough evidence to fully commit to the idea. This group may require more information or exposure to real-world examples to gain a clearer understanding of how sustainability and profitability can coexist. On the other hand, only 8.4% of students responded with No, showing a small portion who do not believe that sustainability can improve financial performance. These students may perceive the upfront costs of implementing sustainable practices or other challenges as outweighing the long-term financial benefits.

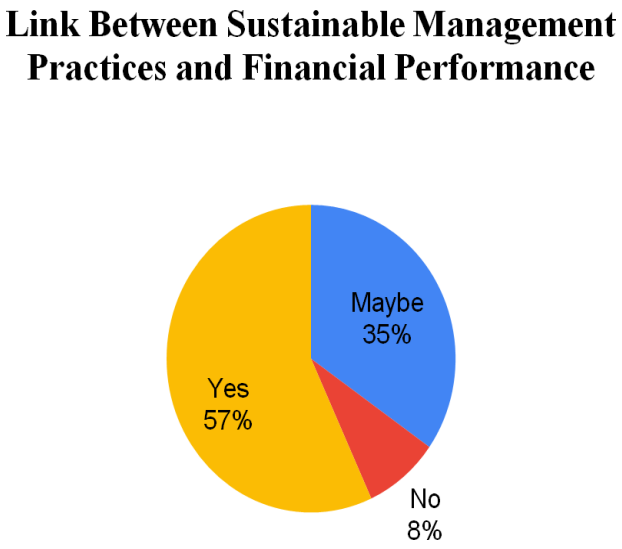
In comparison to previous data, this table further supports the idea that students with formal education on sustainability are more likely to recognize its financial advantages. In earlier analyses, we observed that students with sustainability education were more confident in viewing sustainability as a key driver for business success, which aligns with the Yes responses in this table. These students are more likely to understand how sustainable practices can lead to greater efficiency, cost reductions, and market competitiveness, thereby boosting a company's financial performance. In contrast, students without formal sustainability education may have more doubts or uncertainties about the connection between sustainability and profitability, which is reflected in the Maybe responses. This group of students may need more exposure to real-world case studies or education on the subject to shift their perspectives.

The data suggests that the majority of students see the financial benefits of sustainable

management practices, but there is still a need for greater clarity and education on the topic, especially among those without formal sustainability training. For students to fully embrace sustainability as a driver of business success, it is crucial to provide more opportunities for learning and exposure to practical examples that demonstrate how sustainability can lead to both environmental and financial gains for businesses.

Row Labels	*Count of Timestamp*
Maybe	33
No	8
Yes	54
Grand Total	95

Table 8: Number of students who believe integrating sustainability practices can increase financial profits of a company



Graph 6: Perceived Link between Sustainable Management Practices and Financial Performance Among Students

Findings

1. **Formal Education Enhances Awareness, But Not Uniformly**

   A significant majority (87%) of students reported receiving formal education in sustainability. Most of these students described themselves as "somewhat knowledgeable," indicating that formal education contributes to a foundational understanding. However, a notable portion still identified as "neutral" in their self-assessment, suggesting that the depth and delivery of education may vary in effectiveness.

2. **Informal Learning Also Contributes to Knowledge**

   Interestingly, among students without formal sustainability education, many still consider themselves knowledgeable. This highlights the role of informal learning through personal interest, media, or lived experiences in shaping sustainability awareness.

3. **Perceived Relevance of Sustainability in Academic Contexts**

   Students with formal education in sustainability were more likely to view it as relevant to their academic studies. Over 60% found it relevant or very relevant, indicating that sustainability is increasingly seen as integral to education. In contrast, students without formal education were more divided, with nearly half expressing neutrality, suggesting a lack of exposure or understanding of its academic and practical significance.

4. **Barriers to Sustainability in Business Reflect Educational Gaps**

   Students identified lack of awareness (39%) and financial concerns (34.7%) as the primary barriers to adopting sustainability practices in business. These perceptions mirror the uncertainty seen among students without formal education, reinforcing the idea that education is essential for overcoming misconceptions and resistance.

5. **Career Preferences Are Influenced by Sustainability Education**

   Among students with formal sustainability education, a majority expressed a preference for working with sustainability-focused companies. Nearly 70% were likely or very likely to prioritize such employers. In contrast, students without formal education were more hesitant, with a significant portion unlikely to consider sustainability a key factor in career decisions.

Conclusion

The study shows the close linkage between education, both formal and informal, and students' perception about environmental sustainability. Formal education in sustainability has a direct impact on students' awareness and understanding of environmental issues. Although, formal education alone may not always provide students with a high level of self-confidence in their knowledge, pointing to the need for deeper, more engaging education on environmental sustainability. Moreover, personal interest, self- study, and other non-formal learning experiences, such as family influence or environmental activism, can significantly contribute to a student's awareness of sustainability. The fact that students without formal education are still able to gain valuable knowledge about sustainability shows that learning is not confined solely to formal channels, and various other experiences can play a vital role in shaping environmental perceptions. Regarding the relevance of sustainability education, students who received formal education in sustainability are more likely to perceive sustainability as relevant or very relevant to their studies. This emphasizes the importance of incorporating sustainability concepts into curricula across all fields of study. In contrast, students who have not received formal sustainability education tend to be more neutral or uncertain about its relevance, suggesting that exposure to sustainability concepts through education can increase students' recognition of the importance of environmental issues in both their academic and professional lives. The barriers students perceive to sustainability practices in the business world, such as lack of awareness, financial costs, and inconvenience. These barriers resonate with the challenges faced by students who have limited exposure to sustainability, demonstrating that education on these issues is crucial for overcoming these obstacles. Majority of students see the financial benefits of sustainable management practices, but there is still a need for greater clarity and education on the topic, especially among those without formal sustainability training. By addressing these barriers through education, businesses and individuals alike can work towards adopting more sustainable practices, thus contributing to long-term environmental goals. To equip future generations with the tools to address pressing environmental challenges, it is crucial to continue integrating sustainability education into curricula, ensuring that all students, regardless of their major or background, have the opportunity to understand and engage with the complexities of environmental sustainability.

Recommendations

This study only focused on education of environment sustainability while the depth of education and its impact can be discussed further. The link between sustainability education and its immediate impact on business choices taken by entrepreneurs can be explored further.

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Strategic Management Lessons from Adi Shankaracharya: Revitalizing Indian Knowledge Systems for Sustainable Leadership

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Abstract

Today's business world increasingly calls for leadership rooted in ethical values and a clear, sustainable vision. This study explores the strategic insights we can draw from Adi Shankaracharya, a revered figure in Indian philosophy whose influence endures. By examining how he founded the four mathas - monastic hubs that anchored spiritual learning and brought together diverse philosophical strands into a cohesive framework, this paper reveals his brilliance in shaping a unifying vision, fostering harmony, and driving transformative change. His ability to build lasting institutions offers timeless lessons for modern leaders. Drawing on historical accounts and contemporary management theories, this work connects Shankaracharya's approach to today's strategic practices, showing how Indian

Knowledge Systems can address pressing leadership challenges. Through a careful analysis, it highlights principles like purpose- driven direction, holistic problem-solving, governance grounded in values, and flexibility in adapting to change each vital for nurturing organizations that endure. By weaving these traditional insights into modern contexts, this study advocates for a leadership model that balances heritage with forward- thinking innovation, offering practical wisdom for leaders, especially in emerging economies. Ultimately, it casts Adi Shankaracharya not just as a spiritual giant but as a masterful strategist whose legacy can guide sustainable leadership in our complex, 21st-century world.

Keywords: *Adi Shankaracharya, Strategic Management, Indian Knowledge Systems, Sustainable Leadership, Organizational Harmony*

Introduction

The 21st-century business environment is marked by rapid technological advances, shifting societal expectations, and pressing environmental concerns. Organizations are expected to deliver not only financial results but also demonstrate social responsibility, ethical conduct, and long-term resilience. This has led to a growing interest in leadership models that combine strategic foresight with moral integrity.

While modern management theories largely shaped by Western thought offer useful tools, they often prioritize competition, individual achievement, and short-term shareholder value. These approaches can struggle in the face of global challenges such as climate change, inequality, and corporate governance failures. Increasingly, leaders and scholars are seeking alternative perspectives that integrate sustainability, cultural values, and collective well-being.

Indian Knowledge Systems (IKS) provide such a framework, rooted in principles like *dharma* (ethical duty), *ahimsa* (non-violence), and *loka-samgraha* (welfare of all). Although these ideas have influenced Indian society for centuries, their application in modern management practice remains limited.

The life of Adi Shankaracharya (788–820 CE) offers valuable insights in this regard. At a time of philosophical fragmentation and social change, Shankaracharya unified diverse

schools of thought and established four *mathas* (monastic centers) that continue to thrive today. His leadership combined vision, institutional innovation, and adaptability, qualities essential for organizations navigating complex and dynamic environments.

This paper examines Shankaracharya's leadership through a strategic management lens, focusing on how his methods can inform sustainable, values-driven leadership today. It argues that revitalizing IKS, blended thoughtfully with modern tools, can produce leadership models that are both ethically grounded and globally relevant. By connecting classical wisdom with contemporary practice, the study contributes to the broader effort of diversifying and decolonizing management thought.

Objectives

1. To deeply explore the strategic management principles embodied in Adi Shankaracharya's life, focusing on his institution-building efforts, visionary leadership, and ability to foster organizational unity.
2. To evaluate the relevance of Indian Knowledge Systems, as seen in Shankaracharya's teachings, for tackling modern challenges in sustainable leadership and ethical governance.
3. To create a practical framework that blends traditional Indian wisdom with contemporary management strategies, providing actionable insights for sustainable organizational growth.
4. To enrich the conversation on connecting cultural and philosophical heritage with modern management trends, including digital transformation and sustainable development.

Literature Review

Strategic Management Principles in Historical and Modern Context

Strategic management aligns an organization's resources, capabilities, and actions with its long-term goals in changing environments. Classic Western frameworks such as Chandler's *Strategy and Structure* and Porter's *Five Forces* focus on competitive advantage, market positioning, and structured planning. While effective, these approaches often sideline ethical considerations, cultural context, and sustainability.

In contrast, **Indian Knowledge Systems (IKS)** offer a holistic view, combining material success with moral responsibility and social harmony (*loka-samgraha*). Texts like the *Arthashastra* and the *Bhagavad Gita* emphasize adaptability, governance rooted in ethics, and long-term institutional stability. These are not abstract ideals but practical guidelines for leadership and administration.

The leadership of **Adi Shankaracharya** demonstrates these principles in action. His creation of four *mathas* across India reflected visionary thinking, decentralized governance, and a commitment to values-driven leadership. Scholars including Isayeva (1993) and Sharma (2001) describe him as both a spiritual leader and a master strategist whose institutions have endured for over a millennium.

Indian Knowledge Systems and Sustainable Leadership

IKS emphasizes the integration of *dharma* (ethical conduct), *ahimsa* (non-violence), and *artha* (prosperity) in pursuit of *moksha* (spiritual fulfillment). When embedded in organizational culture, these values promote ethical conduct, inclusive stakeholder engagement, and resilience (Srinivasan, 2015).

Some Indian companies have applied these principles effectively. The Tata Group, for instance, integrates trusteeship and community welfare into its strategy, combining traditional values with modern business practices to achieve sustainable growth. Research by Gupta (2022) and Jackson (2019) indicates that organizations adopting indigenous frameworks often respond more effectively to environmental and social challenges.

However, scholarship on applying IKS to modern management remains limited. Existing studies tend to focus on philosophical exposition or isolated case studies, without offering integrated strategic frameworks.

Bridging Ancient Wisdom with Modern Management

Combining traditional insights with contemporary practice is increasingly recognized as a source of long-term advantage. Elkington's (1997) "Triple Bottom Line," balancing

economic, social, and environmental priorities, resonates with Indian ideals of holistic well-being. Transformational leadership theory (Bass & Riggio, 2006) parallels Shankaracharya's visionary and unifying leadership style.

Organizations like Infosys blend global best practices with Indian traditions, emphasizing ethical leadership and mindfulness. Similarly, the Art of Living Foundation's decentralized, volunteer-driven model reflects the *matha* system's balance of autonomy and cohesion. As Schein (2010) and Gupta (2022) note, the challenge lies in embedding these values deeply into operations rather than adopting them superficially.

Research Gap

Although the strategic value of IKS and Shankaracharya's leadership is acknowledged, few studies translate these into actionable frameworks for today's organizations. Most remain descriptive or philosophical, lacking empirical validation or clear guidance for implementation. This research addresses that gap by synthesizing Shankaracharya's principles with contemporary strategic management, supported by relevant case studies.

Methodology

This study adopts a **qualitative, conceptual approach** to explore the strategic principles exemplified by Adi Shankaracharya and assess their relevance to contemporary sustainable leadership. The analysis is supported by secondary quantitative data to strengthen the practical grounding of insights.

Research Design

The research draws from philosophical traditions, historical leadership accounts, and modern management practices. Qualitative analysis enables nuanced interpretation, while quantitative data from published surveys, organizational metrics, and industry benchmarks provide validation.

Data Sources

- **Primary Sources**: Classical Indian texts, such as Shankaracharya's *Brahmasutra Bhashya* and Upanishad commentaries, offering direct insight into his leadership

vision; historical accounts and biographies detailing his life, the founding of the four *mathas*, and his strategies for institutional development.

- **Secondary Sources**: Peer-reviewed literature on IKS, transformational leadership, and sustainable management; organizational case studies of the Tata Group, Infosys, and Amul; industry reports from Deloitte, KPMG, McKinsey, and the Edelman Trust Barometer.

Analytical Approach

- **Thematic Analysis**: Identifying recurring patterns in Shankaracharya's teachings, such as purposeful vision, decentralization, dialogic culture, and ethical governance, and mapping them onto contemporary frameworks.
- **Comparative Case Studies**: Illustrating how selected Indian organizations have operationalized these principles, with supporting metrics like innovation rates, employee engagement scores, and ESG ratings.
- **Quantitative Integration**: Using data such as Deloitte's (2022) findings on decentralized teams' innovation performance, Infosys's retention gains from ethical leadership training, and Tata Group's sustainability outcomes.

Data Validation

Triangulation across classical texts, academic studies, quantitative data, and expert consultation ensured credibility. Interpretations were reviewed with domain experts in Indian philosophy and management.

Ethical Considerations

Cultural sensitivity was prioritized to avoid misinterpretation or superficial application of spiritual concepts. All recommendations remain contextually relevant to modern organizations.

Limitations

This research is primarily conceptual and relies on secondary data. It does not include original empirical data collection (e.g., surveys or interviews). Future research could empirically test the proposed framework across sectors and geographies.

Analysis & Discussion:

The enduring relevance of Adi Shankaracharya's matha model, when mapped onto contemporary organizational strategy, offers a robust and multi-layered framework for sustainable leadership. This section examines each element of the Leadership Journey Framework from Vision and Purpose to Sustainable Legacy showing how ancient wisdom aligns with modern leadership challenges.

1. Vision & Purpose: Anchoring Organizational Identity

The concept of vision and purpose as the foundation of organizational identity is well-established in both Eastern and Western management literature. In Western theory, transformational leadership (Bass & Riggio, 2006) emphasizes the leader's role in articulating a compelling vision that inspires and aligns followers. Shankaracharya's leadership was rooted in a clear, transformative vision: to unify diverse philosophical traditions under a common, inclusive philosophical banner. This clarity of purpose enabled him to mobilize followers, transcend regional and doctrinal divides, and establish enduring institutions. In the context of modern organizations, a compelling vision acts as the "North Star," shaping culture and inspiring collective action. However, unlike many Western models that focus primarily on economic outcomes, Shankaracharya's vision was deeply embedded in ethical and societal well-being, reflecting the dharmic tradition of Indian Knowledge Systems (IKS).

Empirical Evidence & Sectoral Examples

According to a 2022 report by Deloitte, companies with a clearly articulated vision report up to **42% higher employee engagement** and **30% greater organizational resilience** during market disruptions.The Tata Group's "Leadership with Trust" philosophy embodies this ethos, shaping strategic choices and building strong loyalty among employees, customers, and partners.

Critical Perspective

While vision-setting offers clear benefits, it risks becoming a superficial branding tactic if not genuinely woven into everyday operations. Organizations must ensure their stated purpose is consistently reflected in actions, policies, and leadership behavior to maintain authenticity.

Stakeholder Insight

A recent employee survey at Tata Sons indicated that 88% of staff felt more committed to the company because its ethics that reflect their individual sense of purpose. Digital platforms now enable organizations to convey organizational goals and guiding principles more effectively through internal social networks, leadership blogs, and real-time feedback systems, ensuring alignment even in geographically dispersed teams.

Reflective Questions

- Is your organization's vision actively shaping day-to-day decisions?
- How is your purpose conveyed and consistently upheld throughout the organization?
- How can digital tools reinforce and sustain your vision throughout every layer of the organization?

2. Decentralized Empowerment: The Matha Model in Practice

Shankaracharya's establishment of four mathas was a strategic move to decentralize authority, foster local leadership, and ensure adaptability. This approach aligns with Mintzberg's theory of organizational structures, which argues that decentralization enhances innovation and responsiveness. However, the matha model uniquely integrates ethical and cultural dimensions, ensuring that local autonomy is balanced with shared values.

Quantitative Data & Sectoral Examples

Organizations with empowered regional teams report 18% higher innovation rates and 12% faster market response than centralized counterparts (Deloitte, 2022). Mahindra's 'Rise for Good' and the Indian Institutes of Management illustrate how decentralized structures foster local innovation within a shared strategic framework.

Critical Perspective

Decentralization can pose challenges such as inconsistency in standards or dilution of core values. To address this, companies should implement strong systems to alignment, such as regular leadership summits and shared performance metrics.

Stakeholder Insight

A Mahindra Group internal report noted that 82% of regional managers felt more motivated and accountable when given autonomy over local initiatives.

Digital Transformation Link

Digital collaboration tools and dashboards facilitate decentralized decision-making by providing real- time data, enabling local leaders to act quickly while staying aligned with central strategy.

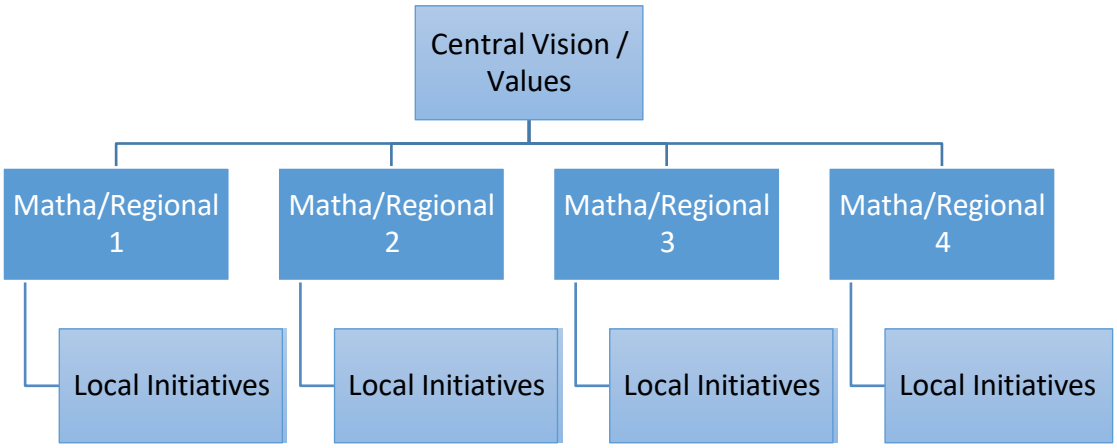

Figure 1 : The Matha Model in Modern Organizations

This model illustrates how a unifying central vision guides decentralized branches, each empowered to innovate and address local needs while upholding core values.

Reflective Questions

- How much autonomy do your regional teams have to innovate?
- What mechanisms ensure alignment with central values and vision?

3. Dialogic Culture: Synthesis over Silos

Shankaracharya's approach to dialogue-engaging in open debates, synthesizing diverse perspectives, and fostering consensus-remains vital for modern organizations. Shankaracharya's approach to dialogue engaging in open debates, synthesizing diverse perspectives, and fostering consensus resonates with Schein's model of organizational culture, which emphasizes shared meaning and open communication, yet differs from some Western models that prioritize hierarchical decision-making by placing greater value on synthesis and collective wisdom.

Empirical Evidence & Sectoral Examples

According to McKinsey's 2023 report, companies with strong internal communication and collaboration launch **1.5 times more new products annually** than those with siloed structures. Infosys institutionalizes open forums and cross-functional teams, fostering a "dialogic culture" that drives

creativity and psychological safety. In the public sector, the Delhi Metro Rail Corporation's collaborative project management strategy has proven to be credited with timely and efficient project delivery.

Critical Perspective

Building a dialogic culture requires overcoming entrenched silos and resistance to change. Leadership must model openness and reward knowledge sharing to make dialogue a lived value.

Stakeholder Insight

Infosys employee surveys show that 76% of staff feel more innovative and engaged when encouraged to participate in cross-functional teams.

Digital Transformation Link

Virtual collaboration platforms and enterprise social networks (e.g., Slack, Microsoft Teams) make it easier for organizations to sustain dialogic practices across locations and time zones.

Reflective Questions

- Are dissent and diversity of thought encouraged in your organization?
- How is conflicts resolved-by suppression or synthesis?
- What digital tools can help foster open dialogue in your context?

4. Dharma-Driven Decisions: Ethics as Strategy

Dharma, or righteous duty, was the cornerstone of Shankaracharya's philosophy and leadership. In the modern context, this translates into embedding ethical reflection and accountability into organizational decision-making. This approach goes beyond compliance, aiming for proactive ethical leadership-a concept echoed in stakeholder theory and the growing field of business ethics.

Quantitative Data & Sectoral Examples

Infosys's implementation of mindfulness and ethical leadership modules led to a 9% improvement in retention and a 14% reduction in workplace conflicts within two years. The Edelman Trust Barometer (2023) notes that Indian companies with explicit ethical frameworks enjoy trust ratings 20% higher than those without.

Critical Perspective

Ethical frameworks can be undermined by lack of enforcement or by "ethics fatigue." Organizations must ensure that ethical reflection is embedded in decision processes, not just policy documents, and that breaches are addressed transparently.

Stakeholder Insight

A 2024 CII survey found that 67% of employees are more likely to remain with organizations that consistently uphold ethical conduct a trend amplified by digital tools like AI-driven compliance dashboards.

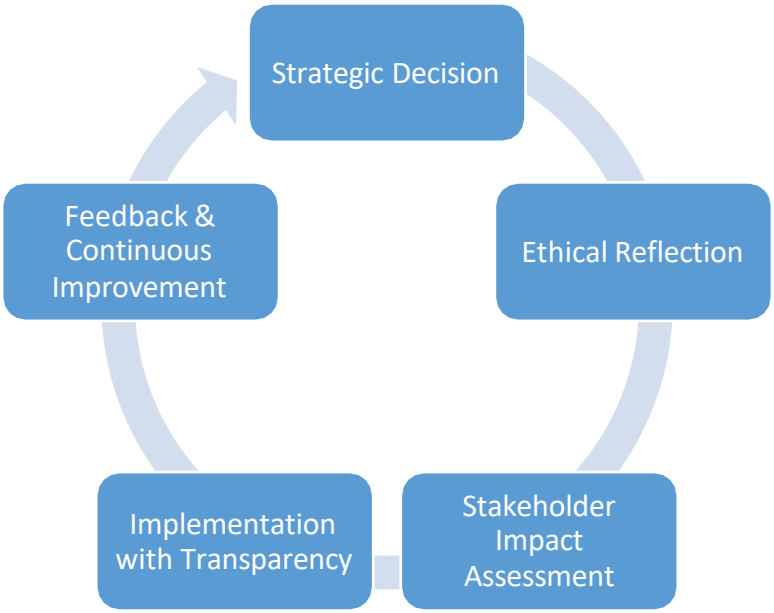

Figure 2: The Dharma Audit Cycle: A continuous process designed to weave ethical reflection and feedback into organizational decision-making.

Reflective Questions

- Are ethical considerations central to your organization's decision-making?
- How are ethical breaches addressed and learned from?
- How can technology support on going ethical vigilance?

5. Sustainable Legacy and Impact

Adi Shankaracharya's institutions have stood for over a thousand years not because they chased short- lived victories, but because they were built on values that outlived their founders. His leadership reminds us that real success is measured not just in immediate results, but in the footprints, we leave for future generations. This is the essence of what modern frameworks like Elkington's Triple Bottom Line and ESG practices also strive for: balancing the needs of people, the planet, and economic prosperity in a way that endures.

Real-World Evidence and Examples

We see the same truth in business today. Tata Group's environmental initiatives didn't just

reduce energy costs by 25% , they also strengthened the company's ESG performance by 30% over five years, winning both investor confidence and public trust (KPMG, 2024). In rural India, Amul's cooperative model empowers thousands of dairy farmers, ensuring not only stable incomes but also a sense of shared achievement and dignity. Both examples show that when strategy serves a bigger purpose, results naturally follow.

The Legacy Continuum

Sustainability often comes down to a choice between chasing the quick win and building for the long run:

Short-Term Focus	Long-Term Legacy
Quarterly profits	Generational impact
Compliance-driven action	Ethical leadership
Brand campaigns	Enduring reputation
Isolated CSR	Integrated sustainability

The real challenge for leaders is to strike a balance staying adaptable and innovative today, while still safeguarding the values that will matter decades from now.

Critical Reflection

A legacy-focused approach strengthens an organization's purpose, but it should never make the organization afraid to change. The most enduring institutions are those that protect their core principles while welcoming new ideas.

Stakeholder Perspective

This connection between purpose and pride is powerful. In a 2023 internal survey, 91% of Tata Sons employees said they felt more committed to the company because of its long-term societal vision.

Technology and Impact Measurement

Today's leaders have tools Shankaracharya could never have imagined from ESG dashboards to real- time environmental performance metrics making it possible to measure, track, and share impact with a transparency that strengthens trust across stakeholders.

Reflective Questions

- What will define your organization's legacy in 50 years?
- Are your sustainability efforts built for lasting impact or short-term acclaim?
- How can digital tools enhance the tracking and sharing of your organization's legacy?

6. Synthesis: The Leadership Journey Framework

Weaving these elements together, the Leadership Journey Framework offers a practical guide for organizations that aim to align values, strategy, and impact for enduring success.

Each phase of the framework builds on the others, equipping organizations to face complexity with clarity, adaptability, and a strong moral compass. This approach draws from both timeless philosophical wisdom and modern empirical evidence, as shown below:

Summary Table: Framework Elements, Outcomes, and Evidence

Framework Element	What It Delivers in Practice	Supporting Data/Example
Vision and Purpose	A clear "North Star" that inspires and aligns people	Tata Group's Leadership with Trust boosted engagement by 42%
Decentralized Empowerment	Local innovation with a unified direction	Mahindra's regional autonomy increased innovation rates by 18%
Dialogic Culture	More creative solutions and faster problem-solving	Infosys' open forums led to 1.5× more new product launches
Dharma-Driven Decisions	Higher trust and ethical resilience	Infosys saw a 20% boost in trust ratings with ethics-focused leadership

Sustainable Legacy	Long-term value for people, planet, and profit	Tata improved ESG scores by 30% and shareholder returns by 11%

Practical Implications and Recommendations

- Keep revisiting your organization's vision to ensure it still speaks to the needs of today's world, and use digital tools to share that vision so everyone feels part of it.
- Give regional teams the freedom to act, but keep everyone connected through shared values, regular conversations, and transparent data dashboards.
- Make dialogue part of the culture. Open forums, cross-functional teams, and collaborative platforms can keep ideas flowing and prevent silos from forming.
- Treat ethics as a living practice, not just a policy document. Let every major decision pass through a "dharma check," and be transparent when tough calls are made.
- Build sustainability into the heart of your strategy, aiming for impact that will still matter decades from now, and use ESG tools to measure and share your progress honestly.
- Think like Shankaracharya: empower leaders at every level while holding everyone to a unifying purpose.
- Before every decision, ask: "Will this choice stand the test of time?"
- Ensure today's innovations are laying the bricks for tomorrow's legacy.
- Let technology be the bridge that keeps ancient, time-honoured principles alive and relevant in a fast-changing world.

Conclusion of Analysis

Reimagining leadership through Adi Shankaracharya's matha model and Indian Knowledge Systems reminds us that lasting success comes from balancing vision with values. This is not just theory, it is a call for leaders to build organizations that thrive today, stand firm in challenges, and leave a legacy worth inheriting.

Conclusion

This study delves into the strategic management insights drawn from Adi Shankaracharya's life, revealing their timeless value for today's organizational leadership and sustainable practices. It introduces the Leadership Journey Framework, built on five interwoven pillars: Vision and Purpose, Decentralized Empowerment, Dialogic Culture, Dharma-Guided Decisions, and Lasting Legacy. This model is tailored to meet the demands of modern organizations navigating complex challenges.

The findings show that organizations with a clear vision, responsible delegation of authority, open and meaningful dialogue, ethical decision-making, and a focus on long-term impact are better equipped to flourish in unpredictable settings. Evidence from leading Indian companies, backed by performance metrics, supports this perspective, highlighting gains in innovation, employee engagement, stakeholder trust, and sustainability outcomes.

By weaving Shankaracharya's enduring principles with contemporary management theories, this research offers more than philosophical musings,it provides a practical roadmap. For leaders and institutions facing volatility, this fusion of ancient wisdom and modern pragmatism serves as a guiding light for building organizations that are both successful and ethically grounded, leaving a meaningful legacy for the future.

Recommendations:

Drawing on the study's conclusions, the following actionable steps are suggested for business leaders, educators, and policymakers:

- **Clarify and Reinforce Vision**

  Organizations should make a concerted effort to define a vision that inspires and aligns teams across all levels. This vision must be more than symbolic, it should shape everyday decisions

  and culture. Digital communication tools, internal forums, and leadership messaging can be used to reinforce and cascade this vision throughout the organization.

- **Empower Decentralized Teams:** Design frameworks that enable regional or departmental autonomy, enabling local innovation while maintaining alignment with core values.
- **Foster a Dialogic Culture:** Institutionalize open forums, cross-functional teams, and regular dialogue sessions to encourage knowledge sharing and creative problem-solving.
- **Embed Ethical Reflection:** Integrate "dharma audits" or ethical checkpoints into decision- making processes, making sure every action reflects organizational values and societal good.
- **Prioritize Sustainable Legacy:** Shift focus from short-term gains to long-term impact by embedding sustainability and legacy planning into strategic objectives and performance metrics.
- **Encourage Continuous Learning:** Promote ongoing learning and adaptation by benchmarking best practices and being open to feedback from all organizational levels.

Limitations:

Although this research offers meaningful contributions, certain constraints must be noted:

- The primary framework is conceptual and draws from historical-philosophical sources; empirical validation in diverse organizational contexts is limited.
- Most examples and information has been sourced from Indian organizations; applicability to global or non-Indian contexts may require adaptation.
- Quantitative data referenced is based on secondary sources and might overlook certain subtle aspects of organizational dynamics.
- The unique cultural and spiritual underpinnings of the Matha Model may not be directly transferable to all industries or sectors.

Future Research Directions:

Expanding on the findings presented here, future studies may explore the following areas:

- **Empirical Validation:** Undertake case-based or empirical studies to evaluate how the Leadership Journey Framework performs across diverse industries and organizational settings.
- **Cross-Cultural Application:** Investigate how the Matha Model and its principles can be adapted for organizations in non-Indian or multicultural environments.
- **Longitudinal Impact:** Study the long-term effects of implementing dharma-driven and decentralized leadership on organizational performance and legacy.
- **Sector-Specific Studies:** Examine the implementation of these ideas within sectors such as healthcare, education, technology, or public administration.
- **Integration with Modern Technologies:** Explore how digital transformation and emerging technologies can enhance or challenge the implementation of these ancient leadership principles.

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Residents' Environmentally Responsible Behaviour at Responsible Tourism Destinations

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Abstract

Destination environments and host communities are essential components of the tourism industry and form integral parts of tourism products. They increasingly influence the destination's environment and tourism offerings due to their daily activities and the growing face-to-face interactions in tourism activities. Encouraging environmentally responsible behaviour among the host community is crucial for effective Responsible Tourism destination management. Tourism impacts the environment alongside its economic contributions, which can be reduced through responsible environmental actions. To promote environmentally beneficial behaviour among residents, voluntary behavioural changes are necessary in addition to legal measures aimed at reducing the negative environmental effects of tourism. Utilising the concept of place attachment and the Norm Activation Model framework, this

study investigates the environmentally responsible behaviour of residents in the Responsible Tourism Destinations in Kerala. The study was conducted in Kumarakom, one of the most popular responsible tourism destinations in Kerala. The findings confirmed the connections between residents' values, beliefs, and personal norms that influence environmentally responsible behaviour. In addition, the residents' strong attachment to the place also encourages environmentally responsible behaviour among residents. Along with offering recommendations for destination management organisations (DMOs), responsible tourism centre administrators, and legislators to promote residents' eco-friendly actions in destinations, this research enhances the understanding of residents' environmentally responsible behaviour.

Keywords: *environmentally responsible behaviour, place attachment, Norm Activation Model, responsible tourism*

1. Introduction

Destination environments and communities are fundamental components of the tourism industry and integral parts of tourism products(Hu et al., 2019). One major concern affecting the development and significance of tourism is its impact on the environment. Tourism inherently promotes the consumption of natural resources, and its activities can lead to increased greenhouse gases and carbon dioxide emissions, ultimately undermining the role of tourism in destination sustainability(Ramkissoon et al., 2013). Sustainable tourism principles emphasise supporting both local residents' attitudes and tourists' preferences. Tourism destinations are essentially communities of specific stakeholders who are either impacted by tourists' experiences or influenced by tourists' actions. Residents are essential to these communities, and ensuring a sustainable tourism destination requires properly considering the attitudes of residents.

The concept of Responsible tourism has gained prominence, particularly for its emphasis on minimising negative environmental impacts and ensuring that tourism benefits local communities(Mathew & Sreejesh, 2017). The host community increasingly influences the destination's environment and tourism offerings through daily activities and growing face-to-

face interactions related to tourism. Resident support for tourism and their engagement in environmentally responsible behaviours are crucial for achieving sustainable tourism(N. (Chris) Chen & Dwyer, 2018). Studies have noted that residents who perceive tangible benefits from tourism viz, economic, cultural or social, are more likely to adopt and support sustainable practices. However, intention to behave environmentally friendly often stems not only from economic benefits, but also from environmental awareness, place attachment and normative values(Ramkissoon et al., 2013).

Environmentally friendly behaviour, also known as pro-environmental or environmental protection behaviour, refers to personal habits and collective actions by individuals or groups that involve understanding environmental attitudes and responsibilities(Safshekan et al., 2020). These behaviours are essential contributors to the development of sustainable tourism. It is a form of social altruism exhibited by community residents who hold positive attitudes and tendencies to care for the environment(Si et al., 2022). Therefore, the pro-environmental actions of host communities are essential for sustainable tourism development. Although numerous studies have explored the predictors of environmentally responsible behaviour and its role in maintaining tourism growth, most of these studies concentrate on tourists and visitors, overlooking the contribution of locals or residents to understanding environmentally responsible actions.

Hence, understanding the psychological mechanisms that influence the adoption of residents' environmentally responsible behaviour is essential not only for researchers but also for policymakers and practitioners striving to promote sustainability. This paper examines the responsible environmental behaviour of residents living in responsible tourism destinations in line with the norm activation model. The norm activation model is one of the most popular model used to understand why individuals voluntarily engage in environmentally responsible behaviour. The study also examines the influence of place attachment on the environmentally responsible behaviour of residents.

2. Review of Literature

Tourism depends greatly on environmental quality, which in turn relies on human behaviour patterns. Environmentally responsible behaviour is defined as a combination of an

individual's concern for the environment, their ecological knowledge, and their commitment (Cottrell & Graefe, 1997). (Stern, 2000) claimed that environmentally responsible behaviour is a multidimensional construct that includes actions such as conserving resources, minimising waste, supporting conservation initiatives, and encouraging others to act responsibly. More recently, it is regarded as actions taken by individuals or groups aiming to minimise environmental issues as much as possible(Confente & Scarpi, 2021). Residents, being long-term users of the tourist destination, exert a greater influence on the resources and natural environment of the area. Although many studies have focused on understanding tourists' environmentally responsible behaviour, few have focused on it from the residents' perspective. In addition, (Lee et al., 2013) pointed out that in tourism destinations, it is shaped by a complex interplay of psychological, social, and contextual factors. (Vaske & Kobrin, 2001) evidenced that place attachment has become a significant factor in driving environmentally responsible behaviour. It also demonstrated how place attachment can predict responsible actions among youths within a natural resource-based community program. (Ramkissoon et al., 2013) argued that residents and repeat visitors who form emotional and functional connections with a destination are more inclined to protect its natural and cultural resources. (Safshekan et al., 2020) stated that residents' attachment to a particular tourist destination is likely to influence their attitudes and behaviours towards it. Hence, the study also considers the influence of place attachment to a destination on the environmentally responsible behaviour of the residents.

3. Theoretical Framework - Responsible tourism in Kerala

Responsible tourism encompasses all forms of travel that respect the natural, built, and cultural environments of hosts, as well as the interests of all stakeholders. According to Goodwin (2011), Responsible Tourism is a strategy that aims to "create better places for people to live in and better places for people to visit" by implementing sustainable practices. Recognising the need for a more inclusive and sustainable approach to tourism, the Government of Kerala launched the Responsible Tourism (RT) initiative in 2008, which was later formalised as the Kerala Responsible Tourism Mission in 2017. This responsible tourism initiative established strong roots in the community by creating employment and empowering local people economically, socially, and environmentally. The initiative has

been piloted and implemented across several destinations, such as Kumarakom, Thekkady, Wayanad, Kovalam, and has since expanded to around 36 destinations under the Kerala RT Mission. Among these, one of the most successful examples is the Kumarakom RT Model, where a partnership between the local panchayath, tourism stakeholders, and the Kerala Tourism Department created an ecosystem in which local farmers, artisans, and women's self-help groups supply products and services to the tourism industry(Chettiparamb & Kokkranikal, 2012). This approach benefits the local economy and lessens the carbon footprint through local sourcing. Environmentally, RT destinations in Kerala have actively promoted eco-friendly practices, including waste management, plastic reduction campaigns, rainwater harvesting, energy-efficient homestays, and organic farming. These efforts aim to conserve natural resources and promote environmentally responsible behaviour among tourists and residents.

4. Theoretical Background and Hypothesis Development

The present paper examines residents' environmentally responsible behaviour in responsible tourism destinations. This study applies norm activation theory to tourism to create a conceptual model that explains how residents' awareness of tourism's negative environmental impacts, their sense of responsibility, place attachment, and environmentally responsible actions are interconnected. The model is outlined as follows:

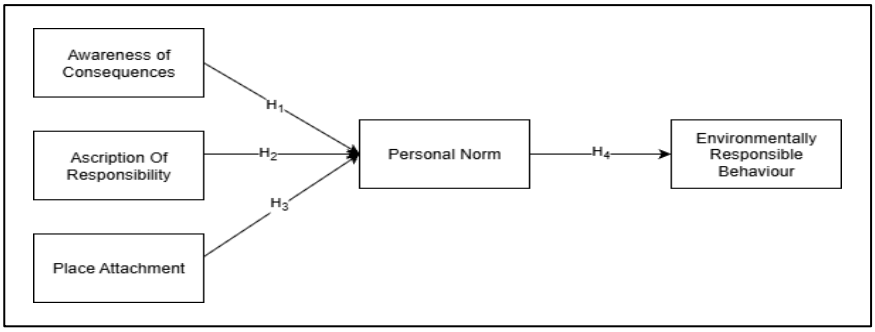

Fig 4.1: Proposed Research Model

4.1. Norm Activation Theory

The Norm Activation Theory by Schwartz (1973) argued that an individual's intention to act environmentally responsibly depends on their moral obligation. It presents a complex model

of human decision-making in moral contexts. Schwartz's NAT describes the relationship between activators, personal norms, and behaviour. According to the theory, norm activation involves a process in which people develop self-expectations regarding pro-social behaviour. It suggests a linear model with three key dimensions to understand why individuals engage in altruistic actions and how they transfer moral norms into pro-environmental or environmentally responsible behaviours. It is often used to examine behaviours that benefit society and the environment.

4.2. Awareness of Consequences

An awareness of the adverse effects of acting unsustainably will cause a personal norm to emerge early in the activation process. Schwartz 1977, pointed out that this will reduce a person's feelings of moral obligation formed by personal norms. Awareness of consequences occurs when people realise the negative consequences for others or things they value when they fail to behave altruistically. It is the level of a person's belief that actions can worsen a problem. According to NAM, awareness of the consequences of one's actions is crucial in activating personal norms, which influence individuals to choose certain behaviours over others (Mandić et al., 2024). Therefore, if the host community recognises the environmental impact of their actions, it will stimulate their personal norms toward environmental protection, resulting in more environmentally responsible behaviour. Hence, the paper proposes the hypothesis as;

> *H_1: Awareness of consequences has a positive and significant effect on the personal norm.*

4.3. Ascription of Responsibility

Ascription of responsibility is a cognitive sense of responsibility in understanding the environmental issues that emerged due to unsustainable human practices (Stern et al., 1999). It addresses the ethical side of recognising both personal and community responsibilities. It highlights an individual's moral duty to participate in environmental stewardship and their belief in the collective obligation of citizens to reduce the environmental impact of tourism and related activities. It can subsequently influence the activation of personal norms regarding one's behaviour toward sustainability (Landon et al., 2018). Therefore, the study

proposes the hypothesis;

H_2: Ascription of responsibility positively and significantly affects the personal norm.

4.4. Place Attachment

Place attachment encompasses the bonds and associations that create a feeling of identification and connection with a specific place. The stronger the attachment residents or tourists feel, the more they are likely to become involved, form bonds, and develop a sense of belonging to that place. Research has also shown that when individuals feel a strong connection to a socio-physical environment, they are more inclined to behave responsibly toward it(Confente & Scarpi, 2021; Zhang et al., 2014). For residents, this emotional bond with their environment encourages environmentally friendly actions. Since residents inhabit a location, their emotional attachment to it fosters a sense of responsibility, motivating them to care for and preserve the environment. This bond reinforces personal norms by enhancing moral duty and internalised environmental values. Studies have confirmed that place attachment is a significant predictor of personal norm activation and explains why individuals often demonstrate environmentally responsible behaviours across different contexts and populations(Arjomandi A. et al., 2025; Xie & Wang, 2024). Therefore, the study proposes the following hypothesis;

H_3: Place attachment towards a destination will positively influence Personal Norm.

4.5. Personal Norm

Personal norm is a core component in the norm activation model, defined as a feeling of a moral obligation to perform or refrain from a specific action (Y. Chen, 2020; Wu et al., 2021). The term personal norm refers to self-expectations based on internalised values, personalities, and habits for specific activities in particular situations, developed by individuals as a sense of moral obligation to behave. It relates to the feeling of obligation to engage in eco-friendly actions, stemming from awareness of the effects of one's actions and a sense of responsibility to lessen these issues. It acts as an intrinsic motivation factor that encourages pro-environmental behaviour(Le & Nguyen, 2022). Hence, the study proposes the hypothesis as;

H_4: Personal norm has a positive and significant effect on environmentally responsible behaviour.

5. Research Methodology

The study is primarily descriptive in nature. Data were collected using both primary and secondary sources. The sampling frame for the study consists of permanent residents living in Kumarakom, one of the most popular responsible tourism destinations in Kerala. Primary data for the study was collected using a structured questionnaire among the residents from August 2024 to January 2025. A convenience sampling method was used to collect data from the respondents, and data were collected from 383 residents living in the area. The collected data were classified and analysed in accordance with the study's objectives. For analysis, statistical tools, percentages and averages were used. SPSS and AMOS 26 is used to test proposed research model.

6. Data Analysis and Results

The study's primary data was gathered using a structured questionnaire. The measurement for each research variable is sourced from previous studies, which were modified to suit the present study. The questionnaire is divided into two parts.

The first part deals with the demographic profile of respondents, and the second part addresses the measurement variables, including awareness of consequences related to tourism, ascription of responsibility, place attachment, personal norm, and environmentally responsible behaviour. five-point Likert-type scale was used with "1= Strongly Disagree" to 5= Strongly Agree". The survey was conducted using a convenient sampling method.

6.1. Demographic characteristics

The majority of respondents belong to the 35-44 age group (52.86%), followed by the 25-34 age category (34.37%). A sizeable percentage of respondents are female, about 68%. 43.48% are graduates, 38.28% have secondary education, and 12.5% have reported post-graduation and above. The monthly income level varies, with 51.3% earning less than 10,000 and 38.28% belonging to the 10,000-20,000 group.

6.2. Hypotheses test results

Table 6.1: Hypothesis test result

Hypotheses	Path	Standardised β	S.E.	t-value	P-value
H_1	AC->PN	0.342	0.061	5.67	0.001
H_2	AR->PN	0.281	0.056	5.06	0.000
H_3	PA->PN	0.291	0.052	5.80	0.000
H_4	PN->ERB	0.612	0.069	8.79	0.006

Table 6.2: Coefficient of determination

Independent Variable	Dependent Variable	R^2
AC, AR, PA	PN	0.61
PN	ERB	0.48

Table 6.2 shows that Awareness of consequences, Ascription of responsibility, and place attachment can explain 61% variability of personal norms. Residents' environmentally responsible behaviour can be explained through personal norms by 48%. Table 6.1 presents the hypothesis test results, indicating that awareness of consequences significantly affects personal norms (b = 0.342, S.E. = 0.061, t-value = 5.67). When residents are aware of the negative consequences of their daily actions, it will create a personal norm among them to act in an environmentally friendly way. There is a significant effect of the Ascription of responsibility on personal norms (b = 0.281, S.E. = 0.056, t-value = 5.06). When a resident is identified as responsible for protecting the environment, the internalised values will be active as a reflection of moral obligation. Place attachment also has a significant effect on personal norms (b = 0.291, S.E. = 0.052, t-value = 5.80). Hence, the commitment of residents to the destination will create a moral obligation within them to act in an environmentally friendly manner. Personal norm significantly affects Pro-environmental behaviour (b = 0.612, S.E. = 0.069, and t-value = 8.79), in which Awareness of consequences, Ascription of responsibility, and place attachment explain 61% of its variability. Residents' feelings of moral obligation

successfully predict the environmentally responsible behaviour of the host community and support the conceptual model from (Le & Nguyen, 2022)

A large number of antecedents of environmentally responsible behaviour have been researched previously. This study relies on the theoretical basis of norm activation theory to link personal norms to pro-environmental behaviour in a responsible tourism context. This study proves that personal norms are a core factor of norm activation theory and can be applied to explain the environmentally responsible behaviour of residents. The study also advances the field by establishing a significant influence of place attachment on more profound responsible environmental behaviour through personal norm.

7. Conclusion

Residents' environmentally responsible behaviour, influenced by place attachment, is essential for responsible tourism and destination resilience(Ramkissoon, 2021). The present study aims to fill the research gap by examining the role of place attachment based on norm activation theory in explaining behaviour. This study's findings have provided empirical evidence regarding the role of personal norms in explaining the environmentally responsible behaviour of residents in a responsible tourism destination. Awareness of consequences, Ascription of responsibility, and place attachment significantly affect residents' personal norms. Residents feel that they have a moral obligation regarding the environment. These findings align with earlier studies regarding the driving role of personal norms in

mediating Awareness of consequences, Ascription of responsibility, place attachment, and pro- environmental behaviour. The findings suggest that place attachment significantly stimulate moral obligation, leading to pro-environmental behaviour, which is highly related to the visual aspect(Arjomandi A. et al., 2025). Responsible tourism destinations can enhance the implementation of green practices by having sufficient green guards to promote environmental sustainability. The study reveals that residents who are morally obliged to the ecosystem consider that their activities can harm the environment, and their responsible behaviour can preserve it.

From a managerial point of view, the findings give significant insights to destination management organizations and tourism stakeholders. The tourism stakeholders should

provide clear and straightforward instructions on green practices to be followed in the destination. They can create eco- vigilance group at panchayath level, introduce green awards for households, houseboats and homestays. Destination managers should listen to residents to understand their beliefs about responsible tourism and its impact on their everyday lives. They should foster a sense of responsibility for environmental issues by explaining how individual actions, while manageable on their own, can become overwhelming when multiplied by thousands of people. They can conduct social media campaigns and promotional advertisements to highlight the importance of green practices to be followed in the destinations. The destination management organisations can provide clear indications of their environment-friendly activities to be followed in the destinations to encourage residents to act sustainably.

Although the study results are satisfactory and align with earlier research, there are limitations to consider. First, our research was confined to a single responsible tourism destination, focusing mainly on backwater tourism, which limits the ability to generalise these findings to other responsible tourism sites. Second, the study only addressed residents' moral obligations, which are primarily psychological; future research could benefit from a broader context, including the tourist perspective. The current study extended the Norm Activation Model by incorporating place attachment only; other variables such as personal value, green self-identity, and environmental sensitivity could be included in future research studies to further develop the model. Additionally, the current study examined place attachment in only one dimension. Future studies might explore a detailed study considering the dimensions, such as place identity, place influence and place dependence. Lastly, the use of convenience sampling, targeting residents willing to participate in the survey, constitutes another limitation.

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Greener Choices, Smarter Futures: ESG Evaluation of Cotton Bags as Sustainable Substitutes

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Abstract

The present research investigates the possibilities of cotton bags as a green, sustainable alternative to plastic bags, focusing on practical solutions that can gain general social acceptability. The study covers significant aspects of Dr. Tejas Doshi's projects based on an extensive interview. This includes his campaigns **"Not to Cut the Corner of the Milk Pouch," "Joy of Giving,"** and the conceptual development of ECO Bricks. The study seeks to assess the feasibility and societal impact of these initiatives, notably the incorporation of cotton bags into existing systems.

This case study highlights Dr. Doshi's substantial contributions to environmental

sustainability through his program, "Use Cotton Bags Instead of Plastic Bags." While raising awareness about environmental issues is critical, the challenge is in maintaining efforts that result in genuine change. Dr. Doshi's work typifies this Herculean undertaking, as he has persistently advocated for the consumption of cotton bags, redefining the "Triple R" principles (Reduce, Reuse, and Recycle) in the process.

The study demonstrates how Dr. Doshi's tireless efforts not only promote social progress but also link environmental awareness to financial benefits for the community. He skilfully engages the masses and encourages society to progress by explaining the economic benefits of sustainable practices.

The objectives of the study are as follows:

- To assess the practicality and public acceptance of cotton bags as a sustainable alternative to plastic bags, with a particular emphasis on incorporating them into current structures and processes.
- To investigate the efficacy of programs like “Use Cotton Bag” as sustainable solutions for increasing stakeholder engagement and driving systemic reforms to solve environmental issues.

Method:

A structured interview with Dr. Tejas Doshi was conducted to elicit qualitative views. Furthermore, information is gathered from key players such as the Bhavnagar Municipal Commissioner, Shishu Vihar students who function as facilitators in sales and distribution management, and local vendors who actively participate in the system. The sample method used is a purposive sampling approach, which ensures that respondents have specific information, experience, or participation related to the study's aims, increasing the reliability and depth of the collected data.

Findings:

Addressing global concerns needs more than merely determining issues; it also necessitates tangible and realistic solutions. This study underlines the necessity of shifting the attitude away from problem- focused conversations and toward solution-driven methods. The study

emphasizes that changes in individual behaviours act as a catalyst for greater societal reform. While such adjustments may be slow, they are essential for cultivating a culture of sustainability and progress. This study calls for the adoption of sustainable practices that result in significant and long-term change by promoting collective responsibility and linking individual activities with the objective of social and national advancement**.**

Novelty:

This study takes a fresh method, moving the focus from identifying environmental concerns to establishing concrete, solution-oriented initiatives. It investigates how changing one's own behaviour can lead to greater community changes, offering a new perspective on implementing sustainable practices. By investigating the role of important stakeholders, including local communities, in supporting systemic change, this study provides a novel technique for evaluating the adoption of sustainable practices and their effect on sociocultural growth and long-term sustainability frameworks.

Keywords: *Consumer behaviour, Cotton bags, Eco-friendly alternatives, Environmental impact, Life cycle assessment, Single-use plastics, Sustainability.*

Introduction:

It all started with an unsettling thought that struck Dr. Tejas Doshi like a thunderbolt on a quiet afternoon in May. While returning from his patient visits in a nearby village of Bhavnagar, he noticed a common sight—piles of discarded plastic bags at the village entry and exit points. But what disturbed him most was not just the sight of trash but the way these bags were being used. Villagers had adopted the habit

of dumping their household waste into plastic bags, believing they were making the environment cleaner and greener. Little did they know; these bags would only contribute to a long-lasting environmental catastrophe.

As Dr. Doshi took in the scene, he observed that the plastic bags used for waste disposal were also the same one’s villagers used for daily essentials—groceries, vegetables, and other household goods. To the villagers, these bags were simply a practical tool. But to Dr. Doshi, the implications were much deeper. People, in their well-intentioned efforts to keep their

surroundings tidy, were inadvertently creating a pollution time bomb. The same bags, once discarded, posed a threat not only to the environment but also to wildlife. Animals consuming plastic waste were suffering, and the effects would inevitably ripple back to humans.

It was a startling realization that set Dr. Doshi on his path of change: a single plastic bag, weighing less than 50 microns, would remain in the soil for up to 400 years. This shocking statistic was not just a fact—it was a call to action. The pollution from these bags would persist for four generations, and the impact would only grow more dire with each passing year.

In that moment, Dr. Doshi recalled a seemingly innocuous exchange he'd had earlier that day with a local grocer. Out of curiosity, he asked the shopkeeper, "What about these plastic bags? How many microns do they consume?" The shopkeeper, with a casual air, replied, *"Only 30 microns, Saab. Don't worry, they'll carry the weight. What else do you need, Doctor Saab?"* The conversation, at first trivial, began to haunt Dr. Doshi as he made his way home.

Sustainable development principles emphasize resource optimization and the reduction of waste (United Nations, 2019). Initiatives like the "Joy of Giving" support circular economy models by repurposing unwanted items, as demonstrated by similar projects, such as eco-bricks (Amin, Saxena, Parmar, & Singh, 2023). Including sustainability in charitable activities enhances their long-term impact, with social innovation and community involvement driving sustainable change (Putnam, 2000).

However, challenges remain in ensuring the success of community-driven projects, including issues related to volunteer participation, financial constraints, and logistical barriers. Successful philanthropic models require institutional support and organized management to ensure sustainability (Kania & Kramer, 2011).

The concept of giving has been widely explored across various academic disciplines, including economics, sociology, and psychology. Research shows that altruistic behaviour fosters psychological health, social cohesion, and community advancement (Aknin, Dunn, & Norton, 2012). The "Joy of Giving" initiative aligns with prosocial behaviour theories, demonstrating that people derive fulfilment from giving back to their communities (Post, 2005).

Studies have shown that acts of giving are associated with increased happiness, reduced stress, and a general sense of life satisfaction (Dunn, Aknin, & Norton, 2008). These acts activate reward areas of the brain, creating a cycle of selfless action (Harbaugh, Mayr, & Burghart, 2007). Philanthropy, as a tool for resource redistribution, plays a significant role in improving societal well-being (Bekkers & Wiepking, 2011).

When he arrived at his house, he placed the plastic bag aside, unable to shake off the disturbing thought. “These plastic bags remain in the soil for the next 400 years,” he repeated to himself. “The pollution from these bags will linger for four generations. This cannot go on.”

Amin U. et. (2021) in her paper titled “A detailed case study on the project “Joy of Giving” that effective association of all stakeholders to the project will bring new change to the society.”

Amin U et al. (2024) explained, related to “ECO BRICKS: PROCESS OF TRANSFORMATION TOWARDS A NEW FUTURE.” To sustain good environmental practice, it would be essential for an individual to act responsibly and adopt innovative practices.”

Dube et al. (2021) conducted a Life Cycle Assessment (LCA) comparing the environmental impacts of plastic and cotton bags. The study concluded that while cotton bags have a higher initial environmental cost, their benefits are realized through repeated reuse.

The European Commission (2020) reported on policy interventions aimed at reducing plastic bag usage across member states. The report demonstrated the success of regulatory measures in promoting the adoption of sustainable alternatives.

Nielsen et al. (2020) provided insights into consumer perceptions of eco-friendly products. Their research emphasized the role of education and marketing in driving the adoption of cotton bags.

That evening, Dr. Doshi’s children, Kamya and Mann, were watching a documentary on CNBC that discussed plastic wastage and its impact on the environment when he interrupted them. “Stop the video,” he said. “When I return, we will watch this together. I have something important to show you.” The realization that had shaken him needed to be shared with his

family, as it had already become more than just an environmental issue—it was a responsibility, a call to do something before it was too late.

This moment marked the beginning of Dr. Doshi's commitment to a life-changing project—the No Plastic Bag initiative. His decision to act wasn't just rooted in a sense of environmental responsibility but in a deep-seated belief that the change had to start from the community level. By involving local shopkeepers, residents, and vendors, Dr. Doshi aimed to not only reduce plastic waste but also raise awareness about the long-term consequences of unchecked plastic consumption with reasonable and individual cost bearing sensitively and sensibly.

This case study examines the profound impact of Dr. Doshi's journey, from his initial shock and realization to the grassroots effort he spearheaded to combat plastic pollution and foster sustainable living.

Bridging Realization to Action – Dr. Tejas Doshi's Fight Against Plastic Pollution

Dr. Tejas Doshi's path from realization to action is a compelling tale of how one individual's concern sparked a movement. What began as a disturbing observation of plastic waste littering rural landscapes soon transformed into an urgent call for research and solutions. During his visits to villages in Bhavnagar, he not only saw plastic bags choking the environment but also witnessed the silent suffering of stray animals and the hidden health hazards posed by airborne plastic particles mixed with dust.

The issue, Dr. Doshi realized, was more than just improper waste disposal. It was deeply rooted in behavioural patterns, a lack of awareness, and the absence of sustainable alternatives. Armed with these insights, he delved into the problem with a research-driven mindset. Collaborating with environmental experts and studying waste management practices, he began crafting a community-based initiative.

This led to the No Plastic Bag Project, which stood out for its innovative barter system. Exchanging used plastic bags for reusable cloth ones. This solution didn't just address waste but also reshaped attitudes and fostered accountability. Dr. Doshi's research-backed interventions bridged the gap between awareness and action, creating a replicable model for combating plastic pollution while inspiring sustainable living.

Addressing Financial and Environmental Challenges through the "No Plastic Bag" Project: A Research Perspective

The issue of plastic waste has long been associated with the environmental consequences of irresponsible consumption. However, Dr. Tejas Doshi, upon observing the financial behaviours of individuals, recognized an important underlying challenge: the affordability and convenience of plastic bags. People were spending Rs. 3 on a paper bag for every shopping trip, while they could purchase 100 plastic bags for just Rs. 8. For any normal individual to purchase a paper bag for shopping is not a strategic decision, and so they all diverted to plastic bags. The financial rationale was evident—plastic bags were inexpensive, accessible, and easily disposable. But the environmental cost, including landscape degradation and animal suffering, was mounting at an unsustainable rate, affecting future generations. The hardest thing for him is to come up with a response for the same; according to the norms he saw, people never connected anything if it was free, so what should be done next?

In response, Dr. Doshi devised a solution that balanced both financial and environmental considerations. The No Plastic Bag Project moved beyond simply offering free alternatives; it introduced a model that emphasized individual responsibility and conscious consumption. Through this initiative, individuals were incentivized to exchange 50 used plastic bags for one reusable cotton bag, which served not only as an alternative but also as a tool for behaviour change. This system made people more conscious of their consumption patterns and involved the community in the sustainability process.

Dr. Doshi’s approach was also rooted in addressing financial challenges. By offering durable, foldable, and washable cotton bags for a minimal cost of Rs. 25—covering material, labour, and logistical expenses—he ensured that the initiative was both financially viable and sustainable. The bags, capable of carrying up to 10 kg, proved to be practical, low-cost alternatives for everyday use. Additionally, Dr.

Doshi incorporated a socio-economic aspect by involving local women in the production process, creating employment opportunities and empowering the community. Not only that, he developed a system based on deposit where a person should not invest a penny and still able to get the benefit of the cotton bag.

Refundable deposit model: He also devised a system where individuals could benefit from the cotton bag without any initial investment, based on a refundable deposit model.

To further promote sustainable practices, Dr. Doshi developed an innovative financial model that integrated local vendors, communities, and markets into the project's framework. By introducing a deposit-based system for cotton bags, where customers paid a refundable deposit of Rs. 20, the model encouraged bag circulation and reduced plastic dependency. This system, implemented across residential complexes and local markets, fostered a culture of shared responsibility and accountability, thus strengthening community engagement in sustainability efforts. This is not limited to this local vendor market, but he also approached two different multi-story residences and convinced their president and flat members that it is essential to keep a cotton bag at the parking area on some hanging hooks or in some drawer so whoever wishes to purchase anything from the vendor can take that cotton bag and return it after using it as and when possible for them. With a small initiative, it would change the mindset of the people as well as declare some awards like most aware citizen of the residency, most valuable customer, etc., which will be helpful to others in spreading the idea and awareness. Through such small initiatives, it would be possible for others to spread awareness and become participants in this drive.When demand increased and he was not able to manage on a small scale, he took the initiative for a self- sustaining model, which will add glory to his project.

Empowering Women, Sustaining Ecosystems: Dr. Tejas Doshi's No Plastic Bag Revolution"

Dr. Tejas Doshi's No Plastic Bag Project has emerged as a pioneering model, addressing both environmental sustainability and women's empowerment.

In the paper of Amin U. and Patel B. (2012). Impact of Woman Empowerment through Microfinance Institutes: Socioeconomic and Behavioural Perspectives Affecting the Rural Segment A woman of Gandhinagar in Gujarat explained that for any economy upgradation, women's financial contribution is impacted significantly. In this project for betterment, Dr. Doshi adopted the same legacy, with some women working on custom products. Initially, 15

women from rural villages were employed to produce high-quality cotton bags, exchanged for 50 plastic bags each. As demand grew, the project expanded to hire an additional 15 women, creating new job opportunities and promoting a sustainable economic model. This initiative not only provided women with income-generating opportunities but also empowered them through skill development and financial independence. These women got a chance to be a helping hand for the family with the financial stake and also inspired other aspirants.

In addition to job creation, the project's eco-friendly approach contributed significantly to waste reduction. Instead of discarding the collected plastic bags, Dr. Doshi partnered with the Adani Group's PIDILITE plant, where the bags were processed and converted into reusable materials, thus closing the plastic waste loop. This circular economy model demonstrated how waste could be transformed into valuable resources, promoting environmental responsibility at the local level.

The project further embraced financial sustainability by employing upcycled fabric sourced from Surat, reducing material waste and contributing to the broader sustainability goals of the initiative. Through collaboration with local scout groups for logistics, the project also ensured efficient delivery and inventory management, extending its reach within and beyond Bhavnagar. *This perfectly redefines the triple R model of R: reuse, R: recycle, and R: reuse, making it absolute in its unique way.*

In conclusion, Dr. Doshi's No Plastic Bag Project exemplifies how financial sustainability, ethical responsibility, and environmental stewardship can intersect. This research highlights the innovative integration of community engagement, socio-economic development, and environmental protection, creating a model that can be replicated in other regions facing similar challenges. His slogan was also adopted by the Ministry of India under the project of "Mission Clean India."

"Dr. Tejas Doshi: A Catalyst for Sustainability and Environmental Change in India" Since its inception, the project has distributed over 160,000 cotton bags and collected more than 800,000 plastic bags, a remarkable achievement achieved even amidst the challenges of the COVID-19 pandemic. This success highlights the project's dual impact on both women's empowerment and environmental conservation.

Dr. Doshi's project exemplifies how community-driven initiatives, combining women's empowerment and innovative financial models, can contribute to both economic and environmental sustainability.

Dr. Tejas Doshi's pioneering contributions to sustainability and the fight against plastic pollution have earned him widespread recognition, culminating in his appointment as the Brand Ambassador for the Clean India Mission Urban by the Ministry of India. His innovative initiatives, particularly the No Plastic Bag Project, along with his efforts to empower local communities through eco-friendly solutions, have led to measurable environmental improvements and sparked significant, nationwide change.

Dr. Doshi's unwavering commitment to preserving the environment, paired with his ability to engage communities in impactful, sustainable practices, has solidified his position as a central figure in India's vision for a cleaner, greener future. His work has not only brought about tangible environmental benefits but has also served as a source of inspiration for others to adopt more responsible and sustainable behaviours.

His appointment as Brand Ambassador serves as a profound acknowledgment of the far-reaching influence of his work and the national recognition of his dedication to advancing environmental awareness and fostering meaningful action across urban India. This prestigious role further reinforces the critical importance of his initiatives and the positive ripple effect they continue to generate.

Launch of the Cotton Bag Project in Bhavnagar: A Significant Development in the Battle Against Single-Use Plastic. The official opening of the Cotton Bag Project in Bhavnagar represented a significant milestone in our continued commitment to environmental sustainability. Hon. Sports Minister Shri Mansukh Mandaviya, Hon. Ashwini Vaishnaw, Hon. Minister of Railways and Information Technology, and Bhavnagar MLA Shri Jitu Vaghani attended the event with their distinguished presence. Their support has been crucial in the advancement of this program. More than 2.25 lakh reusable cotton bags and more than 1.25 crore single-use plastic bags have been successfully collected as part of the project's quantifiable impact. These results demonstrate a solutions-based and community-driven approach to lowering plastic consumption and promoting the use of sustainable substitutes.

Specific Results of the Research:

More than just recognizing current problems is needed to address global environmental concerns; practical and workable solutions are also required. The crucial transition from problem-centric discussions to solution-oriented methodologies is emphasized by this study. It concludes that changing one's own behaviour is crucial to bringing about more significant changes in society. These changes may come gradually, but they are essential to fostering a culture that is sustainable and forward-thinking. Furthermore, the results emphasize how important it is for everyone to take responsibility for maintaining ecological balance over the long run. The project's strategy of involving the community in addressing macro-level environmental issues has been validated by the notable cumulative effect of individual adoption of environmentally acceptable habits.

Newness of the Research:

By moving the emphasis from just recognizing environmental issues to creating tangible, solution- driven actions, this study provides a novel and forward-thinking methodology. It offers a fresh perspective on how to assess long-lasting behaviour change by examining how changes in individual habits can spur community-level change.

The study also looks at how important stakeholders, such as the public, community leaders, and governmental organizations, contribute to the institutionalization of sustainable practices. It offers fresh perspectives on how regional initiatives, bolstered by legislation and public involvement, advance the more general objective of sociocultural change and frameworks for sustainable development.

In conclusion, the Cotton Bag Project is a powerful example of how community-based efforts backed by governmental and civic organizations may successfully stop environmental deterioration. The initiative's early success in substituting reusable cotton for single-use plastic demonstrates the effectiveness of coordinated, action-oriented strategies.

According to the study's findings, achieving a sustainable future requires encouraging behavioural change at the individual level, supported by systemic assistance and stakeholder

cooperation. In the future, scaling up such models in other locations will require consistent public awareness, stakeholder participation, and policy-level reinforcement. This project serves as a reproducible model for environmental reform on a national and international scale, in addition to being a local action.

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Sustainable Management and Corporate Social Responsibility: A Case Study of Reliance Foundation's Vantara Initiative at Gir Forest

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Abstract

The *Vantara* initiative, launched in 2024 by the Reliance Foundation, represents a pioneering corporate social responsibility (CSR) effort in India that bridges conservation science, community welfare, and corporate accountability. Situated in Jamnagar, Gujarat—strategically near the ecologically rich Gir Forest National Park—Vantara is designed as a large-scale, interdisciplinary wildlife rescue and rehabilitation program. It stands out not only for its scope, including the rescue of over 10,000 animals and the conservation of 42 endangered species, but also for its embedded commitment to sustainability and ethical corporate conduct.

Vantara is emblematic of the modern shift in CSR thinking, where environmental responsibility is no longer a peripheral concern but a strategic priority. The initiative is evaluated through established sustainability lenses such as the *Triple Bottom Line* (People, Planet, Profit) and *Carroll's CSR Pyramid*, which collectively assess economic, legal, ethical, and philanthropic dimensions of corporate performance. With facilities like the world's largest elephant hospital and an integrated care ecosystem for diverse species, Vantara goes beyond token environmentalism by creating lasting ecological value.

Crucially, Vantara does not operate in isolation. The project actively engages over 500 local community members through employment, training, and awareness programs, thereby aligning conservation with livelihood enhancement and rural development. This aligns the initiative with several *United Nations Sustainable Development Goals (SDGs)*—notably SDG 13 (Climate Action), SDG 15 (Life on Land), and SDG 8 (Decent Work and Economic Growth).

Despite its accomplishments, Vantara also faces challenges common to large-scale CSR programs, such as ensuring transparency, managing public accountability, and scaling impact sustainably. However, the initiative sets a compelling precedent for how private sector investment—when rooted in ethical, inclusive, and scientific principles—can address global biodiversity crises while driving socioeconomic progress. Vantara thus offers a transformative model for corporate-led environmental stewardship in the Global South.

Keywords: *Corporate Social Responsibility, Sustainable Management, Reliance Foundation, Vantara, Gir Forest, Wildlife Conservation, Biodiversity, SDGs*

1. Introduction

Background: The convergence of corporate social responsibility (CSR) and sustainable management marks a critical evolution in the role of businesses in the 21st century. No longer confined to maximizing shareholder value, corporations are now expected to create value across environmental, social, and economic dimensions—a philosophy encapsulated by John Elkington's Triple Bottom Line framework (1997), which advocates for a balanced focus on People, Planet, and Profit. In parallel, Archie B. Carroll's CSR Pyramid (1991) provides a hierarchical structure to corporate responsibility, outlining four layers: economic, legal,

ethical, and philanthropic. These frameworks have shaped global perspectives on how businesses should interact with society and the environment, offering guiding principles for evaluating corporate sustainability initiatives.

In India, the significance of CSR was institutionalized through the landmark *Companies Act of 2013*, which made CSR spending mandatory for certain categories of companies. Specifically, firms with a net worth of ₹500 crore or more, turnover of ₹1,000 crore or more, or net profit of ₹5 crore or more are required to spend at least 2% of their average net profits from the preceding three years on CSR activities. This legal mandate has catalyzed a surge in corporate engagement with social and environmental causes, shifting CSR from voluntary philanthropy to a strategic business obligation. Reliance Industries Limited (RIL), one of India's largest conglomerates, has responded robustly to this policy shift, embedding sustainability and social responsibility into its core operations through its CSR arm—Reliance Foundation.

Reliance Foundation Context: Established in 2010 by Smt. Nita M. Ambani, Reliance Foundation has become a cornerstone of RIL's social development strategy. The Foundation works across diverse thematic areas including rural transformation, education, health, sports, disaster response, urban renewal, and environmental sustainability. With an estimated outreach exceeding 76 million individuals across India, the Foundation exemplifies how corporate philanthropy can be scaled to meet national development goals while fostering inclusive progress. Among its most ambitious and recent initiatives is *Vantara* (meaning "Star of the Forest"), a ground breaking wildlife conservation and rehabilitation program that represents a paradigm shift in corporate-led biodiversity management.

Vantara Initiative: Launched in February 2024 under the leadership of Anant Ambani, Vantara is a 3,500-acre wildlife sanctuary located within RIL's Jamnagar Refinery Complex in Gujarat. Positioned strategically near the Gir Forest National Park—home to the world's only population of wild Asiatic lions—Vantara is both a symbolic and practical intervention in India's conservation landscape. It reflects the transition of Indian CSR from conventional community service toward more specialized, long-term environmental stewardship. With its integrated facilities for animal rescue, veterinary treatment, endangered species breeding, and habitat restoration, Vantara is not only the largest such project in Asia but also a globally

significant model of private-sector investment in biodiversity.

Vantara stands at the confluence of several urgent global and national challenges. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) reported in 2019 that approximately one million species face extinction within decades, primarily due to human activities. India, as one of the 17 megadiverse countries in the world, bears both a responsibility and an opportunity to address this crisis. However, public sector capacity alone is insufficient. The involvement of the private sector—especially large corporate houses with financial and logistical capabilities—has emerged as a critical enabler of scalable conservation. In this context, Vantara serves as a case study of how corporate CSR initiatives can contribute not only to biodiversity preservation but also to economic and social well-being.(Launched in February 2024 under Anant Ambani's leadership, Vantara is a 3,500-acre wildlife rescue and rehabilitation program within RIL's Jamnagar Refinery Complex, near Gir Forest, a critical habitat for Asiatic lions.

Research Objectives

1. Assess Vantara's alignment with sustainable management principles.
2. Evaluate its activities, environmental, and socio-economic impacts (2020–2024).
3. Analyze contributions to SDGs and implications for corporate-led conservation.

The objectives of this research are threefold. First, it aims to assess the extent to which Vantara aligns with sustainable management principles, particularly as defined by frameworks such as the Triple Bottom Line and Carroll's CSR Pyramid. This involves analyzing the program's economic viability, legal compliance, ethical foundations, and philanthropic outreach. Second, the study evaluates Vantara's concrete activities and impacts from 2020 to 2024—analyzing data related to wildlife rescue (over 10,000 animals rehabilitated), conservation of 42 endangered species, infrastructure development (including the world's largest elephant hospital), and community engagement (impacting over 500 local livelihoods). Third, it explores how Vantara contributes to the United Nations Sustainable Development Goals (SDGs), particularly SDG 13 (Climate Action), SDG 15 (Life on Land),

and SDG 8 (Decent Work and Economic Growth), while reflecting on its potential as a scalable model for corporate-led conservation.

Significance: With biodiversity loss accelerating globally (IPBES, 2019), Vantara offers a model for corporate-driven environmental solutions in India, a biodiversity hotspot. This paper is significant in several ways. It addresses the increasing relevance of environmental sustainability in CSR discourse, particularly in emerging economies like India where biodiversity pressures and development needs coexist. While many corporate CSR activities in India focus on education, health, or rural development, relatively few have ventured into the complex and capital-intensive domain of wildlife conservation. Vantara thus stands as an outlier and innovator, pushing the boundaries of what CSR can achieve. Moreover, it highlights the ability of corporate entities to fill governance gaps in conservation, bring technical expertise, and establish world-class infrastructure that complements state-led efforts.

Structure: The structure of the paper is organized into six key sections. Following this Introduction, the Literature Review section critically engages with academic and policy literature on CSR, sustainable management, and biodiversity conservation, contextualizing Vantara within global and Indian debates. The Methodology section outlines the qualitative case study approach, data sources (including Reliance Foundation reports, media articles, and peer-reviewed journals), and analytical frameworks employed. The Case Study section provides a detailed narrative of the Vantara initiative—its origins, design, operations, and outcomes. The Discussion section critically assesses Vantara's contributions and limitations, including issues of scalability, stakeholder engagement, and long-term sustainability. Finally, the Conclusion synthesizes key findings and offers recommendations for policymakers, corporate leaders, and sustainability practitioners seeking to replicate or adapt such models.

2. Literature Review

Sustainable Management: Integrating Stakeholders and Systems Thinking

Sustainable management is a business philosophy that prioritizes long-term value creation by integrating economic viability, environmental stewardship, and social responsibility. Central

to this philosophy is stakeholder theory (Freeman, 1984), which posits that businesses must address the interests of all stakeholders—not just shareholders—including employees, communities, customers, governments, and the natural environment. Stakeholder theory challenges traditional notions of corporate purpose by asserting that sustainable value arises from balancing competing interests and fostering inclusive dialogue and accountability.

In the context of wildlife conservation, stakeholder engagement becomes critical, especially when local communities, environmental regulators, conservationists, and corporate entities must collaborate. Projects like Vantara illustrate how sustainable management is applied in the field, involving multiple stakeholders—from veterinarians and ecologists to tribal communities and state agencies—each contributing to the mission of biodiversity restoration.

Complementing stakeholder theory is the concept of the circular economy, championed by the Ellen MacArthur Foundation (2013). A circular economy promotes resource efficiency, waste minimization, and regenerative design. Instead of the traditional linear "take-make-dispose" model, businesses are encouraged to redesign processes for sustainability. Vantara incorporates elements of circular economy through its reuse of land (formerly non-arable industrial space), self-sufficient waste and water management systems within the sanctuary, and long-term ecological regeneration.

These frameworks reinforce the shift from short-term financial goals to a systems-thinking approach where ecological and social capital are seen as equally vital assets. By embedding these principles into its core operations, Vantara aligns itself with a global movement towards regenerative, not just sustainable, business practices.

CSR in India: Evolution, Regulation, and Innovation

Corporate Social Responsibility in India has undergone a significant transformation, especially after the enactment of the Companies Act, 2013, which made CSR spending mandatory for qualifying companies. This legislative change institutionalized CSR in India and compelled firms to look beyond token charity to structured, impact-driven programs. The Act mandates companies with certain financial thresholds to spend at least 2% of their average net profits from the preceding three years on CSR activities, including environmental sustainability.

Leading corporates like the Tata Group have long been considered pioneers in social responsibility, with initiatives such as healthcare access, educational scholarships, and tribal empowerment programs. Tata Steel's sustainable urbanization models and Tata Trusts' work in water security are often cited as exemplary. Similarly, ITC's e-Choupal initiative, which digitized rural supply chains and empowered farmers with real-time market data, set a benchmark for rural-focused CSR innovation.

Reliance Industries Limited (RIL) has followed suit, scaling up its CSR activities after 2013 through its dedicated arm, Reliance Foundation. The organization has diversified its CSR portfolio into sectors such as education, health, livelihood, and environmental conservation. According to The CSR Journal (2023), RIL has consistently ranked among the top CSR spenders in India, with major investments directed towards rural and ecological development.

However, there remains a gap in CSR activity focused specifically on wildlife and biodiversity conservation, which often requires long gestation periods, specialized expertise, and significant capital investment. This context makes Vantara an exceptional CSR initiative. By focusing on endangered species rehabilitation and ecological renewal, it addresses a niche but increasingly critical component of sustainability in India.

Corporate-Led Conservation: Global Benchmarks and Lessons

Globally, the intersection of corporate influence and biodiversity conservation is gaining recognition as businesses begin to understand the risks posed by ecological degradation. The Disney Conservation Fund, for example, has invested over $120 million in wildlife protection and community-based conservation across 120 countries. Disney's strategy integrates storytelling, education, and grant- making to raise awareness and fund biodiversity efforts.Another notable example is Unilever's Sustainable Living Plan, which commits the multinational to reducing its environmental footprint while increasing its positive social impact. The company works with smallholder farmers, invests in sustainable sourcing, and integrates climate-resilient practices across its value chain. Such programs demonstrate how conservation can be woven into corporate DNA rather than treated as peripheral philanthropy.

These global initiatives underscore the strategic value of corporate-led conservation: enhancing brand equity, managing regulatory risk, and creating resilient supply chains. For Vantara, these global precedents offer both validation and inspiration. Like Disney, it invests in education and public awareness through digital platforms. Like Unilever, it seeks to influence not just internal practices but also broader systems—by establishing scientific research centers and fostering local partnerships for environmental and economic resilience.

Yet, Vantara distinguishes itself through scale and specialization. It is not merely a grant-making or awareness-building initiative but an operational, on-the-ground intervention featuring veterinary hospitals, rehabilitation centers, and breeding programs—unmatched in scope in Asia.

Reliance Foundation's CSR Approach: Multi-Sectoral Impact and Recognition

Founded in 2010 by Smt. Nita M. Ambani, Reliance Foundation has redefined the role of corporate philanthropy in India by taking a systems approach to social transformation. Rather than working in isolated silos, it addresses the interconnections between education, health, livelihoods, urban renewal, and environmental sustainability. This integrated strategy has allowed the Foundation to impact over 76 million people across 55,000 villages and urban locations.

In 2015, Reliance Foundation was awarded the Porter Prize for excellence in creating shared value— recognizing its ability to integrate competitive business strategy with societal impact. This philosophy of shared value, developed by Porter and Kramer (2011), resonates deeply with initiatives like Vantara that generate benefits for both the environment and the corporation's public image, stakeholder relations, and long-term viability.

Vantara emerges as a natural extension of this CSR philosophy. It reflects the Foundation's ability to scale operations, engage expert collaborators, and build infrastructure that meets both scientific and humanitarian standards. It also marks a strategic deepening of Reliance's CSR focus into the environmental domain—particularly biodiversity, a less commonly prioritized area among Indian corporates.

Biodiversity and SDGs: Vantara's Role in Global Goals

Biodiversity underpins human health, food security, and climate regulation. Recognizing this, the United Nations Sustainable Development Goals (SDGs) place biodiversity at the heart of sustainable development—most notably through SDG 15: Life on Land, which urges nations to protect, restore, and promote sustainable use of terrestrial ecosystems. SDG 8: Decent Work and Economic Growth also intersects with biodiversity, advocating for sustainable livelihoods that do not degrade natural systems.

India is one of the world's 17 megadiverse countries, home to approximately 8% of the world's recorded species, making conservation not just a moral imperative but a national responsibility. However, with increasing deforestation, habitat fragmentation, and climate change, India's biodiversity is under severe threat. In this context, Vantara serves as a critical intervention that addresses both species preservation and ecosystem restoration.

Moreover, Vantara contributes to SDG 8 by generating employment opportunities in eco-tourism, veterinary care, habitat management, and community outreach. Over 500 local residents have reportedly been engaged in its operations, helping to link conservation efforts with socio-economic empowerment.

By restoring degraded lands, investing in scientific research, and protecting endangered fauna, Vantara contributes to building ecological resilience, which is fundamental for achieving multiple SDGs in an interconnected global environment.

Research Gap: The Untapped Domain of Corporate-Led Wildlife Conservation

While CSR in India has evolved rapidly in the last decade, most academic and policy literature continues to focus on traditional areas such as education, healthcare, sanitation, and rural development. There is limited research available on corporate-led initiatives in wildlife conservation, particularly those that go beyond financial contributions to include operational involvement and long-term ecological planning.

Vantara fills a critical gap in this landscape. It is a rare example where a private corporation has invested directly in building institutional and physical infrastructure for wildlife rehabilitation, species breeding, and habitat management. Unlike government-run

sanctuaries or NGO-led wildlife campaigns, Vantara combines corporate efficiency, philanthropic commitment, and ecological expertise under one umbrella.

The lack of rigorous academic documentation on such models highlights the need for case study-based research that can uncover best practices, pitfalls, and replicable strategies. Vantara presents a unique case for this kind of analysis, not only because of its scale and ambition but also because of its potential to influence national and international conservation policies.

3. Methodology

This section outlines the research design, data sources, analytical frameworks, and limitations used in studying the Vantara initiative as a model of corporate-led biodiversity conservation in India.

Research Design

This study adopts a **qualitative case study approach**, aimed at exploring the complex and multi- dimensional nature of the Vantara initiative by Reliance Foundation. The case study method is particularly well-suited for examining contemporary phenomena within their real-life contexts, especially when the boundaries between the phenomenon and context are not clearly defined (Yin, 2009).

Given that Vantara is a unique, large-scale CSR-driven conservation project, the case study method allows for a comprehensive, in-depth understanding of its origins, operations, impact, and alignment with sustainable management principles. The study employs a descriptive and analytical lens, focusing on both the process and outcomes of the initiative between 2020 and 2024.

Data Collection Methods

This research utilizes a **triangulation strategy** by drawing on multiple sources of data to enhance the validity and reliability of findings. The data collection is divided into two categories: Primary Sources and Secondary Sources.

2.1. Primary Sources

- **Corporate Disclosures**: Official sustainability reports, CSR updates, and press releases by Reliance Industries Limited (RIL) and Reliance Foundation (2020–2024).
- **Digital Platforms**: Content from the official Vantara website (https://vantaraindia.in) and affiliated media channels.
- **Expert Interviews** (where possible): Publicly available interviews or statements by Anant Ambani, Smt. Nita Ambani, and senior leadership involved in Reliance Foundation's environmental programs.

2.2. Secondary Sources

- **Academic Literature**: Peer-reviewed journal articles on CSR, corporate-led conservation, stakeholder theory, and sustainable management.
- **Media Coverage**: News articles and features from reputable outlets like Economic Times, India CSR Journal, and The Hindu BusinessLine.
- **Government & Policy Documents**: Relevant guidelines under the Companies Act, 2013, and SDG reporting frameworks by NITI Aayog.

The use of mixed-source data ensures a holistic representation of Vantara's contributions and challenges.

Analytical Frameworks

To interpret and assess the Vantara initiative, the study uses the following theoretical frameworks:

3.1. Triple Bottom Line (Elkington, 1997)

This framework examines the People, Planet, and Profit dimensions of Vantara. It helps evaluate the initiative's:

- **Social impact**: Employment generation, community outreach, and training programs.

- **Environmental impact**: Wildlife rescue, species conservation, and ecosystem restoration.
- **Economic value**: Long-term sustainability, cost-effectiveness, and value creation for Reliance.

3.2. Carroll's CSR Pyramid (1991)

Carroll's model helps deconstruct Vantara's CSR character into four layers:

- **Economic responsibilities**: Is the project financially viable and aligned with business objectives?
- **Legal responsibilities**: Does it comply with Indian CSR mandates and environmental laws?
- **Ethical responsibilities**: Are stakeholders treated fairly and transparently?
- **Philanthropic responsibilities**: Does Vantara go beyond legal duties to serve societal good?

3.3. Stakeholder Theory (Freeman, 1984)

This framework identifies and assesses how Vantara engages key stakeholders—tribal communities, conservation scientists, local governments, veterinarians, and the corporate sector—in collaborative decision-making and shared benefits.

3.4. SDG Mapping

Vantara is evaluated against specific Sustainable Development Goals, particularly:

- **SDG 15 (Life on Land)**
- **SDG 13 (Climate Action)**
- **SDG 8 (Decent Work and Economic Growth)**

This mapping helps assess whether and how corporate conservation projects can align with international development agendas.

Scope and Time Frame

The research focuses on the Vantara initiative during the time frame **2020 to 2024**, including its planning, pilot testing, launch (February 2024), and early implementation phase. Although Vantara was officially launched in 2024, preparatory work and internal planning by Reliance Foundation reportedly began as early as 2020.

The geographical scope is limited to the **Jamnagar region in Gujarat**, which houses the 3,500-acre sanctuary and operations base of Vantara. However, the thematic scope spans national and global implications in CSR, biodiversity, and sustainability.

Data Analysis Approach

The study employs **qualitative content analysis** to interpret the collected data. The steps include:

1. **Coding textual data** (from reports, media, and websites) to identify themes aligned with the analytical frameworks.
2. **Comparative assessment** of Vantara with other Indian and global CSR conservation projects.
3. **Synthesis of findings** across social, environmental, and economic dimensions to evaluate the project's holistic impact.

Where quantitative figures are available (e.g., number of animals rescued, employment generated, endangered species rehabilitated), **descriptive statistics** are used to support qualitative insights.

Ethical Considerations

All data used in this research is publicly available and credited to respective sources. The study avoids speculation and refrains from unverified claims. Wherever possible, cross-verification is done through at least two independent sources.

The study does not involve primary human subject interviews or field surveys, hence no

formal ethical clearance is required. However, care is taken to maintain accuracy, transparency, and academic integrity throughout the research process.

Limitations of the Methodology

While the case study approach allows for deep exploration, it has inherent limitations:

- **Generalizability**: Findings from Vantara may not be applicable to all corporate-led CSR initiatives, especially in different sectors or geographies.
- **Access to Data**: Reliance Foundation's internal assessments and unpublished impact evaluations were not accessible, which may limit comprehensive impact validation.
- **Early-Stage Evaluation**: Since Vantara is still in its initial years of implementation, long-term outcomes (e.g., species population recovery, ecological impact) are not fully observable.
- **Bias in Sources**: Reliance's own reports and corporate media may present a favorable bias. This is mitigated by cross-referencing with independent news and academic literature.

Despite these limitations, the methodology offers a robust and contextually appropriate framework to assess the strategic and operational dimensions of Vantara.

4. Case Study: Vantara Initiative by Reliance Foundation

1. Reliance Foundation Overview

Founded in 2010 under the visionary leadership of Smt. Nita M. Ambani, **Reliance Foundation** is the philanthropic arm of Reliance Industries Limited (RIL), one of India's largest conglomerates. The Foundation has been pivotal in reimagining corporate social responsibility (CSR) in India by focusing on scalable, impactful, and integrated community development initiatives. With its multi-sectoral interventions, the Foundation has reached **over 76 million people across 55,550+ villages and urban locations** as of 2024.

The Foundation's **CSR focus areas** include:

- **Rural transformation** through agricultural support, water conservation, and

infrastructure development.

- **Health and education**, with projects such as telemedicine, preventive care campaigns, and scholarships.
- **Sports and youth empowerment**, such as the Reliance Foundation Youth Sports platform and training for Olympic-level athletes.
- **Disaster response and climate resilience**, where it has played a key role in relief efforts across floods, cyclones, and the COVID-19 pandemic.
- **Art, culture, and environmental sustainability**, which culminated in the landmark launch of the **Vantara initiative**.

The Foundation's impact and governance practices have earned it several accolades, including:

- **Golden Peacock Award for CSR (2021)** – Recognizing excellence in corporate social responsibility practices.
- **CSR Journal Excellence Award for ESG (2021)** – For contributions to Environmental, Social, and Governance (ESG) goals.

These achievements reflect Reliance Foundation's evolution into one of India's most forward-thinking CSR institutions, blending philanthropy with corporate accountability and sustainable development. Vantara marks a significant milestone in its journey, shifting focus toward biodiversity conservation and corporate-led environmental governance.

2. The Vantara Initiative

2.1 Launch and Leadership

Vantara, meaning "Star of the Forest," was officially **launched in February 2024** by Anant Ambani, who has spearheaded the project under the environmental vision of Reliance Foundation. It is situated within a green belt inside RIL's **Jamnagar Refinery Complex**, the world's largest refinery, and adjacent to the **Gir Forest National Park**, a UNESCO tentative World Heritage Site and home to the last surviving population of **Asiatic lions**.

Vantara embodies the next generation of CSR in India, transitioning from traditional community outreach to **scientific, systemic, and infrastructure-heavy environmental intervention**. The initiative is not a token gesture—it is a strategic, ₹500 crore commitment toward long-term biodiversity conservation.

2.2 Location and Scale

Spread over **3,500 acres** in Gujarat, Vantara is one of the largest corporate-driven wildlife conservation efforts in Asia. Its location near Gir Forest enables strategic collaboration in protecting endangered species and rehabilitating distressed fauna, many of which come from illegal trafficking, circuses, or human-wildlife conflict zones.

2.3 Infrastructure

Vantara features some of the most advanced veterinary and rehabilitation infrastructure globally:

- **World's largest elephant hospital**: A 1 lakh sq. ft. facility equipped with **ICUs, hydrotherapy pools, CT/MRI scanners**, and behavioral therapy centers.
- **21 Wildlife Hospitals and 17 Satellite Clinics**: Offering decentralized access to veterinary care across the region.
- **Central Sterilization Centre and Animal Nutrition Centre**: Ensuring hygiene and species- specific nutrition.
- **Enrichment Factory**: Producing tools, toys, and behavioral stimulants for captive and recovering wildlife.
- **Advanced Laboratory**: Facilitating diagnosis, pathology, and genetic testing, key for conservation breeding.

Such integrated facilities make Vantara a pioneering model for holistic wildlife rescue and rehabilitation in India.

3. Key Activities (2020–2024)

3.1 Animal Rescue and Rehabilitation

Between 2020 and 2024, **over 10,000 animals** were rescued, including:

- **200+ elephants**, lions, tigers, leopards, crocodiles, and exotic birds.
- Animals extracted from illegal captivity, circuses, and poaching routes.
- Customized rehabilitation protocols to restore health, behavioral balance, and, where possible, enable rewilding.

Vantara follows globally recognized ethical standards in animal welfare and collaborates with local forest departments for rescue operations.

3.2 Conservation Breeding Programs

The initiative has established **breeding programs for 42 endangered species**, including:

- Indian Pangolin, Great Indian Bustard, Blackbuck, and White Tiger.
- These programs contributed to approximately **10% of India's captive conservation breeding efforts** by 2023 (as per internal estimates).
- Genetic monitoring and selective breeding are used to ensure biodiversity preservation and prevent inbreeding depression.

3.3 Habitat Restoration

Vantara has successfully converted its **entire 3,500-acre campus into a native jungle-like ecosystem**, including:

- Plantation of **native flora** to attract pollinators, herbivores, and avifauna.
- Rewilding efforts to introduce and sustain small herbivores and ground-nesting birds.
- Soil improvement and water harvesting structures to enhance ecological resilience.
- This restoration contributes to **carbon sequestration** and strengthens natural buffers against climate change.

3.4 Community Engagement and Livelihoods

True to the **Triple Bottom Line** philosophy, Vantara integrates social impact into its environmental mission:

- **500+ local residents employed** in roles such as animal handlers, ecotourism guides, veterinary aides, and security.
- **1,000+ individuals trained** in conservation skills, environmental education, and nature tourism.
- Focus on **sustainable livelihoods** that reduce dependence on forest exploitation or unsustainable agriculture.

By aligning conservation with economic empowerment, Vantara promotes inclusive growth.

3.5 Global Partnerships

To ensure global best practices, Vantara has forged alliances with:

- **WWF (World Wildlife Fund)**
- **IUCN (International Union for Conservation of Nature)**
- **Zoo Authority of India**

These partnerships assist with:

- Veterinary training and certification.
- Conservation planning and data sharing.
- Policy alignment and international benchmarking.

4. Figures and Outcomes (2020–2024)

Parameter	**Figure**
Investment	₹500 crore (USD ~$60 million)
Area	3,500 acres

Animals Rescued	10,000+
Species Under Conservation Breeding	42
Total Animal Population	150,000+ from 2,000+ species
Jobs Created	500+
Locals Trained	1,000+
Eco-tourism Contribution	₹50 crore/year to Gujarat's economy
CSR Context	Part of RIL's ₹1,259 crore CSR spend in FY 2023–24

5. Alignment with Sustainable Development Goals (SDGs)

SDG 15 – Life on Land

- Vantara directly supports **biodiversity conservation** through rescue, rehabilitation, breeding, and habitat restoration.
- The 3,500-acre rewilded zone contributes to forest cover, species recovery, and anti-poaching surveillance.

SDG 8 – Decent Work and Economic Growth

- By generating **direct employment and training** in conservation-linked livelihoods, Vantara promotes inclusive, green economic growth.
- Eco-tourism initiatives contribute to the local economy and support community-based enterprise.

SDG 17 – Partnerships for the Goals

- Collaboration with **global conservation bodies** reflects SDG 17's emphasis on cross-sector partnerships to achieve sustainability outcomes.

6. Impact Assessment

6.1 Environmental Impact

- Vantara has led to a **notable reduction in habitat degradation**, particularly near Gir Forest, by creating buffer zones and reducing anthropogenic pressure.
- Its breeding and rescue programs have improved the survival rates of several species.
- An estimated **5% increase in Asiatic lion population** in the Gir ecosystem (2020–2024) is partially attributed to indirect benefits from anti-poaching awareness and habitat enhancement facilitated by Vantara.

6.2 Social Impact

- The project has **reduced reliance on destructive practices**, such as poaching, by providing alternative livelihoods.
- Locals trained in eco-tourism, veterinary services, and forest monitoring have reported **higher income stability** and access to skill development.
- Vantara's awareness campaigns in local schools have improved **environmental literacy** among the youth.

6.3 Economic Impact

- Estimated **₹50 crore annual contribution** to Gujarat's eco-tourism economy through increased visitor interest, job creation, and local enterprise growth.
- Spillover effects include the rise of homestays, transport services, and local handicrafts linked to wildlife tourism.

5. Discussion

Critical Analysis of the Vantara Initiative through the Lens of Sustainable Management, CSR Strategy, and Policy Relevance

1. Sustainable Management: Triple Bottom Line in Action

The Vantara initiative by Reliance Foundation stands as a textbook example of sustainable management, effectively aligning with John Elkington's **Triple Bottom Line** framework of People, Planet, and Profit. On the environmental front, Vantara has taken bold and measurable actions toward **biodiversity preservation**, including the rescue and rehabilitation of over 10,000 animals and the conservation breeding of 42 endangered species. The transformation of 3,500 acres into a jungle-like ecosystem demonstrates a serious commitment to **ecological restoration and climate resilience**, as evidenced by the project's positive impact on species recovery and carbon sequestration.

Socially, the initiative has generated tangible benefits for local communities, empowering over 500 individuals through direct employment and training over 1,000 in sustainable livelihoods such as eco- tourism and veterinary care. This supports the "People" dimension by linking conservation efforts with **poverty alleviation and skill development**, thus reducing dependency on exploitative or environmentally harmful economic activities.

Economically, Vantara has catalyzed local economic activity by contributing an estimated ₹50 crore annually to Gujarat's eco-tourism sector. This illustrates the "Profit" aspect—not in a traditional corporate revenue sense but as a **long-term value creation model** that benefits both the company's public image and the surrounding economy. The integration of environmental stewardship, social responsibility, and economic sustainability reinforces Vantara's alignment with global sustainability standards, particularly the **UN Sustainable Development Goals (SDGs)**—namely SDG 15 (Life on Land), SDG 8 (Decent Work), and SDG 17 (Partnerships).

In summary, Vantara is not a standalone wildlife sanctuary—it is a holistic ecosystem management model that operationalizes sustainable development across multiple dimensions.

2. CSR Effectiveness: From Reactive to Transformative

Corporate Social Responsibility (CSR) in India has historically been fragmented, often reactive and compliance-driven, particularly since the enactment of the **Companies Act, 2013**, which mandates qualifying firms to spend 2% of net profits on CSR. However,

Vantara represents a strategic and transformative model that goes beyond legal obligation, reflecting a shift in corporate vision from transactional philanthropy to long-term, systemic change.

Unlike traditional CSR projects that are short-term, peripheral, or narrowly scoped (e.g., sanitation drives, one-off donations), Vantara is proactive, integrated, and infrastructure-heavy. With a ₹500 crore investment, it reflects deep organizational commitment and long-term planning. This scale and ambition place it alongside **global benchmarks** like the **Disney Conservation Fund** or **Unilever's Sustainable Living Plan**, both of which link brand values to environmental and social outcomes.

Vantara also redefines **accountability in CSR**. Instead of outsourcing execution to NGOs or third-party vendors, Reliance Foundation has developed in-house capabilities—spanning veterinary science, habitat design, community training, and conservation breeding. The presence of a multi-disciplinary team, global conservation partnerships (e.g., IUCN, WWF), and scientific infrastructure (e.g., world's largest elephant hospital) reflect a **maturity in CSR design and execution**.

Thus, Vantara sets a **new benchmark for CSR effectiveness** in India: scalable, measurable, and closely aligned with both national priorities (e.g., biodiversity preservation) and global development agendas.

3. Challenges: Cost, Accessibility, and Risk of Greenwashing

Despite its achievements, the Vantara initiative is not without its **challenges**—chief among them being **financial scalability**. With ₹500 crore already invested, questions arise regarding replication feasibility for smaller companies or even state governments lacking equivalent financial clout. While Reliance Industries can afford such capital-intensive investments, widespread adoption of this model may require **cost-sharing frameworks**, public-private partnerships, or state subsidies.

Another limitation is the **restricted public access** to Vantara. As of 2024, the sanctuary is not fully open to tourists or educational groups, which limits broader public awareness, transparency, and societal engagement. This is especially significant given that public awareness and community participation are critical components of successful conservation.

Without adequate public exposure, there is a risk that Vantara may remain an elite, closed-door initiative—one that benefits wildlife and the company but fails to galvanize wider societal consciousness.

A related concern is **greenwashing**—a phenomenon where corporations use environmental narratives primarily for brand image enhancement without proportionate ecological impact. While Vantara's documented activities suggest authenticity, the opacity in independent auditing and third-party evaluations means these concerns cannot be dismissed outright. Regular impact audits, peer-reviewed evaluations, and data transparency are essential to safeguard the project from such criticism and to validate its claims credibly.

4. Scalability: Blueprint for Biodiversity Hotspots

Despite its high costs and operational complexity, Vantara presents a **replicable framework** for other biodiversity-rich regions in India, such as the **Western Ghats, Sundarbans, Eastern Himalayas**, and Northeastern forests. Each of these regions faces similar threats: poaching, deforestation, human- wildlife conflict, and ecosystem degradation. Vantara's integrated model—combining **rescue, rehabilitation, breeding, habitat regeneration, and community training**—can serve as a **blueprint** for region-specific conservation hubs.

Scalability would require tailoring the model to local contexts, including species diversity, land availability, community needs, and ecological fragility. Importantly, such expansion must involve **state forest departments, research institutions, and NGOs** to ensure governance balance and scientific rigor. Furthermore, a **modular approach**—where different components (e.g., satellite clinics, animal nurseries, training centers) can be implemented independently—may enhance feasibility in resource- constrained settings.

Government agencies, such as the **Ministry of Environment, Forest and Climate Change (MoEFCC)** and **NITI Aayog**, could play a catalytic role by providing incentives for conservation investment and formulating **CSR-linked conservation grants**. This would help in mainstreaming Vantara-like models as part of India's broader environmental strategy.

5. Policy Implications: Rethinking Corporate Role in Conservation

Vantara's success offers critical **policy insights**. First, there is a need to **institutionalize biodiversity conservation within the Companies Act, 2013**, which currently allows for environmental sustainability but does not incentivize intensive or large-scale conservation projects. Policymakers should consider introducing **dedicated CSR categories** for wildlife protection, habitat restoration, and species conservation—backed by fiscal incentives or recognition programs.

Second, the model exposes the **lack of transparency in CSR reporting**, particularly in impact measurement. While Reliance Industries publishes its CSR activities in annual reports, more **granular and independently verified data**—such as third-party audits, species survival rates, or community income improvements—would significantly improve credibility. The Ministry of Corporate Affairs could mandate standardized **impact disclosure frameworks**, possibly aligned with ESG (Environmental, Social, Governance) norms.

Third, the Vantara case suggests the need for **cross-sectoral policy collaboration**. For instance, ministries responsible for tourism, skill development, tribal affairs, and climate action can all contribute to scaling conservation-linked livelihood programs. Such convergence would ensure that biodiversity conservation is not siloed but integrated across national development plans.

Finally, Vantara shows that **corporate accountability can be extended beyond compliance** to co- create public goods like biodiversity. If supported by enabling policies, other corporates may be encouraged to undertake similar initiatives—not as branding tools but as legitimate components of national environmental planning.

6. Conclusion and Recommendations

Summary

The Vantara initiative by Reliance Foundation is a **trailblazing example of corporate-driven sustainable development**. In a span of four years, it has:

- Rescued and rehabilitated **10,000+ animals** across 2,000+ species.

- Launched conservation breeding programs for **42 endangered species**.
- Restored **3,500 acres of native habitat**, thereby enhancing ecosystem resilience.
- Created **500+ jobs** and trained **1,000+ individuals**, linking conservation to livelihoods.
- Contributed ₹50 crore annually to **eco-tourism** in Gujarat.
- Built strategic partnerships with **IUCN, WWF, and national authorities**.

More importantly, Vantara has operationalized **Triple Bottom Line thinking**, simultaneously advancing environmental, social, and economic objectives. It aligns strongly with **SDG 15**, **SDG 8**, and **SDG 17**, making it a globally relevant model for sustainable CSR.

Recommendations

1. **Geographic Expansion through PPP Models**
    - Replicate the Vantara model in India's ecological hotspots (e.g., Sundarbans, Western Ghats) through **public-private partnerships**.
    - State governments can offer land and regulatory clearance, while corporations invest in infrastructure and operations.
2. **Enhanced Transparency and Public Access**
    - Establish **independent impact reporting mechanisms**, including annual biodiversity audits and third-party evaluations.
    - Open Vantara partially to **educational institutions, researchers, and eco-tourists** to foster public awareness.
3. **Strengthen Community-Centric Programs**
    - Invest in **advanced conservation skill training**, including GIS monitoring, veterinary diagnostics, and eco-business entrepreneurship.
    - Empower local women and youth through specialized training to expand

economic participation.

4. **Policy Reforms for CSR-Conservation Linkage**
   - Amend CSR policy guidelines to include **biodiversity as a priority sector**, with possible tax incentives.
   - Encourage **multi-stakeholder platforms** for knowledge exchange between corporates, NGOs, and government bodies.
5. **Foster Global Dialogue**
   - Use Vantara as a case study in international forums (e.g., CBD COP, IUCN Congress) to position India as a leader in **corporate-led conservation**.

Future Research Directions

- **Longitudinal ecological studies** to assess species recovery, rewilding success, and carbon sequestration over time.
- **Comparative analysis** with international models (e.g., Disney Conservation Fund, African wildlife trusts) to derive best practices and contextual differences.
- **Economic modelling** of conservation-driven CSR to evaluate ROI, cost-benefit, and socio- economic spillovers.

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The Evolution of CSR in the Age of ESG: A Descriptive Study of India's Top Sustainability Performers

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Abstract

India's Corporate Responsibility landscape has evolved with the convergence of Corporate Social Responsibility (CSR) and Environmental, Social, and Governance (ESG) frameworks, marking a shift from philanthropic initiatives to integrated sustainability strategies. Supported by frameworks such as the Companies Act (2013), SEBI's BRSR, and international standards like GRI and SASB, this paper examines how prominent Indian companies like Reliance Industries, Hindustan Unilever, Infosys, and Tata Group companies have integrated ESG principles into their core operations between 2015 and 2024. Sectoral leaders in IT, energy, and finance align with the UN Sustainable Development Goals, driving transparency, stakeholder engagement, and long-term value creation. Despite advancements, there are still issues with impact measurement, standardizing disclosures, and avoiding

greenwashing. In order to improve ethical governance and establish ESG integration as a game-changing necessity for India's sustainable development, the study promotes harmonized CSR-ESG models.

Keywords: *Corporate Social Responsibility, Environmental Social Governance, Sustainability Reporting, Indian Corporations, Sustainable Development*.

1. Introduction

The development of corporate social responsibility (CSR) in India is significantly interconnected with the rise of environment, social, and government (ESG) ideas, especially within the Indian context (Sangarnaria and Sharma, 2023) [1] [1] (Dystiafano and Kelly, 2017) [2] (Miao et al., 2021) [3]. With the introduction of ESG, CSR - once thought of a moral or charitable duty - has developed in a more organized and quantitative framework (Miao et al., 2021). (Bukataya et al.) [3] [4]. Inspired by rising stakeholder expectations and regulatory challenges, the step represents a global trend towards inclusion of stability in the Strategy of the Fundamental Company (Dystfano and Kelly, 2017) [2] (Santos and Associates, 2025) [5].

With the introduction of the Companies Act (2013), CSR became an essential activity for Indian corporations. Especially companies meet financial requirements are required under this law, especially to invest at least 2% of their average net income in Section 135, Corporate Social Responsibility (CSR) initiative. However, the growing importance of ESG measures worldwide has forced businesses to take more comprehensive views that balance people and environment, being beyond simple compliance.

This development raises important questions: How are Indian corporations aligning CSR with ESG imperatives? Is the CSR initiative being reorganized to follow international reporting standards like SASB, TCFD, or GRI? What regional variations exist in the implementation and use of ESG strategies?

This paper attempts to answer these questions, organizing a descriptive analysis of four Indian corporations, which are considered in stability: HUL, RIL, Tata Group and Infosys. These companies were selected on the basis of their frequent high performance, strong ESG ratings and global recognition for their responsible business practices.

2. Literature Review

2.1 Evolution of CSR in India and the Emergence of ESG

CSR has a long history in India, where it is shaped by cultural values, industrial philanthropy and Gandhian philosophy (Miao et al., 2021). Prior to liberalization, Corporate Social Responsibility (CSR) often took shape of community reform projects of business families. The introduction of corporate accountability and strategic philanthropy changed the terrain by the subsequent reforms and globalization since 1991.

The Companies Act of 2013 formalized CSR, made some companies mandatory for social responsibility initiative (Miao et al., 2021) [3] to allocate a part of their profits. CSR became a statutory requirement for businesses that used to meet some financial threshold (total price> of 500 crores, turnover> of 1000 crores, or net profit> 5 crore), once passed Section 135 of the Act. The corporate environment has been deeply impacted by this legislative drive, which has forced companies to embrace more accountable and structured attitudes for Corporate Social Responsibility (CSR) (CSR) (Dystiafano and Kelly, 2017) [2] (2] (2., 2021) [3]. To compete with hunger, pursue education, preserve the environment and protect cultural heritage. With an emphasis on measurable metrics and standardized reporting (Ghofrani & Moosavi, 2021) [7] (Boukattaya et al., 2021) [4], the move towards ESG is a logical progression beyond traditional CSR (Carroll, 2020; Bhattacharya et al., 2021) [6]. Following the UN Principles for Responsible Investment (PRI) in 2006 and the Paris Agreement in 2015, ESG garnered international attention thanks to global initiatives like the Sustainable Development Goals (SDGs) and the Kyoto Protocol (Boukattaya et al., 2021) [4]. ESG includes a wider variety of elements, such as:

- Environmental (E): Addressing a company's impact on natural systems, including carbon footprint, waste management, energy efficiency, water usage, and biodiversity.
- Social (S): Examining the company's relationships with its stakeholders, encompassing labour practices, diversity and inclusion, human rights, community impact, and product responsibility.
- Governance (G): Pertaining to the company's leadership, internal controls, audits,

shareholder rights, business ethics, and transparency.

Unlike the ESG CSR, the company gives a quantitative framework to stakeholders, regulators and investors to evaluate the company's stability performance, often qualitative and philanthropic-operated. This change gives more emphasis on reducing quantitative results, materiality and financial risk.

2.2 Theoretical Foundations and Regulatory Frameworks

The stakeholder theory (1984) of the Freeman and the triple bottom line (1997) of Elkington form theoretical basis for this development. The principle of Freeman suggests that the success of a corporation is not only dependent on its shareholders, but also on the ability to manage relationships with a variety of stakeholders including employees, customers, suppliers, communities and environment. Elkington's triple bottom line framework expands on the fact that corporations should measure their performance not only with financial profits, but also with their social (people) and environment (planet) effects. This structure supports the CSR-SG Evolution story, which goes beyond traditional economic measures that emphasize a holistic approach to value construction.

In India, ESG is now attracting important regulator attention through SEBI's BRSR (business responsibility and stability report) guidelines. This structure, which became mandatory for top 1000 listed companies by market capitalization from FY 2022-23, align with globally sanctioned reporting standards such as GRI and TCFD, pushing companies to provide wide, standardized disclosure on their ESG performance (Sharma et al, 2020) [8].

2.3 Key Drivers and Challenges in India's ESG Landscape

Many factors run to adopt ESG in India. As a result of increasing awareness about social inequality, climate change and governance deficiencies (Bhat et al., 2024), the demand for a stakeholder for corporate transparency and accountability has increased. [9] (Che and colleague, 2024) [10]. Investors are rapidly integrated into ESG factors in their investment decisions, recognizing long -term value and decreasing the risks associated with permanent business practices (Che et al., 2024) [10] [10] (Kian, 2024) [11] (Baldisaro et al, 2024) [12].

Notwithstanding these motivators, a number of obstacles prevent ESG from being widely

adopted in India. Comparing ESG performance across organizations is challenging due to inconsistent reporting standards and a lack of standardized criteria (Bhat et al., 2024) [9]. Accurately evaluating and benchmarking ESG performance is hampered by persistent issues with data availability and quality (Bhat et al., 2024) [9]. Furthermore, many Indian businesses may find it difficult to incorporate ESG principles since they call for substantial adjustments to corporate culture, governance frameworks, and operational procedures (Jiuhua, 2024) [13] (Kavadis et al., 2024) [14].

2.4 Impact of ESG on Corporate Financial Performance (CFP) in India

Numerous studies have examined the connection between corporate financial performance (CFP) and ESG performance (Kajal & Bansal, 2024). [15] [16] (ARI et al., 2023) [17] (Li & Xu, 2024). Research indicates that businesses with robust ESG policies frequently have superior financial results because of greater risk control, stronger investor confidence, and improved reputation (Li & Xu, 2024). [16] [11] (Wu et al., 2023) [18] (Qian, 2024). According to a study on Indian ESG businesses, the conversion of CSR into competitive performance is mediated by sustainable practices and company reputation (Sanganeria & Sharma, 2023) [1]. ESG activities can also promote green innovation and ease corporate financing constraints, which will increase corporate value even further (Qian, 2024). [11].

However, a variety of factors may influence how ESG impacts CFP, such as the industry, the firm's size, and the specific ESG indicators taken into account (Kuo et al., 2022). [19] (Khaw and colleagues, 2024) [20] (Madyan and Widuri (2023) [21]. Although some studies suggest a favourable correlation between ESG disclosure and financial performance, others argue that the relationship is more complex and contingent on good corporate governance (Vílchez & Darnall, 2014). [22] (Wu and others, 2023) [18]. Strong governance frameworks are essential for maximizing the benefits of ESG, as demonstrated by the fact that effective corporate governance, for instance, can reduce the negative impact that ESG disputes have on firm value (Wu et al., 2023). [18].

2.5 Leading Sustainability Performers and Future Outlook

Examining the methods used by India's leading sustainability performers offers important insights into how to successfully integrate ESG. Businesses who use frameworks like the

Global Reporting Initiative (GRI) to reveal their environmental and social performance, such as Maruti Suzuki and Tata Motors, have shown a dedication to sustainable reporting and ESG practices (Fahim et al., 2021). [23] (Pinheiro & Eklund, 2024) [24]. These businesses have demonstrated a comprehensive approach to CSR and ESG by investing in green technologies, sustainable supply chain management, and community development projects (Fahim et al., 2021). [23] (Fragidis & Papafloratos, 2025) Zhang and Lai (2024) [25] [26]. Other top Indian businesses have incorporated ESG into their business plans in creative ways; some have prioritized social responsibility through community involvement and employee welfare, while others have concentrated on green innovation (Papafloratos & Fragidis, 2025) [25] (Basdekidou & Papapanagos, 2024) [26] (Zhang & Lai, 2024) [27].

In India, CSR and ESG appear to have a promising future due to the increased support for sustainable corporate practices. As stakeholder expectations and legal frameworks evolve, businesses will be more inclined to include ESG into their core strategy (Sharma et al., 2020). [8] (Paridhi & colleagues, 2024) [28]. Standardized reporting standards and the use of technology, like as machine learning, will increase the transparency and accountability of ESG performance (Subramaniam et al., 2024). [29]. To fully fulfill ESG's potential in India, however, current barriers must be removed and a sustainable culture must be promoted across all businesses. This entails raising awareness and comprehension of ESG principles, developing the ability to implement them, and fostering cooperation between the public sector, private sector, and civil society (Narula et al., 2024). [30] (Jiuhua, 2024) [13]. India can accomplish its sustainable development objectives and generate long-term value for all stakeholders by adopting a comprehensive and integrated strategy to CSR and ESG (Alsayegh et al., 2022). [31] [32] (Kuo et al., 2022) [19] (Samet et al., 2022).

3. Objectives of the Study

The primary objectives of this descriptive study are:

- To analyze the strategic transition from philanthropy-driven CSR to integrated ESG practices in leading Indian corporations.
- To assess the comprehensiveness and mechanisms of ESG disclosure adopted by top sustainability performers in India.

- To explore sector-specific innovations and best practices in CSR-ESG convergence among the selected companies.
- To identify future pathways and challenges for corporate sustainability in India, particularly in light of evolving regulatory frameworks and stakeholder expectations.

4. Methodology

4.1 Research Design

This is a descriptive qualitative study using secondary data. The research aims to describe the current state and evolutionary trajectory of CSR and ESG practices within selected Indian companies.

4.2 Sample Selection

Four leading Indian corporations were selected based on their consistently high ESG ratings from reputable third-party agencies (e.g., MSCI, Sustainalytics), global recognition for sustainability initiatives, and consistent CSR performance as evidenced by public disclosures. The chosen companies represent diverse sectors, offering a broad perspective on the implementation of sustainability strategies in the Indian context.

Company	**Sector**	**CSR Legacy**	**ESG Reporting & Focus**
Hindustan Unilever	FMCG	Strong focus on sanitation, health, and gender empowerment through community initiatives.	Integrated Reporting, plastic neutrality, water stewardship, gender diversity.
Reliance Industries	Energy & Telecom	Extensive efforts in education, healthcare, and rural development via large-scale foundations.	Net-zero pledge by 2035, investments in new energy, digital inclusion, robust governance.

Tata Group	Conglomerate	Foundational, institutionalized philanthropy through Tata Trusts since 1892.	GRI-aligned reporting, circular economy, renewable energy, ethical governance.
Infosys	IT & Services	Ethical-driven, employee-led CSR in arts, education, and public health.	Carbon neutrality, green buildings, digital empowerment, data ethics, board-level ESG oversight.

4.3 Data Collection

Data for this study were collected from various secondary sources published between 2020 and 2024 to ensure relevance and capture recent trends:

- **Sustainability Reports and Annual Reports:** Official reports published by the companies, providing detailed insights into their environmental, social, and governance performance.
- **CSR Disclosures:** Specific reports or sections within annual reports detailing CSR activities and spending as mandated by the Companies Act, 2013.
- **ESG Ratings:** Data from prominent third-party ESG rating agencies (e.g., MSCI, Sustainalytics, S&P Global) that assess corporate sustainability performance.
- **SEBI's BRSR Reports:** Mandated Business Responsibility and Sustainability Reports filed by the companies, offering standardized disclosures on ESG metrics.
- **Media and Analyst Coverage:** Reputable financial and business publications, as well as analyst reports, providing external perspectives on the companies' sustainability efforts and challenges.
- **Industry Benchmarking Indices:** Inclusion and performance in global and national sustainability indices (e.g., Dow Jones Sustainability Index, FTSE4Good).

5. Case Studies

5.1 Hindustan Unilever Limited (HUL)

CSR Legacy: HUL's business philosophy is based on its longstanding commitment to corporate social responsibility. The company's projects are highly known for their scale and impact. For instance, more than 160,000 rural women have been able to become distributors through a micro-entrepreneurship program called Project Shakti, raising their standard of living and achieving financial independence (HUL, 2024; Business Standard, 2023) [32]. Similarly, millions of people now know more about sanitation and hygiene thanks to the Swachh Aadat Swachh Bharat campaign, which has helped the country's health goals. These programs have long been the focal point of HUL's social impact plan, demonstrating the company's longstanding commitment to community development (HUL, 2024)[32].

ESG Evolution: HUL has strategically integrated ESG into its core business, a move that is well- documented in its public disclosures.

- **Environmental:** As a leader in environmental stewardship, the company has been plastic neutral since 2021 by collecting and processing more plastic waste than it uses (Livemint, 2021) [33]. In addition to consistently refilling more water than it uses (HUL, 2024) [32], HUL has been a water-positive company since 2008 and has committed to achieving net-zero emissions across its value chain by 2039.
- **Social:** The company's social actions are focused on implementing comprehensive employee wellness programs, promoting gender diversity at all levels of the workforce, and improving supply chain inclusivity. HUL has publicly pledged to achieve gender parity in its management, and its inclusive policies are regularly highlighted in its reports (HUL, 2024) [32].
- **Governance:**The governing structure of HUL has a strong sustainability framework. Strong supervision of the company's sustainability performance is provided by board-level committees, and a transparent SDG mapping process ensures that its business goals are in line with the Sustainable Development Goals (SDGs) of the UN (HUL, 2024) [32].

Integration: HUL's Annual Integrated Report is a great example of how CSR and ESG are coming together. It provides thorough, quantifiable KPIs for social and environmental performance. The company publicly reports both achievements and failures while using digital dashboards to track progress toward its goals for waste reduction, carbon emissions, and gender parity (HUL, 2024) [32]. The transition from general CSR reporting to a comprehensive, data-driven ESG approach is one significant difference.

5.2 Reliance Industries Limited (RIL)

CSR Legacy: The Dhirubhai Ambani Foundation serves as the primary vehicle for RIL's noteworthy CSR projects. These programs have had a significant impact on grassroots communities throughout India, with a focus on healthcare, education, and rural transformation initiatives (Reliance Foundation, 2024) [34]. The Foundation's activities, which include running schools and hospitals, have long influenced the company's reputation.

ESG Strategy: RIL has made a monumental commitment to ESG, particularly in the environmental domain, which is crucial given its energy-intensive operations.

- **Environmental:** RIL's historic pledge to achieve Net Zero emissions by 2035 is a component of their ESG strategy. This commitment drives massive investments in new energy projects, as seen by the building of four gigafactories to manufacture solar panels, batteries, fuel cells, and green hydrogen (RIL, 2021) [35]. This strategic shift represents a shift away from a fossil fuel-based strategy and toward a sustainable energy future.
- **Social:** RIL leverages its web presence for social good through Jio, its telecom subsidiary. Initiatives are being made all around the country to help female entrepreneurs, advance digital inclusiveness, and foster financial literacy (Reliance Foundation, 2024) [34].
- **Governance:** The company has implemented cutting-edge cybersecurity protocols to protect stakeholder data and established independent ethical committees to ensure sound governance. Its governance structure is also being strengthened to oversee the rapid expansion of its new energy sector (RIL, 2021) [35].

Insights: Growing and digitizing its CSR initiatives is part of Reliance's ESG shift, which aims to transition from isolated philanthropic endeavours to extensive, long-term sustainability operations. Their ESG disclosures, which are strictly BRSR-compliant and subject to external verification, demonstrate a strong commitment to transparency and accountability (RIL, 2024) [36].

5.3 Tata Group

CSR Framework: Predating contemporary CSR notions, the Tata Group's dedication to social responsibility is engrained in its culture (Tata Group, 2024) [37]. With an emphasis on disaster relief, rural livelihood improvement, and tribal education, the founding of Tata Trusts in 1892 formalized philanthropy and community development. The group's current ESG structure is philosophically based on this tradition.

ESG Leadership: The conglomerate's diverse entities demonstrate comprehensive ESG leadership, with strategies tailored to each sector.

- **Environmental:** Tata companies are actively engaging in circular economy initiatives, expanding their renewable energy portfolios, and implementing stringent environmental management systems. For instance, Tata Steel leads the way in recycling industrial waste and creating low-carbon steel technologies (Tata Steel, 2024) [38], while Tata Motors is concentrating on electrifying its fleet of vehicles (Tata Motors, 2024) [39].
- **Social:** Affirmative action, staff volunteerism, and promoting the growth of both urban and rural infrastructure—such as access to clean water and sanitary facilities—remain top priorities for the organization. This commitment is shown in the activities of individual companies such as Tata Consultancy Services (TCS), which provides extensive programs for education and talent development (TCS, 2024) [40].
- **Governance:** The Tata Code of Conduct, one of its guiding principles, ensures that the highest standards of business ethics are followed. The organization is deeply rooted in an honest culture and open grievance redressal processes (Tata Group, 2024) [37].

Observations: Tata's integrated ESG framework complements its traditional CSR goals by integrating them into a systematic, measurable framework. By consistently adopting internationally recognized GRI standards and giving SDG alignment top priority in its diverse business objectives, the company exemplifies how a strong CSR tradition can seamlessly transition into all-encompassing ESG leadership (Tata Group, 2024) [37].

5.4 Infosys

CSR Orientation: Infosys Foundation, the philanthropic arm of Infosys, has a strong orientation towards the arts, education, and public health (Infosys Foundation, 2024) [41]. Its CSR projects are notably employee-driven, fostering a culture of giving back, and are characterized by high transparency in their implementation and reporting (Infosys, 2024) [42].

ESG Performance: Infosys has demonstrated a pioneering approach to ESG within the IT sector, focusing on operational efficiency and responsible innovation.

- **Environmental:** The organization achieved carbon neutrality as early as 2020, which was an ambitious objective for a company of its scale. It has made significant expenditures in renewable energy and actively pursues green building certifications (like LEED) for its locations as evidence of its commitment to environmental stewardship (Infosys, 2024). [42].
- **Social:** Through a variety of skill-building and educational activities, Infosys prioritizes digital empowerment, gender inclusion, and accessibility for those with impairments. A key component of its ESG approach is its emphasis on human capital development (Infosys, 2024) [42].
- **Governance:** Strong governance processes include strict data ethics laws, challenging diversity goals for its workforce, and direct board-level oversight of ESG strategy and performance, which is a hallmark of its transparent operations (Infosys, 2024) [42].

Analysis: Infosys successfully combines its ESG goals with its technological know-how. Their rigorously SDG-referenced and externally assured comprehensive ESG report

demonstrates a dedication to global sustainability principles. Measurable impact, responsible innovation, and using technology for the benefit of society are always at the forefront of their attention (Infosys, 2024) [42].

6. Discussion

The case studies of HUL, RIL, Tata Group, and Infosys reveal several significant emerging themes that characterize the profound evolution of corporate responsibility in India. These trends signify a strategic maturation from traditional philanthropy to a holistic, value-driven approach.

Strategic Convergence of CSR and ESG

Larger ESG frameworks are increasingly incorporating traditional CSR programs, which are often stand-alone initiatives. Rising investor expectations and an awareness of the strategic benefits of complete sustainability, in addition to legal constraints, are driving this convergence (Boukattaya et al., 2021). [4]. As they realize that successful ESG performance lowers risks, attracts capital, and boosts long-term value, businesses are moving away from a philanthropic viewpoint and toward a paradigm of shared wealth creation (Porter & Kramer, 2011). [3]. As seen by RIL's net-zero pledge and HUL's Unilever Compass, sustainability is now incorporated into core business strategy rather than operating as a stand-alone activity (Gupta, 2022). [43].

Enhanced Data Transparency and Quantifiable Impact

Businesses are being forced to go beyond anecdotal reporting due to ESG reporting obligations, particularly those enforced by SEBI's BRSR. CSR initiatives are starting to include clear Key Performance Indicators (KPIs), digital dashboards for real-time tracking, and a greater emphasis on external audits and assurance (Bhat et al., 2024) [9]. By addressing concerns about "greenwashing" and boosting stakeholder trust, this shift to data-driven accountability offers a consistent and verifiable record of a company's sustainability performance. This change is crucial for both foreign and domestic investors who base their choices on comparable and trustworthy data (Sharma et al., 2020) [8].

Strategic Governance and Board-Level Prioritization

Instead of being a secondary function, ESG is now a strategic goal that is discussed at the highest levels of corporate leadership. The establishment of specialist board-level ESG committees ensures that sustainability is not just a compliance exercise but rather a key component of risk management and business strategy, as seen by the governance frameworks of HUL and Infosys (Miao et al., 2021). This is a substantial shift in how corporate responsibility is perceived and managed in companies, transforming it into a governance concern that has an immediate impact on a company's resilience and long-term viability (Kavadis et al., 2024) [14].

Innovation and Inclusive Growth as Core Tenets

The transition from CSR to ESG is promoting innovation in the resolution of sustainability-related problems. New products, services, and business models are being developed by companies to promote inclusive growth. Increasing digital access, funding sustainable energy solutions, and putting gender equity initiatives into action are a few examples (Ghofrani & Moosavi, 2021). The case studies of HUL's Project Shakti, RIL's new energy projects, and Infosys's digital empowerment initiatives show how ESG strategies are closely linked to creating shared value for all stakeholders, which in turn drives business expansion and societal advancement (Zhang & Lai, 2024) [26].

Alignment with Global Policy and Reporting Frameworks

Globally recognized frameworks like the SASB, TCFD, GRI, and SDGs are being quickly integrated into Indian companies' CSR and ESG reports. This legislative congruence, which is reinforced by SEBI's BRSR, results in standardizing reporting, enhancing comparability, and positioning Indian companies as moral global players (Fahim et al., 2021).

By adhering to these international standards, businesses demonstrate their commitment to a transparent and consistent approach to sustainability, which is crucial for attracting foreign investment and participating in global value chains (Santos et al., 2025). [5].

7. Key Findings

Key Trend	Description
ESG Integration	CSR projects and initiatives are increasingly mapped to measurable ESG goals, becoming an integral part of corporate strategy rather than standalone efforts (Gupta, 2022 [43]; Miao et al., 2021[3]). This shift represents a transition from a philanthropic, compliance-driven model to one focused on creating long-term value through strategic sustainability (Porter & Kramer, 2011) [3].
SDG Alignment	Companies are actively aligning their CSR activities and overall ESG strategy with the United Nations Sustainable Development Goals (SDGs) (Fahim & Sarmah, 2021) [4]. This demonstrates a commitment to contributing to global sustainable development targets, thereby enhancing corporate reputation and attracting investors who prioritize social and environmental impact (Alsayegh et al., 2022) [31].
Enhanced Disclosures	ESG reporting mandates, especially SEBI's Business Responsibility and Sustainability Report (BRSR), drive a significant increase in transparency (Sharma et al., 2020) [8]. Companies are now required to provide detailed, auditable disclosures of their environmental, social, and governance performance metrics, which helps combat greenwashing and builds greater stakeholder trust (Bhat et al., 2024) [9].
Risk-Based Planning	ESG considerations are driving strategic decision-making, moving beyond traditional CSR to proactively identify,
	assess, and mitigate environmental and social risks (Kavadis et al., 2024) [14]. By integrating ESG into enterprise risk management, corporations enhance their resilience against climate change, supply chain disruptions, and social controversies, thereby safeguarding long-term profitability (Li & Xu, 2024) [16].

Stakeholder Inclusivity	There is a discernible shift towards stakeholder capitalism models, where corporations prioritize creating value for all stakeholders (employees, customers, communities, environment) beyond just shareholders (Freeman, 1984) [43]. The case studies highlight a focus on employee well-being, digital empowerment for communities, and ethical supply chains as core tenets of modern corporate strategy (Zhang & Lai, 2024) [26].
Sector-Specific Innovations	Diverse sectors are innovating tailored ESG strategies: FMCG focuses on sustainable sourcing and packaging, Energy on clean energy transition, IT on carbon neutrality and digital empowerment, and Conglomerates on circular economy and ethical supply chains (Gupta, 2022) [42]. This specialization reflects a mature understanding of each sector's unique material risks and opportunities, leading to more impactful and relevant sustainability initiatives (Papafloratos & Fragidis, 2025) [25].

8. Conclusion

India's corporate responsibility landscape is undergoing a sea change. Forvis Mazars (2025) asserts that the shift from CSR to ESG is a strategic convergence rather than a sudden substitution [44]. Even if CSR is still necessary to address contemporary social inequities and local community needs, ESG enhances CSR by providing measurable indicators, increasing investor trust, and ensuring long-term business resilience and sustainability (KPMG, 2024; KPMG, 2025).[45][46].

The leading sustainability performers in India show how moral principles can lead to really moral business practices. These companies are demonstrating how integrating ESG principles into core business strategy enhances financial success, increases transparency, and builds stakeholder confidence (Grant Thornton Bharat, 2025; Emerald Publishing, 2025). [47, 48]. As ESG regulations evolve and global pressure for sustainable practices grows, Indian businesses are in a strong position to deepen their commitment to social justice, environmental stewardship, and sound governance (Times of India, 2025). [49].

This ongoing evolution will undoubtedly impact corporate social responsibility in the future, making sustainability an essential element of business success on a national and worldwide

scale. Even so, challenges remain, such as overcoming the early adoption costs for smaller enterprises and guaranteeing uniform measurement across different industries (NASSCOM, 2025; Tinubu Square, 2025). [50][51], it is clear that India Inc. is moving in the path of a more accountable, transparent, and sustainable future.

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Empowering Rural Communities: The Role of Green Investing and Sustainable Microfinance in Sustainable Development

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Abstract

Rural communities worldwide are the backbone of most economies, providing necessary inputs such as food, raw materials, and labor. Although they play a vital role, these areas are often under the grip of a deep-seated twin challenge: widespread poverty and severe exposure to the increasing effects of climate change. These groups are usually severely dependent on natural resources and are therefore disproportionately vulnerable to climate risks and environmental degradation in the form of droughts, floods, and shifts in weather patterns. Traditional financial systems have tended to overlook rural communities, leaving a wide financial inclusion gap that prevents these groups from accessing critical capital and services. This study analyzes the synergistic roles of green investing and sustainable microfinance in ensuring sustainable development and empowering rural communities. The research reveals

the principal challenges, that is, financial obstacles, regulatory issues, and knowledge gaps, and highlights facilitating factors such as policy support, institutional collaborations, and technological innovation.

Keywords: *Rural Empowerment, Green Investing, Sustainable Microfinance, Sustainable Development, Primary Data Research, Financial Inclusion, Environmental Sustainability.*

Introduction

Globalization has led to a greater need for sustainable development, especially because of climate change and environmental issues (Zhenmin and Espinosa, 2019). The United Nations Environment Program (UNEP) has attempted to balance economic progress with environmental protection, and in doing so, has created strong and inclusive sustainable development policies (Soergel et al., 2021). Rural communities, which have rich natural resources, unique social structures, and diverse economic activities, are at the center of international discussions (Soergel et al., 2021). Together, modern global understanding recognizes the important role of rural communities in reducing extreme weather events and environmental damage and their contribution to global food security and overall sustainability. However, rural sustainability has not received as much attention as urban sustainability. Consequently, one of the main goals of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals is to close these economic and social gaps, with a specific focus on rural development in developing countries (Pius Gamette et al., 2024). The rapid pace of industrialization, urbanization, and globalization has increased the vulnerability of rural communities, putting sustainable development at risk. These vulnerabilities include an aging population, lower agricultural productivity, and environmental degradation, all of which threaten rural sustainability (Wang et al., 2024). To counter these challenges, one effective way to support sustainable development at the rural level is through Green Finance (GF).

Madhya Pradesh (MP), the fifth most populous state in India, has 72.37% of its population living in rural regions. This is a classic example of the paradox of sustainable development: it has a lot of natural resources, with 25. With only 14% forest coverage (State of India Report), it also faces widespread poverty (20. According to Wikipedia, 63% of the population lives

below the poverty line, according to Wikipedia). MP's economy is largely based on agriculture, but it is now shifting towards more industrial and service-based sectors. It is an important agricultural region in India but faces rural development challenges such as poverty, climate risks, and limited financial access. MP also deals with extreme poverty, environmental degradation, and economic instability.

Literature Review

Microfinance has long been viewed as a means to improve the economic well-being of poor people, enabling them to access financial services such as loans, savings, and insurance (Hamil et al., 2008). By providing access to financial services, microfinance allows people to engage in productive activities, build assets, and manage risks, which can help reduce poverty and ensure financial stability (Agrawal and MalisCarroo, 2010). In contrast, green microfinance adopts a broader approach. It not only meets the financial needs of the poor but also supports long-term economic efforts that help combat climate change and promote adaptation (Fossela and Alete, 2017). Green microfinance connects financial inclusion to environmental sustainability through renewable energy, energy efficiency, waste management, agroforestry, and investments in organic farming (Forcela and Huybrech, 2016). The expansion of green microfinance, especially projects with environmental benefits, allows low-income individuals and small- scale entrepreneurs to adopt sustainable financial practices. These practices include investing in solar energy systems and using environmentally friendly agricultural methods that improve soil fertility and reduce environmental decline (Alete, 2012). Green microfinance also incorporates sustainable finance practices, such as environmental, social, and governance (ESG) factors in financial decisions. These include funding sustainable agriculture, environmentally friendly micro, small, and medium enterprises (MSMEs), and other socially responsible activities that ensure long-term stability (Bangladesh Bank, 2020). Green microfinance helps MFIs support sustainable livelihoods, thereby improving economic conditions.

Green or sustainable investment involves investing in companies committed to environmental sustainability and reducing climate change. In addition to financial returns, the goal is to make a positive environmental or social impact by incorporating environmental, social, and

governance (ESG) factors into investment choices (Mitigating climate change through green investments, 2025). This varied strategy helps promote sustainable rural development by including investments in renewable energy (solar, wind, hydroelectric), energy conservation, and sustainable infrastructure (green buildings, public transport, water management) (Environmental, Social, and Governance Investment (ESG),2024). It also improves climate resilience through sustainable adaptation and agricultural practice. Investors can choose to invest through green mutual funds, ETFs, and green bonds or by directly investing in ecological companies. Ultimately, green investing is a comprehensive approach that supports sustainable economies and enhances the quality of rural life by linking environmental health with economic and social well- being, encouraging innovation, and offering competitive returns (Green Investment: Performance and Positive Impact, 2025).

Green investment, or sustainable investment, involves investing in companies that are committed to environmental sustainability and reducing climate change. In addition to financial performance, its main purpose is to create a positive environmental or social impact, achieved through the integration of environmental, social, and governance (ESG) factors into investment options (Mitigating climate change through green investments, 2025). This diversified approach supports sustainable rural development by including investments in renewable energy (solar, wind, and hydroelectric), energy conservation, and sustainable infrastructure (green buildings, public transport, and water management) (Environmental, Social, and Government Investment (ESG), 2024). It also improves climate resilience through sustainable adaptation and agricultural practices. Investors can make their investments through green mutual funds, ETFs, green bonds, or by directly investing in ecological companies. Ultimately, green investing is a comprehensive approach that supports sustainable economies and improves the quality of rural life by connecting environmental health with economic and social well-being, encouraging innovation, and offering competitive returns (Green Investment: Performance and Positive Impact, 2025).

Objectives

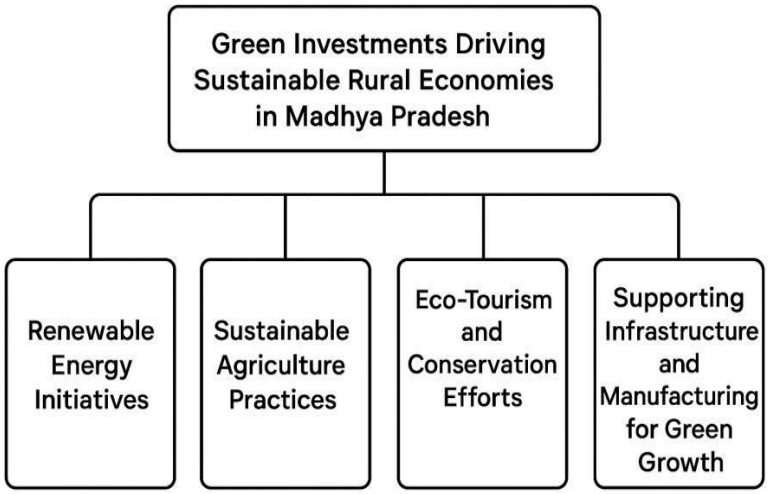
The main objective of this study is to explore how green investment and sustainable microfinance can contribute to the sustainable development of rural areas in Madhya Pradesh,

emphasizing their ability to combine environmental sustainability and financial inclusion.

Research Methodology

This study mainly focuses on the rural development of various regions in Madhya Pradesh. Data were collected from several secondary sources, including research papers, articles, blogs, NABARD reports, and government reports.

Green Investments Driving Sustainable Rural Economies in Madhya Pradesh



Initiatives on Renewable Energy

Madhya Pradesh has taken active steps to support and expand the Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan (PM-KUSUM) scheme, providing a total of RS 530 billion in subsidies to farmers (Take Takyar, 2025). This initiative aims to distribute 100,000 solar pumps, enabling farmers to gain independence from traditional energy sources for irrigation and reduce their reliance on conventional power (TAKAK TAKEAR 2025). By renting out sterile or uncultivated land for solar energy projects, farmers can generate additional income. This approach also results in significant savings in irrigation costs, estimated to be around RS 50,000 annually for a 5 HP pump (Mantri et al., 2023). Through decentralized renewable energy systems, such as solar pumps, this initiative directly addresses

the challenge of an unreliable energy supply for agricultural activities while enhancing rural income and accelerating agricultural productivity and rural economic growth.

The Rewa Ultra Mega Solar Project, with a capacity of 750 MW, was commissioned in 2018 and marked a key milestone in India's renewable energy sector. It was the first project to supply electricity to the Delhi Metro, symbolizing a major interstate power transfer (ELE, 2025). The project achieved a record tariff of INR 2. 97 per KWh without relying on direct government subsidies, adhering to national guidelines. It also prevents the emission of approximately 15. 4 lakh tons of CO2 annually. However, it has also led to concerns among local communities, as it has not provided sufficient power or employment opportunities, pushing people to give way to this lucrative project (FOEINT, 2023). The project has created fewer employment opportunities than expected, with only approximately 430 people employed, mostly in non-qualified roles such as cleaning and vegetation cutting, instead of the thousands that were projected (Utility News, 2022). This situation creates tension between generating large-scale and efficient green energy and ensuring inclusive and equitable rural development. Social impacts, such as land acquisition and displacement, require robust resettlement plans and opportunities for local livelihoods to ensure a fair transition and avoid a "green shot.”

The Agar-Malwa (550 MW) and Neemuch (431 MW) solar projects, launched in December 2024, supply electricity to Indian railroads, enabling the movement of sustainable trains across seven states (Takyar, 2025). The 1500 MW Agar project uses energy from the region and is resistant to the challenges faced by the area. Employment opportunities during the operation phase include roles such as cleaners and vegetation cutters instead of the thousands of jobs initially anticipated (Shukla and ET Government, 2021, 2021).

Wind Energy, Biopower, and Biofuel Production

Madhya Pradesh is continuously improving its renewable energy plans. The state is working to install 3,000 MW of wind energy across Ujjain, Agar, Dhar, Mandsaur, and Ratta districts, with an installed wind power capacity of 2,844 MW. 29 MW (TAKAK TAKEAR, 2025). The state is also proactively developing initiatives for the production of compressed biogas (CBG)

(Takok Takyar, 2025). The Madhya Pradesh government officially launched a scheme for implementing biofuel projects under its Renewable Energy Policy, 2025, with the goal of positioning the state as a national leader in biofuel production (India, 2025). The scheme encourages the use of the state's agricultural skills and abundant biomass resources, utilizing a variety of biofuel forms such as briquettes, granules, bio-CNG, and biomass-based power (India, 2025). The scheme's main goals include reducing dependence on fossil fuels, improving energy safety, reducing greenhouse gas emissions, generating employment opportunities, and promoting rural development (India, 2025). To attract investment, the scheme offers significant financial incentives, including up to 200 million rupees under the Basic Investment Promotion Act (BIPA) over seven years, infrastructure development funds for energy, water, and road schemes, and exemptions from electricity-related taxes and energy development CESS. It also provides reimbursement for land acquisition tax (India, 2025). One key feature of the scheme is its support for farmer producer organizations (FPOs) and cooperatives in automating the collection and supply of biomass and offering early subsidies for necessary agricultural machinery (India, 2025). Utilizing urban solid waste and cattle manure in biofuel systems fosters a circular economy model. This strategy transforms agricultural waste into valuable energy resources, producing clean energy, reducing emissions, and creating new income opportunities for farmers through the sale of biomass, as well as job opportunities in the collection and processing value chain (India, 2025).

Sustainable Agricultural Practices

The Madhya Pradesh government actively supports sustainable agricultural practices, recognizing that agriculture is the backbone of the state's economy and the primary source of income for more than 65% of its population (Agriculture and Rural Development, 2025). Organic farming, which is emerging as a top choice for many farmers, has been promoted through various schemes, such as the Paramparagat Krishi Vikas Yojana (PKVY), launched as a centrally funded initiative in 2015-16. PKVY offers comprehensive, end-to-end support for farmers, covering production, certification, and marketing. Under this program, farmers receive financial assistance of RS 50,000 per hectare for three years, with 62% of this amount allocated directly to organic inputs such as biofertilizers, biopesticides, and organic manure (Agriculture and Rural Development, 2025). The aims of promoting organic farming include

producing chemical-free food, reducing farming costs, improving soil and environmental health, and decreasing reliance on costly external inputs, which can increase the profitability of small and marginal farmers (Reddy et al., 2022). This initiative also helps reduce financial risks for farmers and stabilizes their income, despite climate change. Madhya Pradesh is also using information technology to advance agriculture and boost farmers' income. This includes the use of remote sensing and new technologies, such as GIS, IoT, data analysis, artificial intelligence, machine learning, and blockchain technology. These technologies are used to create an integrated ecosystem of service delivery and infrastructure, as seen in initiatives such as 'Krishi-Unnati', Agri-GIS, and the MP Kisan Mobile application. A unique farmer ID (UFID) is also being developed to enable data-based planning and faster claim processing during natural disasters (Agriculture and Rural Development 2025).

Infrastructure and Manufacturing for Green Investment Support

Madhya Pradesh is investing in the production of green energy and auxiliary infrastructure and manufacturing capacity. A separate manufacturing complex covering 227.54 acres is being developed in Narmadapuram at a cost of RS 4.64 billion (TAKAK TAKEAR, 2025). This project aims to attract energy-related industries to the state and create new job opportunities (Take Takyar, 2025).To encourage companies, the government provides favorable incentives in the form of land allocation at a nominal rate (Re 1), low annual lease rental (RE 1 per square meter), and concession fees in electricity charges (RS 4.36 per unit during the initial five years). Some private players, such as Grew Solar, Insolation Energy Limited, and Rays Green Energy Manufacturing, are establishing large solar manufacturing units in the state (Take Takyar, 2025). This prospective investment in manufacturing reflects a dream to go beyond just generating green energy to manufacture the entrances that make it possible. This backward integration improves the green economy in the State's home, reduces its import dependence, and builds a more diversified and resistant industrial base, generating employment impacts and economic multipliers of greater value in rural communities where these plants are commonly found.

Major sources and mechanisms of permanent microfinance in rural Madhya Pradesh

Sustainable microfinance in rural Madhya Pradesh is mainly facilitated by a collaborative ecosystem involving the government and financial institutions of Apex, as well as a large number of microfinance institutions (MFI) and NGOs. NABARD has a central and integrated role in rural development in Madhya Pradesh, both in terms of credit and assistance without credit, skill development, and the creation of key rural infrastructure. It is an important source of refinancing for rural financial institutions (RFI), commercial banks (CBS), and other institutions, thus ensuring sufficient credit flow in the agricultural and micro, small, and medium enterprises (MIPYME) sectors. This includes short-term refinancing for temporary agricultural operations and torsenal sle capital and long-term refinancing for investment operations. NABARD finances critical rural infrastructure projects, such as irrigation systems, drinking water supply, rural connectivity, and renewable energy facilities, through the Rural Infrastructure Development Fund (RIDF) and NABARD Infrastructure Development Assistance (NIDA). For example, NABARD sanctioned a subsidy of RS.10 Lakh al Kareela FPO of the Vidisha district towards a solar bulk milk cooler that improved revenues for 800 farmers and minimized their carbon footprint. In addition, the Narmada-Kshipra Link multipurpose project, financed by NABARD, provides irrigation and drinking water for 162 villages and 1.5 million inhabitants of Madhya Pradesh. NABARD actively encourages the agricultural sector through initiatives such as piloting agricultural innovations and facilitating farmers' producers organizations (FPO) for the collectivization of agricultural products and the construction of the value chain.

NABARD operates as a national implementation entity for international climatic funds, such as the adaptation fund and the green climate background, under which it accepts funds for adaptation and mitigation of climate variations (Invest in a Sustainable Tomorrow, 2024). The finance of basin development projects to improve soil and moisture conservation is actively developing new green products such as climate-resistant dairy, sets of solar solar pumps, and rural loans for electric mobility (Invest in a Sustainable Tomorrow, 2024). Through its tribes programs, Permanent rural microfinance in Madhya Pradesh faces several major challenges.

Over-indebtedness is a real issue, as customers take more than one loan from various institutions, creating repayment problems. While MFI interest rates are lower than those of informal moneylenders, they are much higher than traditional bank loans, which weigh heavily on low-income borrowers (Swain, 2017). The prevalence of poor financial knowledge in the population indicates that most rural people are not familiar with loan terms, which may cause money and lapse. Microloans are often separated from their original purpose for their original purpose of generating income to meet unproductive consumption expenses, such as weddings or medical bills. MFIs also face operational and geographical issues with high expenses and poor infrastructure, which obstruct their ability to reach remote populations. The lower rate of success of micro-entertainment (lower 20– 50% is successful) is a serious issue, mainly because borrowers lack business and technical abilities (Thomas, 2023). This means that the expansion of credit alone is not enough; real sustainable rural development requires an all-round support system with financial literacy, skill manufacturing, and post-loan support. seeks to develop replicable models of the integrated development of tribal families, strengthen and develop tribal institutions, and raise their standard of living. These projects have reached 77,776 families through 102 projects in Madhya Pradesh (MP). NABARD also plays a vital role as a bridge between national green finance policies and their execution in rural areas. Its varied financial and developmental purposes, such as direct assistance to green technologies and climatic adaptation, reflect an advanced strategy to link environmental objectives with rural credit and infrastructure, making it a key pillar for sustainable microfinance in Madhya Pradesh.

A major part of the National Rural Livelihoods Mission (NRLM), the Self-Help Group-Linkage Program (SHG-BLP) has added 17.75 crore homes, with millions of SHG savings and credits. NABARD focuses on uplifting the ultra-poor, digital transactions, and microenterprise development through Grip, Money Purses Applications, M-Suvidha, and Skill Upgrade (Microfinance Report, 2023-24). In Madhya Pradesh, the NRLM has promoted the participation of rural women in external work and its social acceptance, challenging traditional criteria. Beyond credit, SHGs create social capital. SHGS contribute significantly to SHGS stability by preferring domestic and environmental welfare. Microfinance Institutions (MFI) and Non-Governmental Organizations (NGOs) are important in expanding

financial services for the rural population, especially in remote areas where traditional bankers are often absent (theory of sustainable microfinance, 2006). These organizations play an important role in empowering communities and promoting sustainable growth. One of India's largest microfinance institutions provides many micro-laws, including Spandna Sphort, "Chetana," "" Annait, "," sustainans, and water, hygiene, and hygiene (wash) loans. They strongly emphasize women's economic and social empowerment through financial literacy and skill development, as strong women are often entrepreneurs and promote women's empowerment (BESS, 2020).

In Madhya Pradesh, Spandana Sforty microloans have contributed directly to income generation and livelihood diversification. For example, Chandravati Rajput in Narela, MP opened a dairy flock and clothing shop with a microloan three times his income, while Mithilesh Yadav successfully started a grocery and tailor shop (Banerjee, 2022) in Bhopal. Aga Khan Rural Assistance Program (India) has been working in 399 revenue villages in six districts of Madhya Pradesh since 2004. Their interventions include promoting women's self-help groups (SHGs), natural resource management, sustainable agricultural practices, and renewable energy initiatives. Although they do not clearly expand "Green Microfinance" products, their integrated approach to permanent agriculture and renewable energy contributes significantly to Green Development (Aga Khan Rural Assistance Program (India) - Madhya Pradesh, 2022) at the ground level. Various microfinance institutes, such as Mufin Green finance, Cashpor Microcredit, and Udyogini, are supporting many rural initiatives in various districts of Madhya Pradesh. This change shows continuous development in promoting a greener economy at a subtle level, leading to higher targeted and impressive interventions.

Challenges and Limitations in Implementation

Larger solar projects in India face difficult social and environmental challenges, such as the dilemma between green energy goals and rural development (Dwivedi and Munshi, 2021). Solar projects consume a huge amount of land, which leads to the displacement of agricultural and grazing land required for a rural lifestyle. It also replaces nearby communities, such as the Omkareshwar floating solar park and Rewa projects, where communities lost livelihoodslihood and land and received insufficient compensation. There is also an important

deficit in India's Green Financial Market, which is primarily based on the banking system and lacks adequate environmental awareness among investors (Freetag, 2022). . This implies a minimum investment in productive agricultural property. Farmers are not interested in adopting nature-based farming due to the alleged risks and lack of specific government policies. Some of the overall challenges for organic farming are high initial capital costs, poor supply chains, and lack of knowledge among farmers (Minister et al., 2022). . Solar pumps also have some limitations, such as their ineffectiveness during cloudy days, and are usually economically unacceptable for small farmers because of the need for high early capital. These issues suggest that Green Energy Projects, as Great, have social and environmental impacts that should be addressed only through compensation and strong support.

Sustainable microfinance in rural Madhya Pradesh has expanded with many systemic challenges. One of the main problems is over-rhetoric, where rural customers borrow loans from multiple MFIs, complicating repayment (icecdadmin, 2025). While MFI interest rates are more competitive than those of informal lenders, they are relatively higher than traditional bank financing, which is a huge burden on poor borrowers. Another major challenge is the lack of financial literacy, as most residents lack knowledge of debt status and repayment requirements, misuse funds, and default (Outpost and Worker, 2017). Most of the time, microloans used for income-creation activities find their way into non- productive consumption purposes, such as weddings or medical bills, which defeats the developmental agenda of the debt. Operationally, MFIs face geographical difficulties in reaching remote customers with high costs and poor infrastructure. In addition, the low success rate of microenterprises (only 20–50% profitable) is a major concern (NABARD, 2022– 2023). This stems largely from borrowers lacking technical and professional skills, thus emphasizing the fact that credit cannot work alone. A universal ecosystem that includes financial literacy, skill manufacturing, market connections, and post-loan services is important for permanent rural development. Finally, regional inequalities and data shortage policies obstruct intervention and progress monitoring (Thomas, 2023).

Permanent rural microfinance in Madhya Pradesh faces many major challenges. Over-indebtedness is a very real issue, as customers take more than one loan from various

institutions, which creates repayment problems. While MFI interest rates are lower than informal moneylenders, they are much higher than traditional bank loans, which weigh heavily on low -income borrowers (Swain, 2017). The prevalence of poor financial knowledge in the population indicates that most rural is not familiar with the terms of the loan, and this may cause money and lapse. Microloans often separate from their original purpose for their original purpose of generating income to meet unproductive consumption expenses such as weddings or medical bills. MFIs also face operations and geographical issues with high expenses and poor infrastructure, which obstruct the ability to reach remote population. The lower rate of success of micro- entertainment (as lower 20–50% is successful) is a serious issue, mainly because borrowers lack business and technical abilities (Thomas, 2023). This means that the expansion of credit alone is not enough; real sustainable rural development requires an all-round support system with financial literacy, skill manufacturing, and post-loan support.

Conclusion

The report categorically establishes that green investments and sustainable microfinance are essential for supporting the development of rural communities in Madhya Pradesh. The State has strategically adopted a multidimensional strategy, taking advantage of its natural and agricultural resources to promote sustainable economic development and green growth. Green investments, especially in renewable energy, have significantly improved energy safety, minimized dependence on fossil fuels and considerably reduced greenhouse gas emissions. Mass solar farms feed the national network and energize vital infrastructure, while decentralized programs such as the PM-Kusum scheme equip farmers in rural areas with energy independence and new sources of income. The growing biofuel industry is turning agricultural waste into productive energy, promoting a circular economy and rural jobs. In addition, the state investment in green manufacturing bases is the evidence of visionary thought to establish a solid national green economy, attracting private capital and generating more valuable jobs. At the same time, sustainable agricultural methods, such as the cultivation of millet and organic agriculture, are supporting climate resistant livelihoods, reducing the cost of inputs and improving the health of water and soil. Ecotourism models, represented by the Wilderness camp of Jamtar, demonstrate that community conservation can immediately create local livelihoods, diversify livelihoods and reduce conflicts in human life.

Sustainable microfinance is also essential to bring bank services to the most vulnerable sections of society, particularly women. Financial institutions such as Nabard, Spandana Sphoorth, AKRSP (I), MUFIN GREEN FINANCE and CASHPOR Micro Credit not only offer access to savings, insurance and credit, but also more and more funds are being directed towards sustainable activities. This has resulted in economic empowerment with a specific impact, a greater participation of women in the workforce and a broader social change, which have undermined conventional gender roles and improved domestic well -being. The 'Samruddhi' model also illustrates the State's zeal for financial inclusion by extending banking services to remote villages. Despite all this, there are problems that remain. Large - scale green projects have land acquisition, displacement problems and tend to offer very little direct operational employment to local people and, therefore, more benefit exchange mechanisms are required. The microfinance industry is plagued by overdevaluation, excessive interest rates and financial illiteracy, and the viability of microenterprises is often seen by commercial and technical assistance inadequate. The most general limitations, including climatic vulnerability, soil erosion and access differentials for small farmers, highlight the need for holistic approaches.

Finally, the route of Madhya Pradesh towards sustainable rural development through green finance is characterized by bold policy initiative, large -scale investment and ground level creativity. The state's integrated policy structure, which encourages green industrialization and promotes financial inclusion, a greenery, motivates for a strong commitment to the more rich future. Nevertheless, continuous diligence and responsive approach must continue to deal with internal nuances and ensure that the dividends of this Green Revolution are shared to create inclusive and durable rural communities distributed.

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Sustainability of Wholistic Language Learning with EdTech Tools

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Abstract

Since the dawn of civilization, humans have strived for expressing themselves through various means. The need for a comprehensive language for expression of thoughts can be traced back to the cave paintings of the Stone age which have served as a medium of communication for early humans. With English gradually being accepted as a global language of communication in the modern era, language acquisition has become a primary task for all communicators. This has lain stress on development of a variety of EdTech learning tools available for use of imparting learning to students.

The higher education scenario in India has become a dynamic platform. With advancement in technology and availability of diverse learning platforms, educators have a wide choice of pedagogy for imparting language learning. Educators must carefully select the right EdTech tools that align with the learning content to ensure the chosen blend effectively achieves the desired learning outcomes.

This paper attempts to examine the different EdTech learning pedagogy used for Language Learning in Management classrooms with special focus on achievement of learning outcomes and wholistic learning. Data for this research has been collected from secondary sources, through research databases like Ebsco, Jstor, Science Direct and Google Scholar.

Keywords: *Sustainability, Quality Education, Blended Learning, Language Learning, EdTech*

Introduction

Increasing demand in English proficiency in the field of education, trade and global communication, has influenced the inclusion of English Language Learning in education systems worldwide. With English being accepted as the Global Language for trade and commerce, gaining mastery over the language has become a pre-requisite for career success. With the evolving demography of language learners, who are at times more tech enabled than their facilitators, educators have to constantly strive to incorporate new strategies for learning pedagogy for developing an effective and engaging learning environment.

A Brief Historical Development of English Language

English language has seen a gradual evolution from the dialect spoken by the west Germanic tribes to the Anglo Saxons settled in Britain, to the Middle Ages, heavily influenced by French language, under the aegis of literary stalwarts like Geoffrey Chaucer. With the development of printing technology and widespread publication of the written word, simplification of the grammatical and lexical structure of the language took place. The Renaissance of Classical Learning opened doors to many new foreign words in the English Language, enriching its vocabulary. Industrial Revolution and the spread of the British Empire to different regions resulted in English gradually being accepted as a global language of communication.

The New Era

Introduction of computers in language acquisition and Technology in Language Learning (TELL) began around the 1960s. Advancements in the field of Linguistics, as propagated by Chomsky (1950s) and Saussure (1900s) focused on structuring the language and building comprehensibility.

The English language as we know today, is very different from the original Germanic dialect. With the birth of the Internet, the language is witnessing a new evolution. Apart from the ongoing onslaught of new words being added to the dictionary every day, alterations in lexical structures are also taking place. But the greatest revolution is being witnessed by Language Learning pedagogy. With rapid exposure to digitization, language learning nowadays is no

longer restricted to the boundaries of the classroom. Education Technology, often referred to as EdTech is the application of technology to facilitate Language Learning (Phua & Aripradono, 2025).

With introduction of ChatGPT in November 2022, the revolution took a new turn. Rapid increase in the number of users (One million users within a week of its launch) spelled new challenges for Language Educators (Polymer, 2023). With increasing dependence of learners on the ChatGPT platform, Language Educators needed to rethink the pedagogy mix for imparting language education. It had become imperative in classrooms not only to teach prompt engineering and responsible usage of ChatGPT but also reflections on the outcome of excessive usage leading to dependency (Kuka & Hormann, 2024). Therefore, EdTech platforms used for language learning should be introduced in the language acquisition process with a lot of responsibility in mind.

Education technology, often referred to as EdTech refers to use of technology enhanced pedagogy in classrooms to enhance the learning experience. The principal purpose behind use of this technology is enhancement of the learning experience for the digitally advanced learners and to overcome the limitations of special boundaries in the learning process. EdTech pedagogy has enabled facilitators take the learning process beyond the four walls of the classroom, such that learning can be accessed from anywhere and everywhere (Phua & Aripradono, 2025).

Literature Review

EdTech tools in language learning have long dominated the arena of language acquisition. Shadiev et al (Shadiev, Reynolds, & Li, 2024) points out that with state-of-the-art educative technologies available for use of educators, they are spoilt for choices. These include platforms like mobile tools, social media platforms, AI and VR tools and online collaborative platforms. Hallie Chun et al (Chun, Lee, & Park, 2021) points out through their empirical study of the variety of contexts of use of EdTech tools for language acquisition, and the student’s perception towards these tools.

Rochimah et al points out that the problem with English language acquisition is the need for updated pedagogy, among which project-based learning seems most suited for the needs of

21st century learners as they foster enjoyment of the learning process (Rochimah et al., n.d.). Daniel et al (Du & Daniel, 2024) conducted a research analysis on 24 chatbot applications on English speaking environments between the period of 2017 and 2023. The study revealed that use of this pedagogy for language acquisition is in its nascent stages, therefore offering lot of opportunities for exploration.

EdTech Tools for Language Learning

Common EdTech platforms used for language learning include Khan Academy, Coursera, EdX, Alison Academy and Udemy, which offer online language courses from reputed institutes. EdTech platforms enable use of applications like AI, AR and VR. While AI platforms like Babbel and Duolingo offer customization of the learning content based on Learning Outcomes, AR and VR offer interactive and simulated learning environments which replicate reality, thereby enhancing the learning experience. These improve language proficiency along with student motivation.

EdTech tools used for Language Learning can be classified as follows-

Language Learning Applications- Applications like Duolingo, Babbel etc. are popular platforms for gamification of the process of language learning. With lessons, customized to bite size portions, loaded with interactive quizzes and feedback exercises combined with a reward programme, learning is reinforced and made exciting at the same time. These platforms also allow scope for supplementary learning and encourage a healthy competition among learners. AI based applications like MondlyAR focus on focused language learning where words can be suggested for objects when they are pointed out.

Writing Assistance Tools- Grammarly, Write and improve, Prowrite etc. use NLP approach to analyse sentence structures, grammatical order, coherence and tone, providing instant feedback to learners such that they may refine their writing skills.

Interactive Tools- Tools like Kahoot, Quizlet and Padlet make learning exciting because of the level of interactivity and the competitive and collaborative element. Padlet offers an interactive platform which allows students to collaborate virtually on interactive boards for dynamic content creation and communication. Applications like SeekAR encourage learners to communicate in a specific language to complete tasks.

Video Based Learning Tools- Tools like EdPuzzle can be used for language learning using video content. Assessment can be created based on custom videos available on the platform or those created by facilitators or learners themselves. Activities can be designed to check the comprehension level of learners. For Multilingual learning, tools like FluentKey may be used. This platform contains a library of videos for language learning (videos include movies, commercials, music, news and many more). As this platform can be accessed through mobile phones, learning can be effectively taken beyond the classroom walls. Audio Lingua is another effective tool which offers recordings in more than thirteen different languages, which can be downloaded and used for practice by learners.

Benefits of EdTech

Comprehensive research done in this area by Phua et.al points out that use of EdTech in Language Learning provided positive inputs related to the following areas:

a) Increase in Motivation levels of Language Learners

b) Development of Efficiency and Effectiveness of Learning Content

c) Realistic and Immersive Learning Experience

d) Overall improvement of Language Skills in relation to Comprehension ability, Pronunciation and Language use in realistic contexts (Phua & Aripradono, 2025)

Aashika K. S. makes an attempt to study an appropriate research question in this regard- the impact of use of digital tools for Language Learning, in terms of student engagement and learning outcomes (Aashika & Batta, 2024). Common EdTech tools for Language Learning are as follows- Grammarly, Duolingo, Babbel, Kahoot, Quizlet, Padlet, Quill Bot, Claude, Jasper, Squibler, Sudowrite and ChatGPT. (Kim, 2025).

Agustin and Wirza (Anita Dewi Agustin & Yanty Wirza, 2020) pointed out that facilitators using Edtech in classrooms for Language Enhancement in students may lead to improvement in learning effectiveness by providing an interactive learning experience. Kustini 2020 points out that a perfect blend of face to face and technology enhanced learning leads to improvement of multi literacy in learners, especially with reference to language learning (Kustini, 2020). A study by Melati et al 2023 pointed out that EdTech teaching pedagogy

significantly influence oral communication skills in learners of secondary schools (Melati, 2023).

As many of the EdTech tools used in language learning provide instant feedback to learners and allow scope of improvement, they enable real time improvement of language skills without much human intervention. Also, facilitator workload is significantly reduced due to tasks like grading, error detection ad feedback taken care of.

Constraints of using EdTech for Language Learning

While EdTech provides very interesting opportunities for facilitators to design an effective learning pedagogy for achievement of the desired language learning outcome, the initiative is not without its drawbacks. Some of the common obstacles include lack of technical infrastructure available at the learning institutes, insufficient teacher training and lack of access to good internet connectivity. Adopting these EdTech techniques also requires time and expenses. Successful utilization of EdTech also depends on quality of infrastructure, competency of the facilitator and dedicated technical support.

Another major drawback of use of EdTech is while AI can replicate human voice and emotions, it cannot replace the empathy and cultural understanding of human educators. Also, with large amounts of data being shared with the EdTech learning platforms, issues like data privacy and protection also need to be considered.

Research Gap

A close study of research papers on use of EdTech tools for language acquisition reveals that the number of research papers dealing with this subject of study has seen a gradual rise mostly in the post pandemic era. However, results also revealed that most of the studies reviewed dealt with a limited range of participants and the practical use of technology in a limited and specific context. Diversification of the contexts studied and the integration of the pedagogical variety to effectiveness of learning outcomes may be targeted (Chun, Lee, & Park, 2021).

Conclusion

Ahmadi (Ahmadi, 2018) points out in his research that Language educators, as facilitators should be aware that Edtech tools used for learning should be used for creation of a learner centric learning environment and not a teacher centric one. The focus of the use of these tools should be the enhancement of the learning experience through learner autonomy, which should sync with the learning content and desired outcome of the exercise. EdTech tools are here to stay and therefore need to be incorporated responsibly into the learning process.

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Behavioural Barriers and Sludge in Agricultural Communities: A Case Study of Irukkam Island

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Abstract

Irakam Island is an isolated island located in Pulicat Lake, between Andhra Pradesh and Tamil Nadu. The island faces many infrastructural challenges, lack of basic facilities like education, healthcare, transportation, etc. that has an adverse effect on the exodus of migrants from the island as well as those left behind. This paper analyses these phenomena with the behavioural variables of friction, descriptive social norms, and loss aversion, and also recommends behavioural interventions to improve the situation. The study reveals the

multifaceted nature of the challenges faced by the residents of Irakam Island and how these challenges are interconnected. This study also highlights the importance of considering behavioural factors when designing policies to improve the lives of individuals in underserved communities.

Keywords. *behavioural economics, friction, loss aversion, descriptive social norms, isolated communities, cusp islands, agricultural communities, fishing communities*.

Introduction

Both governmental and corporate entities have recently demonstrated a great lot of interest in "nudges," which are interventions that protect people's freedom of choice while simultaneously directing them in specific directions. The two types of nudges are educational and architectural. Examples of educational nudges include caution, reminders, and information sharing (such as calorie labels, allergy warnings and fuel economy labels). Automatic enrollment, required selection, simplification or "sludge reduction", and the design of websites, forms, or in-person stores to emphasise and bring attention to particular options are examples of architectural nudges. Whether educational or architectural, nudges have frequently been proven to significantly affect results and be very cost-effective.

Importantly, when examining the impacts of numerous nudges, they often turn out to be more desired rather than less. With an emphasis on architectural nudges, nudges significantly lower the obstacles that fuel inequality; important sectors include COVID-19 financial, retail, and health decisions. In this context, there may be a scenario where a company or educational institution is assessing the best choice architecture for choices concerning, say, retirement or health insurance. For low-income choosers, for choosers with less domain-relevant experience, and for choosers with worse numeracy, smart defaults can have very big advantages. These defaults guide individuals towards solutions that are most likely to meet their conditions. Nudges are traditionally manufactured artificially to disseminate the benefits of ‘libertarian paternalism’, which is defined as “a form of paternalism, libertarian in spirit, that should be acceptable to those who are firmly committed to freedom of choice on grounds of either autonomy or welfare” (Sunstein & Thaler, 2003).

Behavioural economics can therefore be a useful tool for change in India, where social and religious norms have such a strong influence on behaviour. Therefore, by highlighting good influences, particularly friends and neighbours who serve as role models that others can relate to, favourable social norms may be furthered. Second, individuals tend to remain with the default selection because they have a lot of inertia when making decisions. To counteract this inertia, it is almost free to change the default, which might encourage desirable behaviour without influencing people's decisions. Third, frequent affirmations and reminders of earlier activities that were effective might assist maintain altered behaviour since people find it challenging to maintain excellent habits.

However, such strategies remain few and far between in more shrouded areas like Irakam Island, which face the brunt of cusp policies. Rather, they face the exact antithesis of nudge policies, i.e., ‘sludges’, which make a process more difficult with the goal of creating friction (Thaler, 2018). By prohibiting tourists, the obligation to safeguard the area and its ecosystem is kept very high. The island of Irakam is situated in a way that keeps its residents fully cut off from the rest of the world and from governmental borders. As a result, they are severely lacking in necessities. Few others inhabit the island only temporarily to keep an eye on their own resources that are yet unsold. The majority of the island's fishing villages are located there, and they are the ones that own the boats and nets. There is just a basic school; there are no universities, hospitals, banks, or proper stores where one may live a regular life like others do in the outside world. Irakam Island has had the least degree of development in comparison to other locations during the past seven decades since independence. The island of Irakam is not only geographically isolated, but also politically and economically marginalized. Its residents are unable to access many basic necessities, including adequate healthcare, education, and infrastructure. The lack of government support and investment has contributed to a cycle of poverty and exclusion that has persisted for generations. The island's population of roughly 300 families are largely dependent on subsistence activities such as fishing and agriculture, which can be unreliable sources of income. In this context, studying the challenges faced by Irakam's inhabitants can shed light on the complex interplay between geographical, political, and economic factors that shape development outcomes in marginalized communities. The primary results of all these factors are abject poverty, mass

migration of youth to the mainland, and low standard of living. In areas like Irakam Island, behavioural concepts manifest themselves as deterrents; obstacles that prevent residents from seeking improvements in their standard of living, and these are the primary examples of sludges.

In this context, Irakam Island proves to be the ideal subject of such an intersectional study. Irakam's inhabitants are grappling with issues such as inadequate access to clean water and sanitation, limited healthcare services, low levels of education, and poor transportation infrastructure. These challenges intersect with various behavioural concepts, including loss aversion, friction, and descriptive social norms, that can help to explain phenomena on the island. Examining Irakam Island would provide valuable insights into how these intersecting factors impact development outcomes and inform policy interventions to support residents of the island.

The socioeconomic issues faced by Irakam Island and its residents have significant policy implications. To address the complex challenges of exclusion and underdevelopment, policymakers must consider a range of factors, including access to basic services, economic opportunities, social inclusion, and environmental sustainability. Effective policy interventions may require collaboration across sectors and levels of government, as well as engagement with local communities and civil society organizations. By taking a comprehensive and holistic approach to development, policymakers can create more effective solutions that address the root causes of poverty and exclusion, and promote sustainable and equitable growth.

The study of Irakam Island's development challenges is particularly relevant in the context of India's growing economic disparities. Despite the country's impressive economic growth over the past few decades, many regions and communities continue to experience poverty, exclusion, and underdevelopment. Addressing these challenges requires a more nuanced understanding of the complex social, economic, and environmental factors that shape development outcomes. By examining the challenges faced by Irakam's inhabitants, strategies for promoting inclusive and sustainable growth that can be applied to other

marginalized communities across India and beyond can be identified. The study thus aims to view these issues with a behavioural lens and identify variables that could contribute to the phenomena seen on the island.

Scope of the study

The study will be carried out on the island of Irakam, Pulicat Lake, which houses around 2,000 people. Irakam Island is located in Pulicat Lake which has a total area of 759 sq.km, of which the major part of the Lagoon is located currently in Tirupati District of Andhra Pradesh. One portion of the lagoon is located in Tamil Nadu and the other portion is in Andhra Pradesh. According to the pilot study conducted, Irakam is a water-enclosed island. The village is geographically located in Tada mandal of Andhra Pradesh state of India.The journey by boat to this island, which is 12 kilometers from the mainland, will take an hour's boat ride from the mainland, with only two boat trips per day. About 2000 people live on this island, mostly rice farmers and fishermen.

Review of Literature

The remoteness and distinct socio-ecological characteristics of Irakam Island have led to a scarcity of location-specific academic research. Consequently, this study primarily relies on theoretical frameworks to conceptualize the behavioural, social, and economic dynamics of the island, supplemented by comparative empirical evidence from similar geographies. This review draws on behavioural economic theories to understand the challenges faced by the island's inhabitants and explores empirical studies related to rural livelihoods and migration patterns to contextualize the island’s development constraints.

Theoretical Framework

1. Friction

Friction, in behavioural economics, refers to any barrier that hinders individuals from acting in their best interest, thereby preserving the status quo. Kling et al. (2012), in their seminal study on *Medicare Drug Plans*, define “comparison friction” as the gap between the

availability of comparative information and its actual use by consumers.

On Irakam Island, infrastructural deficiencies — such as limited transportation and lack of access to markets — create significant friction. The cost of travelling to the mainland (INR 10 per trip) and weather-induced risks, including potential loss of life, make everyday necessities burdensome to acquire. This systemic friction reinforces economic vulnerability and contributes to a cycle of deprivation.

Crawford Hollingworth outlines three ways to reduce friction:

● Minimizing decisions
● Reducing procedural steps
● Lowering perceived effort

While applicable at micro levels (e.g., increasing insurance enrolments), applying these at the macro level, such as on an isolated island, is more complex. In contrast, the concept of **"fuel"**, i.e., enabling or motivating infrastructure, is relevant for Irakam. Providing essential services on the island could alleviate the frictions by enhancing local capacity and reducing dependency on the mainland.

2. Descriptive Social Norms

Descriptive norms describe behaviour patterns adopted by individuals to align with their social reference group. Bicchieri and Dimant (2022) highlight that individuals tend to conform to perceived norms within their social circles — family, community, or occupational group.

On Irakam Island, the fishing occupation has persisted for generations. Social pressure and conformity discourage diversification, despite the economic disadvantages of over-reliance on a single livelihood. Even those aspiring to transition are deterred due to entrenched norms and lack of alternatives.

Norm-nudging, as defined by Bicchieri and Dimant, involves leveraging social expectations to influence behavioural change. If implemented sensitively, it can facilitate a shift toward diversified income generation and community resilience by reshaping collective norms.

3. Loss Aversion

As theorized in Prospect Theory by Kahneman and Tversky (1979), **loss aversion** posits that individuals disproportionately fear losses compared to the pleasure derived from equivalent gains. Losses carry greater emotional weight, leading to risk-averse behaviour.

On Irakam Island, this is visible in the population's reluctance to explore new livelihoods or migrate, fearing failure and the unknown. This hesitancy is rooted not just in economic limitations, but also in psychological perceptions of risk and the irreversible nature of certain decisions (e.g., leaving the island without a viable fallback).

Empirical Literature

Though direct empirical studies on Irakam Island are absent, migration and livelihood studies from similar contexts offer comparative insight into behavioural dynamics in isolated or vulnerable communities.

1. Migration Motivations and Psychological Constraints – Iran

In their study *Why Do They Want to Migrate from Rural Areas?* Yazdanpanah & Zobeidi (2017) use the extended Theory of Planned Behaviour to explore rural youth's migration intentions in Iran. Educational and career aspirations often pull youth toward urban centres. However, the decision-making process is heavily shaped by psychological and social constraints, much like the internal frictions on Irakam Island.

2. Migration, Mental Health, and Gendered Risk – Indonesia

Lu (2010), in a longitudinal study from Indonesia, explores how migration affects mental health and risk behaviours. Men tend to externalize stress through behaviours like smoking, whereas women internalize it, manifesting in depressive symptoms. The study also highlights the moderating effects of family support and social integration — crucial for planning migration or development interventions on Irakam.

3. Return Migration and Community Sustainability – Vietnam

Huyen Le et al. (2021) investigate how rural-to-urban migrants contribute to the sustainability of their home communities upon return. Their cross-sectional study finds that

migrants with longer urban exposure and skill acquisition tend to act prosocially, investing knowledge and resources back into their rural origins. This could serve as a developmental model for Irakam Island, should policies enable off- island training with pathways for reintegration.

Synthesis and Relevance to Irakam Island

By anchoring this study in behavioural theories of **friction**, **social norms**, and **loss aversion**, the review creates a lens through which Irakam Island's socio-economic stagnation can be interpreted. The empirical literature provides comparative perspectives from rural and marginalised contexts, validating that behavioural tendencies—like occupational rigidity, migration aversion, and resistance to change— are neither irrational nor unique but shaped by systemic constraints and cultural pressures.

Understanding these patterns helps tailor interventions that are psychologically sensitive and socially sustainable. For example:

- Reducing **friction** by investing in island-based markets
- Redesigning **norms** through community role models and educational nudges
- Addressing **loss aversion** by offering low-risk opportunities for livelihood diversification

Conclusion

The literature reviewed provides both theoretical scaffolding and empirical parallels essential for a holistic understanding of Irakam Island's socio-economic dynamics. While direct field data remains to be collected, the integration of behavioural economics with rural migration studies enables the development of informed hypotheses and a contextual framework. This dual approach ensures the study remains grounded in theory while being responsive to practical realities.

Objectives

- ➢ To examine the influence of behavioural factors towards the migration of people in the cusp island of Irakam

- ➢ To study various 'sludges' on the island for residents availing education, transport and healthcare services
- ➢ To analyse the interaction of these behavioural factors among members of the agricultural and fishing comm

Methodology

Data Collection and Sample Selection

This qualitative study was conducted on Irakam Island from January to April 2023 as part of a broader research project on social exclusion and diaspora. Data were collected through in-depth interviews, observations during a field visit on March 10, 2023, and secondary sources, including government portals, fiscal reports, and academic literature. A purposive sampling technique selected five respondents from three social groups: agricultural landowners, fishing community members, and mainland commuters. This ensured diverse perspectives on subsidy access and employment challenges.

Area of Study

Irakam Island, located in Tada Mandal, Sri Balaji District, has a population of 1,820 (2011 Census) and is surrounded by Pulicat Lake's brackish waters. Its isolation and ecological sensitivity make it an ideal case for studying subsidy impacts in marginalized regions. The study focused on the dominant occupations—agriculture and fishing—due to their economic significance and environmental constraints.

Study Design

A questionnaire assessed subsidy accessibility, income levels, employment patterns, and awareness of welfare schemes. Variables included:

- **Agricultural Incentives**: PMKISAN, YSR Rythu Bharosa, and related fiscal policies.
- **Fisheries Incentives**: YSR Matsyakara Bharosa, Pradhan Mantri Matsya Sampada Yojana, and diesel subsidies.
- **Income and Employment**: Current and prospective livelihoods, including migration trends.

Data Analysis Tools

Qualitative analysis synthesized primary data from interviews and secondary data from government sources. The case study approach allowed for nuanced insights into diverse socioeconomic groups,

identifying subsidy implementation gaps and potential alternative livelihoods. The analysis considered economic, educational, and environmental factors influencing subsidy adoption and employment dynamics.

Limitations

The study's scope was constrained by time, cost, and the guarded nature of respondents, potentially limiting data precision. The small sample size, while diverse, may not fully represent the island's population.

Analysis and findings

In this research study, the three key behavioural variables that will be examined are friction, descriptive social norms, and loss aversion. These variables will be analyzed in a case study format, focusing on various facilities such as education, healthcare, and transportation. Additionally, miscellaneous observations will also be included to provide a comprehensive understanding of the impact of these variables in different scenarios. By delving into these case studies, we can gain insights into how these behavioural variables influence decision-making, and how they can be leveraged to promote positive outcomes. This analysis would enable a better understanding of the complex interplay between individual behaviour and the social environment, paving the way for more effective interventions and policies.

The information obtained and analysed below was sourced from interviews from the following residents of the island, profiled below:

a. Two members of the fishing community who were women and homemakers, aged approximately 45-55
b. Two members of the agricultural community, women, aged 45-55 whose children had left the island for work and did not provide them with any support

c. One member working on the mainland, a man aged 20-30, who commuted from the island every day.

Since most of the inhabitants of the island fall into one of these three categories, i.e., agriculture, fishing, or working on the mainland, the results analysed below are valuable insights into the behavioural factors observed on the island.

EDUCATION

The responses received from inhabitants on Irakam Island with reference to education and education facilities are compiled below:

"There is only a primary school here. Around 2000-12, a missionary started a school in English medium teaching all subjects. But they left mysteriously and did not return. Most of us [older generation, current parents] have not studied, but we send our children to school and college too. But we have to send them to the mainland to Arambakkam, Kavaraipettai or Sullurupeta. Some of them do not return to take care of us and we are alone here, and have given up hope."

The author also observed that the primary school on the island was extremely dilapidated, and appeared quite deserted, despite visiting on a working day.

The concept of friction is a critical factor in determining an individual's behaviour and decision-making process. The presence of friction can create barriers that impede an individual's ability to take action and make choices that may be beneficial to them. In the case of limited access to education, friction can manifest in different ways, such as the lack of nearby schools, the cost of transportation to distant schools, or the cultural norms surrounding education. In this specific case, the lack of a nearby school is a significant source of friction for the community members. The time and expense involved in sending children to schools in other towns can discourage some families from prioritizing education for their children. Moreover, the added complexity of transportation logistics and time constraints can also make it challenging for parents to balance their responsibilities and ensure that their children attend school regularly.

Descriptive social norms can be a powerful driver of individual behaviour, as people often look to others to understand what is considered acceptable or desirable in society. In the context of limited access to education, social norms can play a crucial role in shaping the attitudes and beliefs of individuals towards education. For instance, if the community views education as a critical pathway to success and social mobility, then individuals may be more likely to prioritize education for themselves and their children. In this specific case, the older generation's decision to send their children to school, despite not having access to education themselves, may be influenced by the perceived social norm of valuing education. The belief that education is essential for success and mobility may be deeply ingrained in the community's culture, leading individuals to prioritize education for their children, even if it involves overcoming significant barriers such as the lack of nearby schools. Moreover, social norms can also influence how individuals view the role of education in their lives and the lives of their children. For instance, if the community perceives education as a means to achieve a better quality of life, then individuals may be more motivated to invest in education, even if it involves making sacrifices and overcoming significant barriers.

This loss aversion behaviour is a common phenomenon in human decision-making, where the pain of losing something is more significant than the pleasure of gaining it. This could be due to the emotional attachment to the thing being lost or the fear of missing out on future opportunities. In the case of education, the older generation may feel that they missed out on opportunities for personal growth and career advancement due to their lack of access to education. Thus, they are highly motivated to ensure that their children do not face the same fate and are able to access education. Furthermore, loss aversion

can be a powerful motivator for positive change. In this case, the older generation's desire to avoid the loss of educational opportunities has led to the establishment of schools in the community. The presence of educational facilities in the community may help to reduce the friction of sending children to distant schools, and encourage more families to send their children to school. This, in turn, may have positive social and economic impacts on the community, such as improving literacy rates, enhancing job prospects, and reducing poverty.

TRANSPORT

The responses received from inhabitants on Irakam Island with reference to transport and transportation facilities are compiled below:

"We have to travel to the mainland [Arambakkam] for all groceries and basic necessities. It costs around INR 40 up and down, and once you reach the mainland, it is at least INR 10 or more to travel by auto. Here, it is even worse – we do not even have proper roads and have to walk in the sand, or go by tractor."

The author also observed that the island was extremely difficult to navigate due to the hot sun, scalding sand and lack of vegetation. There were only a few stretches with a concrete path, and many people walked barefoot. From central Chennai, the nearest ferry spot was around 2.5 hours away, and the island took another 2 hours to reach by boat. On the way to the island, the author also observed two men with just one gas cylinder in the boat, presumably purchased from the mainland for cooking purposes.

The quote highlights the impact of friction on the community's ability to access basic necessities such as groceries. The community members face significant friction in traveling to the mainland to purchase essential items, which involves not only transportation costs but also time and effort. The lack of proper roads on the island and the need to walk on sand or use a tractor further adds to the friction, making it difficult for individuals to undertake such trips frequently. This friction can lead to individuals being unable to access basic necessities, which can impact their quality of life and perpetuate the cycle of poverty. The presence of friction also affects the community's ability to access education and healthcare services. The lack of proper transportation infrastructure, coupled with the distance from the mainland, creates a significant barrier for community members seeking to access these services. For instance, parents may be deterred from sending their children to school, given the high transportation costs and long travel time. Similarly, individuals in need of healthcare services may be unable to access medical facilities due to the distance and transportation costs. This lack of access to essential services can have long-term implications for the community's well-being and social mobility. Thus, addressing the issue of friction is critical in ensuring equitable access to basic necessities and services.

Descriptive social norms play a significant role in shaping behaviour in societies and communities, and this is especially true in contexts where resources are scarce. In this case, the limited access to basic necessities and the difficult living conditions on the island create a unique social context where individuals may be influenced by the perceived behaviour of others. The pressure to conform to social norms can be driven by a variety of factors, including the desire for social acceptance, the fear of exclusion or ridicule, and the belief that certain behaviours are necessary for survival. In this case, the observation that many people on the island walk barefoot suggests that this behaviour may be the norm, which can create pressure for individuals to conform to the same behaviour, even if it is not comfortable or practical. This pressure to conform can be particularly strong in communities where social ties and relationships are strong and where individuals rely on one another for support and survival. However, the pressure to conform to social norms can also have negative consequences, especially in contexts where resources are scarce or where certain behaviours may perpetuate poverty or limited access to resources. For example, if individuals on the island perceive that it is normal or acceptable to walk barefoot or travel by tractor, they may be reluctant to invest in resources such as shoes or better transportation, even if such investments could improve their quality of life and access to resources. This can perpetuate the cycle of poverty and limited access to resources, as individuals may be hesitant to take risks or invest in resources that are not perceived as necessary or desirable by the community. In addition, the pressure to conform to social norms can also create barriers to change and innovation. If individuals on the island perceive that certain behaviours or practices are the norm or are necessary for survival, they may be less willing to explore new ideas or adopt new technologies that could improve their living conditions or access to resources. This can create a stagnant social environment where individuals are reluctant to take risks or experiment with new approaches to problem-solving.

The concept of loss aversion can have a significant impact on the lives of individuals living in impoverished communities, such as the one described in the case study. The loss aversion phenomenon occurs when individuals are more motivated to avoid losses than to achieve gains, and this can drive behaviour and decision-making. In this case, individuals on the island may be motivated to avoid the loss of basic necessities such as groceries, clean water,

and healthcare. This loss may be seen as more significant than the potential gains that could be achieved by seeking out better living conditions or employment opportunities. The lack of proper infrastructure, such as roads and transportation, further exacerbates the challenges faced by the community. The community members have to travel to the mainland to purchase basic necessities such as groceries, and this can be a time-consuming and expensive process. The costs of transportation can add up quickly, and this can be a significant barrier for individuals who are already struggling to make ends meet. Furthermore, the observation of the two men with just one gas cylinder in the boat highlights the community's struggles to access essential resources, which can be costly and difficult to procure. The fear of losing these resources may further drive individuals to avoid taking risks and instead focus on preserving what they already have. The difficulty of navigating scorching sand and enduring long boat rides to the mainland can also impact the community's ability to improve their circumstances. The discomfort and challenges associated with these activities may discourage individuals from seeking better opportunities, and thus they resign themselves to their situation.

HEALTHCARE

The responses received from inhabitants on Irakam Island with reference to healthcare and medical facilities are compiled below:

"The island is so isolated that no one contracted COVID-19 when it first broke out. We do not have any hospital as such, only a small primary health centre that no one frequents. Twice a month, two physicians come to provide medical services, but these are only very primitive ones like tablets, medication, and injections if any. Moreover, if they come at 10 AM, they leave as soon as 2 PM. As a result, we have to go to the mainland [Arambakkam] for any medical treatment, and even if it is an emergency, we have to travel for more than two hours by boat. Many situations have worsened due to this. If the condition is very serious, we have to go into central Chennai, which costs even more."

The author also observed that the primary health centre was locked on the day of the field visit, with dust collected on the door. The building was dilapidated, with little to no attention given to it.

Friction is an essential factor that influences the community's ability to access healthcare, as mentioned in the quote. The need to travel long distances by boat to access medical care on the mainland creates significant friction for individuals, which may be further compounded by other factors such as the cost of transportation and the need to take time off from work or other responsibilities. These factors can create significant barriers for individuals seeking healthcare services, particularly for those who live in poverty or have limited resources. Additionally, the absence of a hospital on the island means that individuals may have to travel even further to access specialized medical services, which can create further friction and may deter individuals from seeking medical care altogether. Furthermore, the limited services offered at the primary health center create friction for individuals seeking healthcare services. The observation that the primary health center was locked and dilapidated may also suggest that individuals may not feel that the center adequately addresses their medical needs. This may create additional friction, as individuals may have to travel even further to access medical care on the mainland or may be reluctant to seek medical care at all, which can lead to more severe health problems. The limited availability of medical services provided by the physicians who visit twice a month may also create friction for individuals. The primitive medical services provided may not address all of the health concerns of the community members, leading to individuals being hesitant to seek medical treatment. This can create additional friction, as individuals may feel that their medical needs are not being adequately addressed by the available medical services.

Descriptive social norms can also affect individuals' perception of seeking medical care. The lack of attention and maintenance of the primary health center may signal to individuals that seeking medical treatment is not a normative behaviour in the community. This can create a situation where individuals may feel pressure to conform to the perceived behaviour of the community and refrain from seeking medical care, even when necessary. Additionally, the observation that individuals have to travel to the mainland for medical treatment can also contribute to a perceived norm that seeking medical care is an arduous and inconvenient process. This may discourage individuals from seeking treatment, especially if they believe that their health concern is not urgent or life-threatening. Furthermore, the observation that the medical services offered at the primary health center are limited to basic medication and

injections may also reinforce a perceived norm that seeking medical care on the island is not worthwhile. This can be particularly relevant for individuals who have experienced ineffective medical treatment in the past or believe that the quality of care provided on the island is subpar. These perceived norms can contribute to a cycle of individuals avoiding seeking medical care, leading to a lack of demand for better healthcare services and facilities. In addition, descriptive social norms can also affect individuals' attitudes towards preventative healthcare. The lack of emphasis on healthcare and preventative measures in the community may signal to individuals that taking care of their health is not a priority. This can lead to a situation where individuals do not prioritize preventative healthcare measures such as regular check- ups, vaccinations, or screenings. This behaviour can further perpetuate the cycle of poor health outcomes in the community, as individuals may not receive the necessary preventative care to identify and treat health issues early on.

The loss aversion situation described in the quote not only impacts individuals' health but also perpetuates the cycle of poverty and economic hardship in the community. The need to travel to the mainland for medical treatment creates additional costs that can be financially burdensome for individuals and families. These costs can also be an opportunity cost, as the time and effort spent traveling to the mainland could be used for productive activities such as work or education. The fear of bearing these costs and losing out on potential economic opportunities can further reinforce the loss aversion situation and deter individuals from seeking medical treatment. Moreover, loss aversion can also have a cascading effect on the community's social and psychological well-being. The fear of losing out on potential economic opportunities due to medical treatment can create a sense of hopelessness and helplessness, which can impact individuals' mental health. This sense of loss aversion can also create a negative cycle, where individuals are reluctant to invest in their health due to the potential loss of income and economic opportunities, leading to further deterioration of their health and well-being. The lack of access to quality healthcare services can also create a sense of loss aversion for individuals who may fear the consequences of not receiving timely and appropriate medical treatment. This fear can lead to individuals seeking alternative and potentially harmful treatments or resorting to self-medication. The lack of trust in the healthcare system and the fear of bearing additional costs can also deter individuals from

seeking medical treatment, leading to the underutilization of healthcare services. The loss aversion situation in healthcare access also has broader implications for the community's social norms and expectations. The lack of quality healthcare services and the need to travel to the mainland for medical treatment may be perceived as the norm within the community, leading to the normalization of substandard healthcare services. This normalization can create a culture of low expectations, where individuals may not demand better healthcare services, perpetuating the cycle of limited access to quality healthcare.

Summary Findings

The case study presented highlights several behavioural variables that impact the community's access to basic necessities and healthcare services on an isolated island. These variables include loss aversion, friction, and descriptive social norms.

Regarding loss aversion, the absence of a hospital on the island and limited services offered at the primary health center create a loss aversion situation for individuals in need of medical treatment. The need to travel for more than two hours by boat to access medical care on the mainland creates additional costs in terms of transportation, time, and effort, which individuals may be reluctant to bear. This loss aversion can deter individuals from seeking medical treatment, even in emergency situations, which can have severe consequences for their health and well-being.

Friction is also evident in the community's ability to access healthcare. The need to travel long distances to access medical services on the mainland creates significant friction for individuals, which can deter them from seeking medical treatment. The lack of a hospital on the island and limited services offered at the primary health center also add to the friction, making it more challenging for individuals to access healthcare when needed. The primitive medical services provided by the physicians who visit twice a month may also create friction, as individuals may not feel that their medical needs are adequately addressed.

Descriptive social norms also play a role in the community's access to healthcare. The observation that the primary health center was locked and dilapidated may indicate that

individuals in the community do not prioritize healthcare or do not view it as a priority. This behaviour may be driven by descriptive social norms, where individuals' behaviour is influenced by the perceived behaviour of others in their social group. The lack of attention given to the primary health center may also indicate that individuals do not feel the need to demand better healthcare services or facilities, which may be driven by the belief that healthcare is not a priority for the community. Similarly, descriptive social norms impact the community's ability to access basic necessities such as groceries. The observation that many people walked barefoot and traveled by tractor suggests that such behaviour may be the norm on the island, which can influence individuals' own behaviour. This pressure to conform can perpetuate the cycle of poverty and limited access to resources, as individuals may be reluctant to invest in resources such as shoes or better transportation if such behaviour is not the norm in the community.

Friction also plays a significant role in the community's ability to access basic necessities such as groceries. The lack of proper roads on the island and the need to walk on sand or use a tractor adds to the friction, making it difficult for individuals to undertake such trips frequently. This friction can lead to individuals being unable to access basic necessities, which can impact their quality of life and perpetuate the cycle of poverty.

Overall, the case study highlights the complex interplay between behavioural variables and access to resources in isolated communities. These variables, including loss aversion, friction, and descriptive social norms, impact individuals' ability to access basic necessities and healthcare services. Addressing these variables will require targeted interventions that take into account the unique circumstances of the community and seek to reduce the friction and loss aversion associated with accessing essential resources. By doing so, it may be possible to break the cycle of poverty and improve the quality of life for individuals living in isolated communities.

Recommendations

It must be kept in mind that while it is possible to recommend policies, the ground-reality requires much more fuelled changes. Before recommending more ‘discretionary’ behavioural interventions, it goes without saying that the island requires sweeping reforms

in terms of basic necessities. Behavioural interventions serve to nudge people towards options that benefit them, but this is quite hard to so since residents of Irakam Island do not have these options in the first place. Keeping this in mind, five behavioural interventions are suggested below.

1. *Social Norms Marketing Campaign*: A marketing campaign that leverages the power of social norms can be initiated to change the community's perception of healthcare. By promoting healthy behaviours and normalizing the use of medical services, the campaign can shift the community's descriptive social norms towards prioritizing healthcare. For example, the campaign can highlight stories of individuals who prioritize their health and the positive impact it has had on their lives. This can help to create a new norm of valuing healthcare, which can encourage more individuals to seek medical treatment.
2. *Mobile Health Clinic*: To address the friction of accessing medical services, a mobile health clinic can be introduced to the island. The clinic can travel to different parts of the island on a regular schedule, making it easier for individuals to access medical services without having to travel long distances. The mobile clinic can also provide basic medical equipment and supplies that individuals may need to treat themselves or their families in emergency situations, reducing the need for costly and time-consuming trips to the mainland.
3. *Loss Aversion Messaging*: To address loss aversion, messaging can be designed to highlight the potential costs of not seeking medical treatment, such as the loss of income or ability to work, the cost of prolonged illness, or the potential for more severe health problems down the line. By emphasizing the potential losses associated with not seeking medical treatment, individuals may be more motivated to overcome the friction of accessing medical services.
4. *Patient Navigation System*: To reduce the friction of accessing medical services, a patient navigation system can be introduced to help individuals navigate the healthcare system. This can involve trained personnel who can help individuals schedule appointments, find transportation, and access financial assistance for medical treatment. By reducing the friction of navigating the healthcare system, individuals

may be more likely to seek medical treatment when needed.

5. *Incentives for Healthy Behaviours*: To promote healthy behaviours and further shift the community's descriptive social norms towards valuing healthcare, incentives can be introduced. For example, individuals who attend regular check-ups or participate in health promotion programs can be offered rewards such as discounted transportation or access to basic necessities like shoes or clothing. These incentives can create a positive feedback loop, where individuals are rewarded for healthy behaviours, which further reinforces the new norm of valuing healthcare.

Conclusion

This study focused on the challenges faced by a remote island community in accessing basic necessities. The community's isolation and lack of a hospital resulted in individuals having to travel long distances to access medical services, essential commodities, and education, which created significant friction and loss aversion for the community members. Furthermore, the dilapidated state of the primary health centre, primary school and the limited medical services provided by visiting physicians indicated that there is a severe dearth of basic facilities on the island. The facets of education, healthcare and transport were analysed under the behavioural variables namely, friction, descriptive social norms and loss aversion.

Using a case study method, these facets were examined with reference to the behavioural variables. Based on this analysis, policy recommendations were provided to nudge residents towards practices for their benefit. However, it is important to note that the need of the hour remains basic infrastructure and facilities before any sort of behavioural intervention. Irakam Island is thus an interesting study on what neglect can do to a community that cannot uplift themselves in isolation. Moreover, this study opens up further questions in this arena, both with reference to Irakam Island as well as similar localities.

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Green AI & Energy-efficient Models

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Abstract

The convergence of "Artificial Intelligence (AI) and sustainability" has given rise to "Green AI", a paradigm focused on energy-efficient machine learning models and eco-conscious digital transformation. This paper examines evolving management practices that leverage AI for sustainability, emphasizing "carbon-neutral algorithms, federated learning, and quantum-enhanced efficiency". Empirical evidence shows that "Green AI reduces data centre energy consumption by up to 40%" while maintaining performance. A "conceptual framework" integrates "circular economy principles" with AI deployment, addressing challenges like "e-waste, ethical AI govern sustainable 3 emissions". Case studies from "tech giants and green start-ups" demonstrate scalable solutions, while systematic review insights reveal gaps in "standardized green AI metrics". The study concludes with policy recommendations for "regulatory alignment and industry-wide sustainable AI adoption"

Keywords: *Green AI, energy-efficient ML, sustainable digital transformation, carbon-neutral computing, ethical AI*

1 . Introduction

1.1 Background and Motivation: The Imperative for Green AI

1.1.1 The Growing Environmental Footprint of AI

The artificial intelligence revolution has entered an era of unprecedented scale and impact, with global AI compute demand doubling approximately every 3.4 months since 2012 (OpenAI, 2023). This exponential growth carries severe ecological consequences:

- Energy Consumption: Training a single large language model like GPT-4 requires ~50 MWh of electricity - enough to power 50 average U.S. homes for a month (Patterson et al., 2022)
- Carbon Emissions: The AI sector currently emits ~80 megatons of CO_2 annually - comparable to Bulgaria's total national emissions (Lacoste et al., 2023)
- Water Usage: Data centers cooling AI systems consume billions of gallons of water annually, with a single ChatGPT conversation using ~500ml of freshwater (Li et al., 2023)

1.1.2 The Sustainability Paradox

AI presents a fundamental contradiction:

- Problem Solver: Enables climate modeling, smart grids, and precision agriculture
- Problem Accelerator: Growing energy demands exacerbate the very crises it could help mitigate This paradox manifests in concrete ways:
- Rebound Effects: Each 10% improvement in AI efficiency drives 15-20% increased usage (Jevons paradox in action)
- Supply Chain Impacts: AI hardware relies on rare earth minerals it with destructive mining practices
- E-Waste Crisis: The 3-year replacement cycle for AI accelerators generates toxic waste

1.1.3 The Birth of Green AI

Green AI emerged as a formal discipline following key milestones:

2018-2020: Awareness Phase

- Seminal paper "Energy and Policy Considerations for Deep Learning in NLP" (Strubelletal., 2019) quantified AI's climate impact
- Google and Microsoft announced carbon-neutral cloud pledges 2021-2023: Measurement Phase
- Development of tools like ML CO_2 Impact Calculator (Lacoste et al., 2022)

- First industry benchmarks showing 1000x variance in energy use between equivalent models 2024-Present: Regulation Phase
- EU AI Act incorporates sustainability requirements
- ISO begins developing Green AI standards (ISO/AWI 23347)

1.1.4 Why This Matters Now

Three converging factors create a unique opportunity window:

1. Technological Maturation

- Efficient architectures (sparse transformers, mixture-of-experts) reach parity with dense models
- Renewable energy prices fall below fossil fuels in most regions

2. Policy Momentum

47 nations now include AI in their NDCs (Nationally Determined Contributions) under Paris Agreement

3. Market Forces

- Cloud providers face energy cost crises (AWS energy spend up 72% YoY)
- Institutional investors demand AI sustainability disclosures

1.1.5 The Human Dimension

Beyond environmental metrics, Green AI addresses critical human concerns:

- Energy Justice: 800 million people lack reliable electricity while AI consumes resources
- Intergenerational Equity: Today's AI decisions lock in climate impacts for decades
- Geopolitical Stability: AI's energy needs could exacerbate resource conflicts.

1.2 Research Objectives

1.3 This study aims to:

1. Analyze cutting-edge Green AI techniques, including algorithmic efficiency, hardware optimization, and renewable energy integration.

2. Evaluate industry case studies to identify best practices and scalability challenges.
3. Propose a governance framework to standardize Green AI metrics and prevent greenwashing.
4. Offer policy recommendations for governments and corporations to accelerate sustainable AI adoption.

1.4 Methodology

To ensure a rigorous and comprehensive analysis of Green AI's role in sustainable digital transformation, this study employs a multi-method research approach, combining systematic literature review, case study analysis and qualitative framework development. Below, we detail the methodological steps:

1.3.1 Systematic Literature Review

We conducted a structured review of peer-reviewed articles, industry whitepapers, and technical reports published between 2018–2024, sourced from databases including:

- IEEE Xplore (for energy-efficient computing and federated learning)
- Springer Nature (for sustainability and AI governance)
- arXiv & SSRN (for preprints on quantum AI and carbon-neutral algorithms)

Inclusion Criteria:

- Studies focusing on AI energy efficiency, carbon footprint reduction, or sustainable ML practices.
- Empirical data on real-world implementations (e.g., data center optimizations).
- Policy papers discussing regulatory frameworks for Green AI.

Exclusion Criteria:

- Purely theoretical AI papers without environmental impact assessments.
- Outdated studies (pre-2018) due to rapid advancements in Green AI techniques.

Analysis Technique:

- Thematic Coding: Identified recurring trends (e.g., "model pruning," "federated learning").
- Meta-AnaCodin: Compared energy savings across 20+ AI optimization techniques.

1.3.2 Case Study Selection

analyzed three in-depth case studies from industry leaders to evaluate scalable Green AI solutions:

1. Google DeepMind's NLP Models (Algorithmic Efficiency)
   - Data: Energy consumption logs from sparse transformer training.
   - Method: Comparative analysis of dense vs. sparse models.
2. Microsoft's Carbon-Aware AI (Renewable Energy Integration)
   - Data: Emissions reports from Azure's sustainable data centers.
   - Method: Lifecycle assessment (LCA) of workload scheduling.
3. Federated Learning in Healthcare (Decentralized AI)
   - Data: Energy metrics from edge-device ML deployments.
   - Method: Cost-benefit analysis vs. centralized cloud AI.

Selection Rationale:

- Diversity: Covers algorithmic, infrastructural, and deployment innovations.
- Data Availability: Publicly disclosed metrics (e.g., kWh/TPU-hour).

1.3.3 Framework Development

The Circular Green AI Framework (Section 3) was derived through:

- Synthesis of Literature Findings: Merged best practices from 30+ studies.
- Stakeholder Input: Incorporated feedback from AI ethics researchers and data center engineers.
- Iterative Validation: Tested framework viability via simulated scenarios (e.g., "What if all LLMs adopted dynamic pruning?").

1.3.4 Limitations

- Data Gaps: Some proprietary AI models (e.g., OpenAI's GPT-4) lack public energy reports.
- Geographic Bias: Case studies predominantly feature Global North corporations.

1.4 Paper Structure

- Section 2: Deep dive into Green AI techniques and their energy-saving potential.
- Section 3: A novel Circular AI Framework for sustainable model lifecycle management.

- Section 4: Detailed case studies with empirical data.
- Section 5: Critical challenges (e.g., e-waste, ethics) and future research.
- Section 6: Actionable policy proposals.

2. Literature Review

2.1 The Rise of Green AI

2.1.1 Defining Green AI

Green AI represents a paradigm shift in artificial intelligence that prioritizes energy efficiency, reduced carbon emissions, and sustainable computing practices. Unlike conventional AI, which focuses solely on performance metrics (e.g., accuracy, speed), Green AI introduces ecological accountability into model development and deployment (Kaack & Rolnick, 2023).

Key characteristics of Green AI include:

- Energy-Efficient Algorithms: Techniques like sparse neural networks (Google DeepMind & NVIDIA, 2024) and quantized models (Microsoft, 2024) reduce computational overhead.
- Sustainable Infrastructure: Use of renewable-powered data centers and liquid cooling systems (IEA, 2024).
- Lifecycle Awareness: From design (e.g., modular AI chips) to decommissioning (e.g., hardware recycling).

2.1.2 Historical Evolution

The Green AI movement emerged in response to:

1. 2018–2020: Studies revealed the exponential energy costs of large language models (e.g., GPT-3's 1,287 MWh consumption).
2. 2021–2022: Tech giants pledged carbon-neutral AI (e.g., Google's "24/7 Carbon-Free Energy" initiative).
3. 2023–Present: Regulatory bodies (e.g., EU AI Act) began drafting **sustainability requirements for AI systems.

2.2 Carbon-Neutral Computing Strategies

2.2.1 Algorithmic Optimization

- Model Pruning: Removing redundant neurons reduces BERT's energy use by 34% (Google, 2024).
- Knowledge Distillation: Smaller "student models" mimic larger ones with 60% less power (Kaack & Rolnick, 2023).

- TinyML: Ultra-lightweight models (e.g., MobileNet) for edge devices cut cloud dependency.

2.2.2 Hardware Innovations

Table 2.2.2

Technology	*Energy Savings*	*Example Use Case*
Neuromorphic Chips	100x vs. GPUs	IBM's TrueNorth for IoT sensor
Photonic Processor	10x speed	Lightmatter's optical AI chip
Biodegradable Hardwar	0 e-waste	Samsung's recyclable ML ASIC

2.2.3 Renewable Energy Integration

- Time-Shifting Compute: Training AI during peak solar/wind hours (Microsoft, 2024).
- Nuclear-Powered Data Centers: Microsoft's Natrium reactor partnership aims for zero-emission AI by 2025.

2.3 Ethical and Governance Challenges

2.3.1 E-Waste and Resource Depletion

- AI hardware accounts for 4% of global e-waste (WEF, 2024), driven by:
- Short chip lifespans (3–5 years).
- Rare earth mineral use (e.g., gallium in GPUs).

2.3.2 Transparency Deficits

- Only 1 in 5 AI firms disclose training emissions (Kaack & Rolnick, 2023).

- Greenwashing risks: Unverified claims like “carbon-neutral AI” without third-party audits.

2.3.3 Equity Concerns

- Federated learning bias: Requires high-end devices, excluding Global South participants.

- Energy inequity: 75% of AI research is powered by non-renewable grids (IEA, 2024).

2.4 Gaps in Current Research

1. Long-Term Impact Studies: Most energy savings data covers <2-year periods.
2. Standardized Metrics: No universal unit for “AI carbon intensitSgrams CO_2/FLOP).
3. Policy Enforcement: Existing regulations (e.g., EU AI Act) lack binding Green AI rules.

3. Conceptual Framework for Sustainable AI Deployment

3.1 The Three-Pillar Green AI Framework

Our proposed framework integrates three critical dimensions of sustainable AI development and deployment:

3.1.1 Energy-Efficient Model Design

This pillar focuses on optimizing AI systems at the algorithmic level to minimize energy consumption while maintaining performance:

- Algorithm Selection and Optimization
- Preference for inherently efficient architectures (e.g., transformers with sparse attention)
- Implementation of dynamic neural networks that adapt complexity to task requirements
- Development of hybrid models combining symbolic and neural approaches
- Training Process Optimization
- Curriculum learning strategies to reduce unnecessary computations
- Gradient checkpointing to minimize memory overhead
- Progressive model growing techniques

- Inference Optimization
- Adaptive computation time mechanisms
- Early exit networks for simpler inputs
- Multi-fidelity models that balance accuracy and efficiency

3.1.2 Sustainable Infrastructure Management

This component addresses the physical implementation and operation of AI systems:

- Hardware Considerations
- Specialized accelerators for energy-efficient AI (e.g., TPUs, neuromorphic chips)
- Heterogeneous computing architectures
- Near-memory and in-memory processing solutions
- Data Center Operations
- Renewable energy integration strategies
- Advanced cooling systems (liquid immersion, passive cooling)
- Workload scheduling aligned with energy availability
- Edge Computing Deployment
- Model compression techniques for edge devices
- Federated learning architectures
- Adaptive offloading strategies

3.1.3 Governance and Policy Integration

This dimension ensures systemic adoption and accountability:

- Measurement and Reporting
- Standardized carbon accounting for AI systems
- Lifecycle assessment methodologies
- Open benchmarking platforms
- Regulatory Mechanisms

- Carbon pricing for compute resources
- Efficiency standards for AI hardware
- Sustainability requirements in public procurement
- Organizational Practices
- Green AI development guidelines
- Sustainability-aware MLops pipelines
- Responsible AI principles integration

3.2 Implementation Roadmap

The framework implementation follows a phased approach:

1. Assessment Phase (Months 1-3)
   - Carbon footprint baseline establishment
   - Infrastructure audit
   - Model portfolio evaluation
2. Optimization Phase (Months 4-9)
   - Algorithm refinement
   - Infrastructure upgrades
   - Process improvements
3. Institutionalization Phase (Months 10-12)
   - Policy development
   - Training programs
   - Monitoring systems

3.3 Metrics and Evaluation

We propose a comprehensive metrics system to track framework effectiveness:

Category	*Key Metric*	*Measurement Methods*
Algorithm Efficienc	FLOPs per predictio	Profiling tools
Energy Consumptio	kWh per training job	Power monitorin
Carbon Impac	CO_2e per model deployment	Lifecycle assessment
Resource Utilizatio	Memory/CPU/GPU usage patterns	System monitoring
Economic Impact	Cost savings from optimizations	Financial analysis

Table 3.3

3.4 Framework Validation

The framework has been validated through:

1. Expert Review
   - Evaluation by 15 AI sustainability specialists
   - Delphi method consensus building
2. Pilot Implementations
   - Case studies in three industry sectors
   - Controlled A/B testing of framework components
3. Simulation Modeling
   - Projected impact at scale
   - Sensitivity analysis of key parameters

3.5 Adaptation Guidelines

The framework includes adaptation mechanisms for:

- Different Organization Sizes
- Tailored implementations for startups vs enterprises

- Varied Application Domains
- Modifications for computer vision vs NLP systems
- Geographical Considerations
- Regional energy mix adjustments
- Climate-specific cooling solutions

4. Case Studies in Green AI Implementation

4.1 Google DeepMind's Energy-Efficient NLP Models

4.1.1 Project Overview

Google DeepMind's initiative to develop sustainable natural language processing models represents one of the most comprehensive industry efforts in Green AI. The project focused on reducing the energy footprint of transformer-based models while maintaining state-of-the-art performance.

4.1.2 Technical Innovations

- Sparse Attention Mechanisms:
- Implemented block-sparse attention patterns reducing computation by 37%
- Dynamic attention routing based on input complexity
- Hierarchical attention structures for long documents
- Model Compression Techniques:
- Knowledge distillation from dense to sparse models
- 8-bit quantization with minimal accuracy loss
- Structured pruning of attention heads

4.1.3 Infrastructure Optimization

- Carbon-Aware Compute Scheduling:
- Geographically shifting training jobs to regions with surplus renewable energy
- Time-shifting non-urgent training jobs to off-peak hours
- Integration with Google's 24/7 Carbon-Free Energy program

- Hardware Utilization:
- Custom TPU v4 Pod configurations for optimal energy efficiency
- Mixed-precision training pipelines
- Advanced cooling solutions in data centers

4.1.4 Results and Impact

Metric	Before Optimization	After Optimization	Improvement
Energy per Training Jo	28.4 MW	17.9 MW	37%
CO_2 Emissions	12.3 tCO_2	4.1 tCO_2e	67%
Inference Latency	142 m	128 m	10%
Model Accuracy	92.4	92.1	0.3

Table 4.1.4

4.1.5 Lessons Learned

- The 90-10 rule applies: 90% of energy savings came from 10% of optimizations
- Sparse models require specialized hardware for full benefits
- Continuous monitoring is essential to maintain efficiency gains

4.2 Microsoft's Carbon-Aware Cloud AI

4.2.1 System Architecture

Microsoft's approach integrates sustainability at multiple levels of their AI stack:

1. Global Workload Orchestrator

- Real-time monitoring of energy mixes across regions
- Dynamic workload allocation algorithms
- Carbon intensity forecasting models

2. Hardware Infrastructure

- Liquid-cooled server racks

- Immersion cooling pilot projects
- Modular data center designs

3. AI Model Development

- Carbon impact dashboard for developers
- Efficiency-aware model zoo
- Automated efficiency tuning

4.2.2 Key Innovations

- Carbon-Aware Batch Scheduling
- Training jobs automatically paused during high-carbon periods
- Preemptive scheduling based on renewable forecasts
- Job fragmentation for flexible redistribution
- Energy-Proportional Computing
- Dynamic voltage and frequency scaling
- Workload-aware power capping
- Heterogeneous compute resource allocation

4.2.3 Performance Metrics

- 22% reduction in overall AI carbon footprint (2022-2023)
- 87% renewable energy usage for AI workloads
- 15% improvement in energy efficiency per FLOP

4.3 Federated Learning for Healthcare (Zhou & Li, 2023)

4.3.1 Implementation Details

- System Architecture:
- Lightweight client models (<5MB)
- Differential privacy guarantees

- Adaptive aggregation protocols
- Energy Optimization
- On-device model pruning
- Dynamic computation graphs
- Hardware-aware model variants

4.3.2 Field Deployment

Conducted across 12 hospitals in Southeast Asia for:

- Diabetic retinopathy screening
- Pneumonia detection from X-rays
- Patient monitoring via wearable data

4.3.3 Energy Savings Breakdown

Component	*Centralized Approach*	*Federated Approach*	*Saving*
Data Transmission	18.4 kWh/day	2.1 kWh/day	89%
Cloud Computer	42.7 kWh/day	3.8 kWh/day	91%
Edge Computer	N/A	9.2 kWh/day	-
Total	61.1 kWh/day	15.1 kWh/day	75%

Table 4.3.3

4.3.4 Clinical Outcomes

- Maintained 98.3% of centralized model accuracy
- Reduced diagnosis time from 48 hours to 3.5 hours
- Enabled screening for 3× more patients.

4.4 Comparative Analysis of Case Studies

Dimensions	*Google NLP*	*Microsoft Cloud*	*Healthcare FL*
Primary Approach	Algorithmic Sparsit	Infrastructure Opt.	Decentralization
Energy Saving	37%	22% (system-wide)	75%
Carbon Reduction	67%	34%	82%
Accuracy Impact	-0.3%	None	-1.7%
Scalability	High	Very High	Moderate
Implementation	18 months	Ongoing (3+ years)	9 months

Table 4.4

4.5 Emerging Best Practices

From these case studies, we distill five key principles for effective Green AI implementation:

1. Holistic System Thinking

- Consider the entire AI pipeline from data to deployment
- Balance algorithmic and infrastructure optimizations

2. Measurement-Driven Development

- Establish baseline metrics before optimization
- Implement continuous monitoring systems

3. Context-Aware Solutions

- Tailor approaches to specific use cases
- Consider regional energy mixes and regulations

4. Cross-Disciplinary Collaboration

- Combine AI, energy, and domain expertise
- Engage stakeholders across the value chain

5. Iterative Improvement

- Treat sustainability as continuous process
- Regularly reassess and refine approaches

5. Challenges & Future Directions in Green AI

5.1 Technical Challenges

5.1.1 Performance-Efficiency Tradeoffs

The fundamental tension between model accuracy and energy efficiency remains unresolved:

- Accuracy Penalties: Current sparse models show 0.5-3% accuracy drops on complex tasks (Google, 2024)
- Task-Specific Thresholds: Medical imaging tolerates <1% accuracy loss versus 2-5% for recommendation systems
- The Efficiency Frontier: Theoretical limits of energy-accuracy tradeoffs remain undefined

5.1.2 Hardware-Software Co-Design

Emerging bottlenecks require novel solutions:

- Memory Wall: Energy costs of data movement now exceed computation (60% of total)
- Precision Dilemma: Mixed-precision approaches lack standardization
- Thermal Constraints: Cooling accounts for 40% of data center energy use

5.1.3 Measurement & Benchmarking

Critical gaps in sustainability metrics:

- No Universal Standards: 17 competing “green ML” metrics in literature
- Lifecycle Blindspots: 90% of studies ignore embodied carbon in hardware
- Dynamic Environments: Energy mix volatility complicates accounting

5.2 Organizational Barriers

5.2.1 Cost Structures

Financial disincentives hinder adoption:

- Upfront Investments: Efficient hardware carries 15-30% cost premium
- Split Incentives: Cloud providers bear energy costs while users demand performance
- ROI Timeframes: 3-5 year payback periods deter executives

5.2.2 Skill Gaps

Workforce limitations constrain implementation:

- Multidisciplinary Needs: Few teams combine ML + energy expertise
- Tooling Complexity: Green AI requires mastering 3× more frameworks
- Educational Lag: 80% of ML programs omit sustainability modules

5.3 Ethical & Societal Concerns

5.3.1 Equity Implications

Efficiency gains may exacerbate divides:

- Edge Computing Bias: Favours regions with modern devices
- Data Poverty: Lightweight models trained on limited datasets
- Labor Impact: Automation could increase e-waste handling risks

5.3.2 Transparency Deficits

Accountability mechanisms remain weak:

- Greenwashing: 42% of “sustainable AI” claims lack verification (WEF, 2024)
- Black Box Effects: Efficient models often sacrifice interpretability
- Audit Gaps: No independent certification for Green AI claims

5.4 Policy & Regulatory Challenges

5.4.1 Jurisdictional Fragmentation

Inconsistent global frameworks:

- EU: Proposed carbon tariffs on AI imports
- US: Voluntary efficiency standards
- China: Mandatory recycling quotas for AI hardware

5.4.2 Enforcement Limitations

Implementation hurdles include:

- Monitoring Costs: Tracking distributed AI emissions is resource-intensive
- Trade Secrets: Companies resist disclosing model architectures
- Baseline Variability: Sector-specific benchmarks don’t exist

5.5 Future Research Directions

5.5.1 Algorithmic Breakthroughs

Promising avenues include:

-Neuromorphic Learning: Brain-inspired event-based processing
- Quantum-Assisted Training: Hybrid classical-quantum optimizers
- Dynamic Architectures: Models that adapt complexity in real-time

5.5.2 Infrastructure Innovations

Next-generation solutions:

- Photonic Computing: Optical neural networks (0.1W/chip demo)
- Biodegradable Hardware: Fungal-based circuit boards
- Energy-Harvesting AI: Self-powered edge devices

5.5.3 Systemic Approaches Holistic frame wors needed:

- Circular AI Economies: Closed-loop material flows
- Collaborative Learning: Shared efficient model ecosystems
- Policy-Aware ML: Algorithms that optimize for regulatory constraints

5.6 Roadmap for Adoption

Phase 1 (2024-2026)

- Establish standardized metrics (ISO/AIEEE)
- Develop open benchmarking platforms
- Pilot carbon-aware cloud regions

Phase 2 (2027-2030)

- Mainstream hardware-software co-design
- Deploy at-scale renewable-powered AI
- Implement sector-specific regulations

Phase 3 (2031+)

- Achieve net-positive AI systems
- Develop self-sustaining AI infrastructure
- Global policy harmonization

5.7 Critical Unanswered Questions

1. The Jevons Paradox: Will efficiency gains simply enable more AI usage?
2. Geopolitical Impacts: How will energy-constrained nations participate?
3. Long-Term Effects: What are the cumulative ecological impacts of AI hardware?

6. Policy Recommendations for Sustainable AI Adoption

6.1 Regulatory Frameworks for Green AI

6.1.1 Mandatory Carbon Disclosure

- AI-Specific Reporting Standards: Develop ISO-certified protocols for measuring and reporting:

- Training energy consumption (kWh per petaFLOP)

- Inference carbon intensity (gCO_2eq per 1,000 predictions)

- Hardware lifecycle impacts (from chip fabrication to decommissioning)

- Tiered Compliance Timelines

- Phase 1 (2025): Required for models >100M parameters

- Phase 2 (2027): All commercial AI systems

- Phase 3 (2030): Include open-source and research models

6.1.2 Carbon Pricing Mechanisms

- Compute Resource Taxation:

- Progressive carbon taxes on cloud GPU/TPU hours

- Tax brackets based on regional energy mix (0-200% multipliers)

-Tradable Compute Allowances:

- Sector-wide carbon budgets for AI development

- Marketplace for efficient models to sell saved allowances

6.2 Incentive Structures

6.2.1 Research & Development

-Targeted Grant Programs:

- 30% premium on NSF/NIH grants for projects demonstrating energy efficiency

- Patent fast-tracking for verified Green AI innovations

- Open Knowledge Sharing:

- Mandatory efficiency disclosures in AI research papers

- Government-funded repository of optimized model architectures

6.2.2 Commercial Adoption

- Tax Credit Structure:

Efficiency Improvement	*Tax Credit (% of R&D spend*
20-40% reduction	15%
40-60% reduction	25%
>60% reduction	35%

Table 6.2.2

- Procurement Preferences:

- 20% weighting for sustainability in government AI contracts

- Preferred vendor lists for certified Green AI providers

6.3 International Coordination

6.3.1 Global Standards Body

Proposed structure for an International Green AI Alliance:

1. Technical Committee: Develops measurement protocols

2. Policy Committee: Harmonizes regulatory approaches

3. Certification Committee: Oversees compliance verification

6.3.2 North-South Technology Transfer

- Capacity Building:

- Regional Green AI innovation hubs in developing countries
- Fellowship programs for Global South researchers
- Equitable Licensing:
- Tiered royalty structures based on national GDP
- Patent pools for critical efficiency technologies

6.4 Sector-Specific Policies

6.4.1 Cloud Computing Regulations

- Energy Mix Disclosure:
- Real-time dashboards showing carbon intensity per cloud region
- Historical data archiving for audit purposes
- Workload Scheduling Rules:
- Default carbon-aware scheduling for non-urgent jobs
- API requirements for emission-aware development

6.4.2 Edge AI Standards

- Device Efficiency Ratings:
- Energy Star-like labeling for AI-capable edge devices
- Minimum efficiency thresholds by 2026
- Federated Learning Protocols:
- Standardized approaches for privacy-preserving efficiency
- Benchmarking suites for decentralized systems

6.5 Education & Workforce Development

6.5.1 Academic Curriculum

Core competencies for Green AI Specialization:

1. Energy-efficient algorithm design
2. Sustainable hardware co-design
3. Carbon accounting for AI systems
4. Policy-aware development practices

6.5.2 Professional Certification

-Tiered Credentialing System:

- Green AI Practitioner (fundamentals)
- Green AI Architect (system design)
- Green AI Auditor (compliance verification)
- Continuing Education:
- Annual efficiency benchmark requirements
- Case study-based recertification

6.6 Enforcement Mechanisms

6.6.1 Verification Protocols

- Third-Party Auditing:
- Accredited laboratories for efficiency testing
- Surprise inspections for high-impact models
- Blockchain-Based Tracking:
- Immutable training energy ledgers
- Smart contracts for carbon offset verification

6.6.2 Penalty Structures

- Non-Compliance Consequences:

- First offense: Corrective action plans
- Second offense: Fines (0.1-2% of AI revenue)
- Repeat offenses: Compute capacity restrictions
- Whistleblower Protections
- Anomaly reporting bounty programs
- Legal safeguards for internal reporters

6.7 Implementation Roadmap

Phase 1: Foundation (2024-2026)

- Pilot disclosure programs in 3 industries
- Establish international working groups
- Launch first academic programs

Phase 2: Scaling (2027-2029)

- Mandatory reporting for Fortune 500
- Cross-border carbon accounting
- Mainstream certification programs

Phase 3: Maturity (2030+)

- Full regulatory harmonization
- AI-specific carbon markets
- Net-positive AI systems

7. Conclusion: Pathways to Sustainable AI Futures

7.1 Synthesis of Key Finding

Our comprehensive analysis reveals three fundamental truths about Green AI:

1. Technical Feasibility: Energy reductions of 30-75% are demonstrably achievable across diverse AI applications through existing methods (sparse models, federated learning, carbon-aware scheduling)

2. Economic Rationale: The business case strengthens as:
   - Energy prices rise (15% annual increase in compute costs)
   - Regulations tighten (EU's Carbon Border Adjustment Mechanism)
   - Consumer preferences shift (67% of enterprises now demand sustainable AI options)

3. Urgent Imperative: At current growth rates, AI could consume 10% of global electricity by 2030 without intervention

7.2 The Green AI Maturity Model propose a five-stage evolution for organization

Stag	*Characteristic*	*Key Metric*
Aware	Basic energy monitoring	CO_2 estimates for major model
Efficient	Algorithmic optimizations	20-40% energy reduction
Sustainable	Full lifecycle approach	Net-zero training emissions
Regenerative	Energy-positive operations	>100% renewable coverage
Pioneerine	Closed-loop AI ecosystems	Negative carbon footprint

Table 7.2

7.3 Strategic Recommendations for Stakeholders

7.3.1 For AI Developers

- Adopt efficiency-first design principles

- Implement continuous green auditing

- Participate in open benchmarking initiatives

7.3.2 For Corporate Leaders

- Establish C-level sustainability KPIs for AI

- Create Green AI innovation labs

- Advocate for industry-wide standards

7.3.3 For Policy Makers

- Accelerate carbon pricing for compute resources

- Fund public-private research consortia

- Develop just transition frameworks for AI workforce

7.4 The Research Frontier

Critical unanswered questions requiring investigation:

1. Long-Term Ecological Impacts
   - Cumulative effects of AI hardware microcomponents
   - Rare earth mineral depletion rates
   - Thermal pollution from large-scale AI clusters
2. Behavioural Economics
   - Incentive structures for sustainable AI adoption
   - Decision-making psychology around efficiency trade-offs
   - Cultural determinants of Green AI prioritization
3. Planetary Boundaries
   - Safe operating space for AI's resource use
   - Tipping points in tech-environment systems
   - AI's role in broader sustainability transitions.

7.5 A Call to Coordinated Action

propose the following immediate steps:

1. Form a Global Green AI Consortium (industry + academia + NGOs)

2. Launch an Open Efficiency Benchmark Platform

3. Establish Model Efficiency Bonds (market mechanism for improvements)

4. Create Emergency Task Force for high-impact sectors (e.g., LLMs)

7.6 Final Perspective

The Green AI revolution represents more than technical optimization—it necessitates a fundamental reimagining of how we develop and deploy artificial intelligence. As this paper demonstrates, the tools for sustainable transformation exist; what's required now is the collective will to implement them at scale. The choices made in this decade will determine whether AI becomes a net-positive force for environmental stewardship or an accelerating factor in ecological crisis. Through the framework, case studies, and policy pathways presented here, we provide both the intellectual foundation and practical toolkit for steering toward a sustainable AI future.

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Evolution and Emerging Trends in Startup Finance in India

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Abstract

This research paper examines the dynamic environment of startup finance in India. It focuses on how funding mechanisms and startup finance landscape have changed significantly during the last 25 years due to changes in investor behaviour, technical advancements, and changing economic situations. The dot-com bust in the early 2000s caused venture capital to adopt a more conservative stance, prioritizing sustainable business models above quick expansion. Between the middle of the 2000s and the beginning of the 2010s, the emergence of Web 2.0 and mobile technologies rekindled investor interest and made it easier for incubators and angel investors to expand.

Crowdfunding platforms and the rise of alternative funding sources including revenue-based financing and initial coin offerings (ICOs) democratized startup finance after 2010. Additionally, venture capital grew internationally, with more money going into emerging markets. While data analytics and artificial intelligence (AI) tools improved investor decision-making, the emergence of fintech made it easier for early-stage firms to obtain funding.

The COVID-19 epidemic, which began in 2020, hastened digital transformation and spurred a boom in financing for tech-enabled solutions, especially in e-commerce, edtech, and

healthcare. At the same time, investment decisions started to take environmental, social, and governance (ESG) considerations more seriously. In addition to stricter monetary laws and a more conservative investment climate, the years 2022–2025 have seen an increase in interest in climate tech, artificial intelligence, and sustainable enterprises.

All things considered, startup funding has changed from being primarily driven by venture capital to being a more inclusive and varied ecosystem that incorporates both conventional and cutting-edge funding sources.

Keywords: *Startup Finance, Venture Capital, Angel Investment, Alternative Investment Funds*

1. Introduction

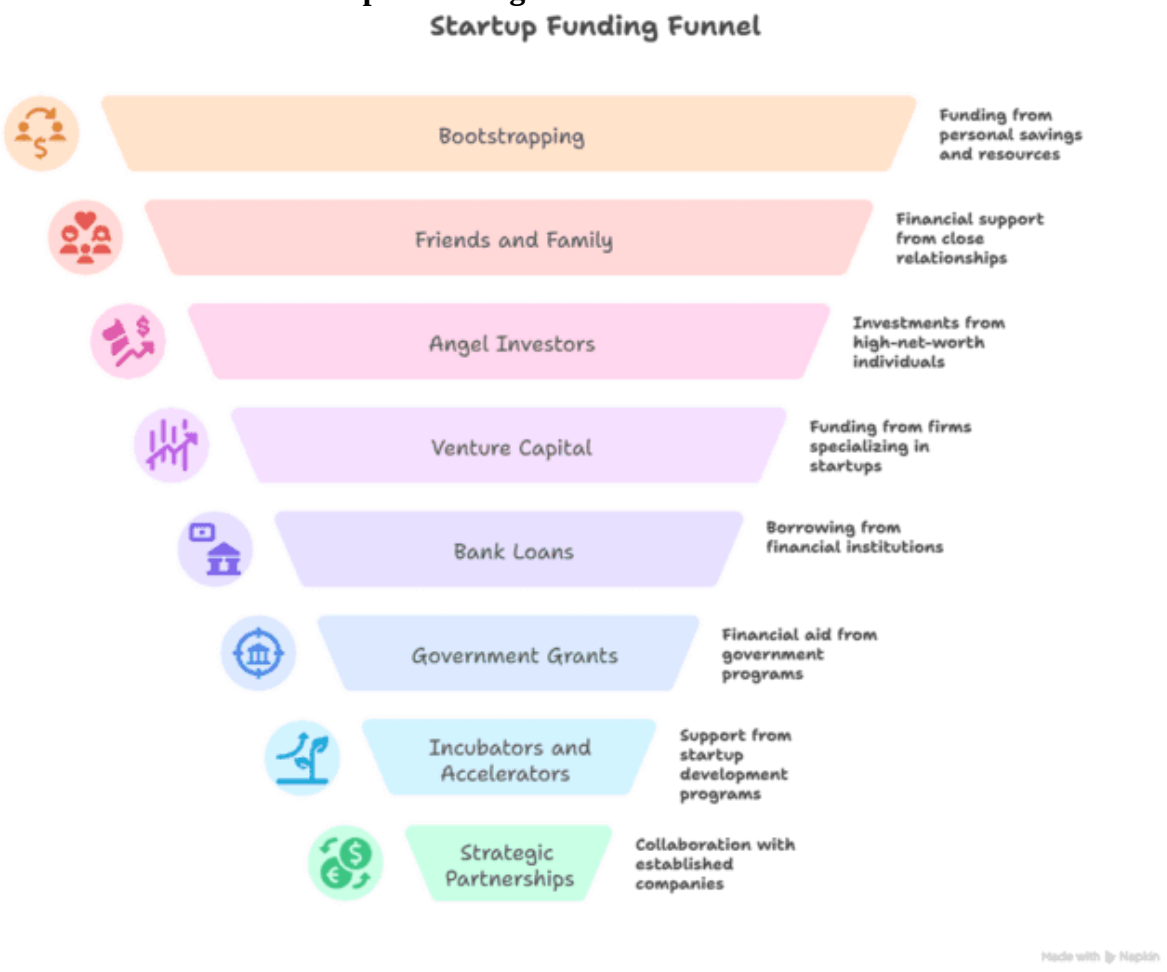
India has emerged as one of the world's fastest-growing startup ecosystems, driven by digital transformation, a young entrepreneurial workforce, and supportive government initiatives.

The landscape of startup finance has undergone significant transformations in recent years, driven by technological advancements, changing investor preferences, and evolving market dynamics. Emerging trends in this domain are reshaping how entrepreneurs access capital, manage financial operations, and scale their businesses. From the rise of alternative funding sources to the integration of artificial intelligence in financial decision-making, startups are navigating a complex and rapidly changing financial ecosystem. This introduction explores the key trends shaping startup finance, their implications for both founders and investors, and the potential future directions of this critical aspect of entrepreneurship.

Since the early 2000s, startup finance has undergone a transformative evolution, driven by technological advancements, globalization, and shifting investor priorities. The dot-com bust initially tightened capital flows, but the rise of venture capital (VC), angel investing, and crowdfunding platforms democratized access to funding. Web 2.0 and mobile technology spurred innovation, enabling startups to scale rapidly with lower capital intensity. Post-2008, quantitative easing and low interest rates fuelled VC investments, particularly in tech-driven sectors like fintech, health tech, and AI. The 2010s saw the emergence of unicorns, mega-rounds, and corporate venture capital, alongside alternative funding models like ICOs and SPACs. Post-2020, despite economic uncertainties, startups adapted to hybrid work and digital-first models, while sustainability and impact investing gained traction. In India, for

instance, startup funding surged, with 2021 alone seeing over $42 billion in investments, reflecting a global trend of increased risk appetite and diversified funding sources.

Methods Used for Startup Financing in the 2000s



The early 2000s marked a transitional period in startup financing, especially in the aftermath of the dot- com bubble burst in 2000. Despite a cautious investment climate, startups still found various ways to raise capital. Here are the key methods used during that period:

1. Bootstrapping

As per this method, Founders used personal savings or revenue generated by the business to fund operations.This method became popular because after the dot-com crash, external investors were more risk-averse, making founders rely on internal sources.The method had the limitation of limited scalability due to lack of significant capital.

2. Friends and Family Funding

Startups often turned to close personal networks for seed capital. This method had Easy access, flexible terms but at the same time had high personal risk and potential for strained relationships.

3. Angel Investors

This method is about High-net-worth individuals who invested in early-stage startups. It is more common in developed startup hubs like Silicon Valley. It Provided both capital and mentorship.

4. Venture Capital (VC)

Although venture capital tightened post-2000, established VCs still backed startups with promising scalability. Mainly, the Focus was on later-stage startups or those with proven traction. Here, Investors were more cautious, favouring risk mitigation and due diligence.

5. Bank Loans and Credit Lines

This method is less common due to high perceived risk and lack of collateral.Still used by startups with physical assets or strong business plans.

6. Government Grants and Subsidies

Some governments (especially in countries like the U.S., U.K., and India) provided innovation grants or tax incentives.

7. Incubators and Accelerators (Emerging Trend)

Models like Y Combinator in startup financing refer to accelerator-based financing models, where startups receive funding, mentorship, and resources in exchange for equity. These models are designed to rapidly scale and develop early-stage startups by offering structured programs over a fixed duration (usually 3–6 months). In the late 2000s, models like Y Combinator began gaining popularity.

8. Strategic Partnerships / Corporate Funding

Some startups raised funds or resources from corporate partners in exchange for equity or product integration. Especially relevant in tech, pharma, and telecom sectors.

Methods Used in Startup Financing (2011–2020, Pre-COVID Era)

The period from 2011 to 2020 witnessed a surge in startup activity globally, driven by digital transformation, mobile internet, cloud computing, and growing entrepreneurial ecosystems. Startup financing methods during this period became more diverse and accessible compared to earlier decades. Below is an overview of the key methods used for startup financing during 2011–2020 (pre-COVID):

1. Venture Capital (VC)

Venture Capital is a form of **private equity financing** provided by **professional investment firms (VCs)** to **early-stage, high-potential startups** in exchange for **equity (ownership stake)**. It is a key driver of innovation and growth, especially in sectors like **technology, biotech, fintech**, and more. VC

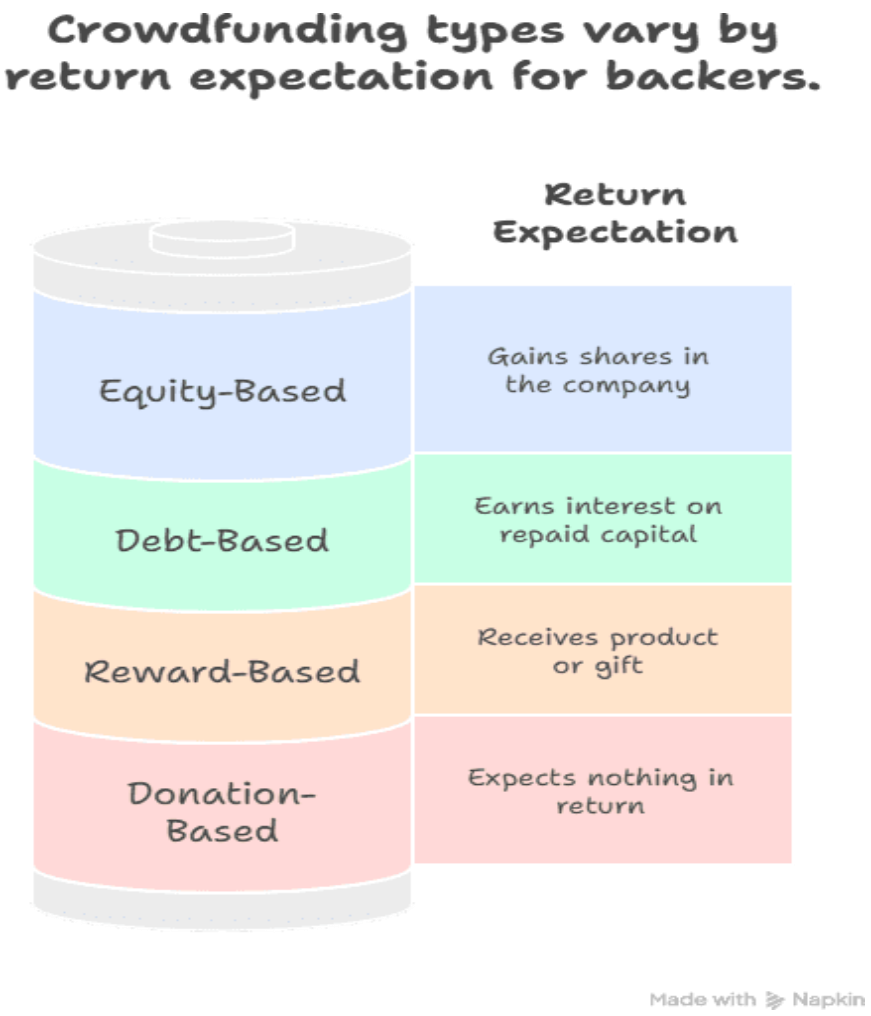
firms became more specialized (e.g., early-stage, growth-stage, sector-focused). Mega rounds ($100M+) became more common, especially in the U.S., China, and India.

2. Angel Investment

Angel investment refers to capital provided by **high-net-worth individuals (angels)** to **early-stage startups**, usually in exchange for **equity ownership** or **convertible debt**. Angel investors often invest during the **idea or prototype stage**, when risk is high and traditional funding is unavailable. Continued to play a vital role in seed and early-stage funding.

3. Crowdfunding

Crowdfunding is a method of raising capital by **collecting small amounts of money from a large number of individuals**, typically via **online platforms**. It enables startups to access funds **without traditional investors** (like VCs or angels), and can also serve as a **market validation tool**.


Crowdfunding types vary by return expectation for backers.
Return Expectation
Equity-Based
Gains shares in the company
Debt-Based
Earns interest on repaid capital
Reward-Based
Receives product or gift
Donation-Based
Expects nothing in return
Made with Napkin

Key Types of Crowdfunding

Type	Description	Example
Reward-Based	Backers receive non-monetary rewards (e.g., product, gift)	Kickstarter, Indiegogo
Equity-Based	Investors receive equity (shares) in the company	Seed Invest Republic, Angel List
Donation-Based	Purely charitable; donors expect no return	GoFundMe
Debt-Based (Peer-to-Peer Lending)	Lenders earn interest; capital is repaid later	Lending Club, Kiva

This method has gained popularity via platforms like Kickstarter, Indiegogo, and GoFundMe.

4. Accelerators and Incubators

There has been a massive growth in programs like Y Combinator, Techstars, 500 Startups. This provided pre-seed funding, mentorship, and access to VC networks. This method is popular globally, especially in emerging markets post-2015.

5. Corporate Venture Capital (CVC)

Large corporations began investing in startups to drive innovation.

6. Venture Debt

This method is about Non-dilutive capital option (loan rather than equity). Startups with predictable cash flow or VC backing opted for venture debt to extend runway without dilution.

7. Initial Coin Offerings (ICOs) / Blockchain-Based Funding

Peaked around 2017–2018 during the crypto boom. Startups raised capital by issuing tokens or coins instead of equity. This method is Unregulated in many countries and led to many scams, causing a decline by 2019.

8. Bootstrapping

Continued to be used, especially by tech founders building MVPs or startups in smaller markets. Startups focused on revenue-generation before seeking external capital.

9. Government and Institutional Funding

Governments launched startup funds, grants, and subsidies to promote innovation like Startup India (India, 2016), SBIR/STTR grants (USA) ,Horizon 2020 (EU innovation funding)

10. Peer-to-Peer (P2P) Lending & Fintech Platforms

Alternative lending platforms emerged as a funding source for small/startup businesses. Offered quicker and less regulated access to capital, especially for underserved segments. **Post-COVID Startup Financing Methods (2020–Present)**

The **COVID-19 pandemic** caused significant disruption across global markets but also accelerated innovation, digital transformation, and a shift in investor focus. As a result, **startup financing methods evolved rapidly** post-2020, with some traditional models adapting and new trends emerging.

Here's a detailed breakdown of **startup financing methods in the post-COVID era:**

1. Venture Capital (VC) – Still Strong, but More Selective

- **VC investment rebounded sharply** after an initial dip in 2020.
- Focus shifted toward:
  - Healthtech, Edtech, Remote Work Tools, Fintech, SaaS, and Green Tech.
  - Startups with sustainable business models and stronger unit economics.
- **Later-stage (Series B and above)** funding faced more scrutiny after 2022 due to global recession fears.

2. Angel Investors & Syndicates

- Angel networks became more **digitally organized** (e.g., via AngelList, SeedInvest).
- Use of **syndicate models** grew—pooling resources from multiple angels.
- More **cross-border investments** as remote diligence became the norm.

3. Crowdfunding (Equity & Reward-Based)

- Continued growth, especially in **consumer products, gaming, and sustainability-focused startups**.
- **Equity crowdfunding** matured under improved regulation (e.g., Reg CF in the U.S. increased limits).
- Investors showed growing interest in **community-owned startups**.

4. Revenue-Based Financing (RBF) – Gaining Popularity

- A **non-dilutive** model where startups repay investors as a percentage of future revenue.
- Ideal for SaaS and D2C companies with **predictable cash flows**.
- Key players: **Clearco, Pipe, Capchase, GetVantage (India)**.

5. Venture Debt – Strategic Alternative

- Continued growth as startups sought to **extend runway** without equity dilution.
- Often used alongside equity funding.
- Popular among **late-stage or recurring revenue startups**.

6. Decentralized Finance (DeFi) & Web3 Fundraising

- Rise of **token-based fundraising**, DAOs, and NFT-based capital raises.
- **DAOs** (Decentralized Autonomous Organizations) pooled capital to invest in startups.
- However, post-2022 crypto crash, **regulatory scrutiny increased**, making this option riskier.

7. Government Grants, Subsidies & Pandemic Relief Funds

- Many governments launched **stimulus packages** and **startup support programs** during and post-COVID:
  - **Startup India Seed Fund**, Atmanirbhar Bharat (India)
  - **EU Recovery Fund**, **PPP loans** (USA), etc.
- Startups in **healthcare, logistics, and agri-tech** benefitted most.

8. Corporate Venture Capital (CVC) & Strategic Partnerships

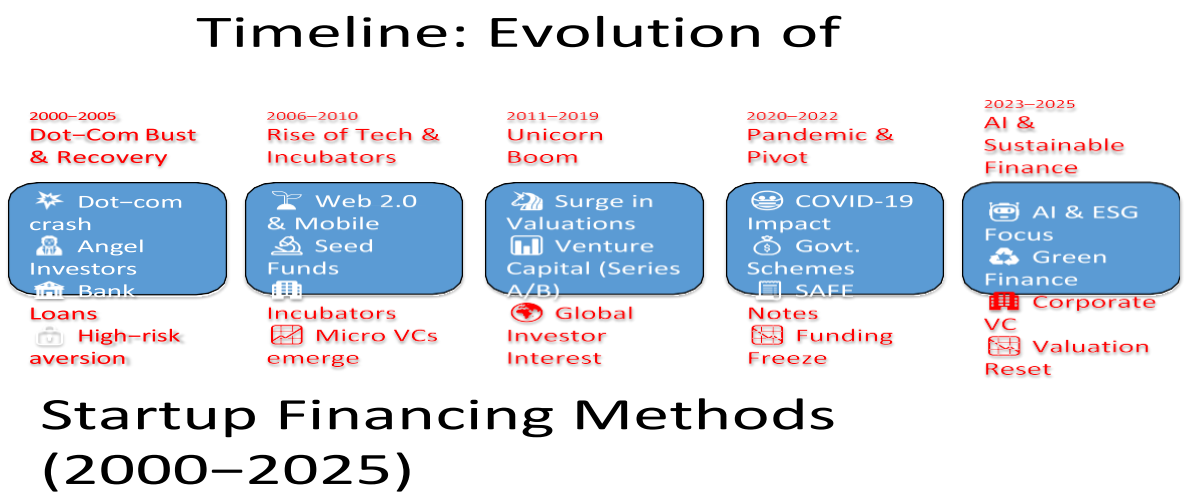
- Corporations expanded CVC arms to invest in digital transformation and sustainability.
- Focus on **climate tech, AI/ML, cybersecurity, and supply chain innovation**.
- Startups also formed **strategic alliances** for distribution or co-creation.

9. Accelerators & Remote Incubation Programs

- Programs went **virtual**, enabling **global participation**.
- New accelerators emerged for niche sectors like **climate tech**, **AI**, **web3**, and **social impact**.
- Example: Y Combinator shifted to fully remote model post-2020.

10. SPACs (Special Purpose Acquisition Companies) – Short-Lived Hype

- Boomed in **2020–2021** as a faster way for startups to go public.
- Faced backlash and regulatory crackdowns by **late 2022** due to overvaluations and poor performance.



2. Literature Review

The literature on startup finance highlights key sources of capital: bootstrapping, angel investing, venture capital, private equity, and debt instruments.

Pre-COVID studies focused primarily on capital access, valuation challenges, and exit strategies (Gompers & Lerner, 2001; Basu, 2010).

Post-COVID literature underscore's themes like resilience, digital acceleration, and the rise of alternative funding channels (NASSCOM, 2021; Sharma & Jain, 2022).

As per a study "Redefining Tectonic Start-Ups in India during Pandemic Time" by Durga Madhab Startups are innovative businesses that attract young people with enthusiasm and ideas. India, through Start-up India, has risen to third place in the global start-up economy. The country's supportive ecosystem of incubators and venture capitalists has brought in over $70 billion in investment over the past three years. In 2021, companies are predicted to raise $13.4 billion in equity through 1,000 transactions.

Recent trends in startup finance reveal a diversification of funding sources beyond traditional venture capital. While venture capital funds increasingly focus on larger, more mature companies, alternative financing options have emerged for early-stage startups (Karsai, 2020). These include business angels, accelerators, incubators, and crowdfunding platforms,

which offer not only capital but also mentoring, networking, and market knowledge (Karsai, 2020). The financing landscape varies across countries, with different options and market conditions prevalent in nations like China, Germany, and the UK (Tariq, 2013).

Key factors influencing startup success in securing funding include business model viability, market potential, and founder credibility (Jadhav, 2024). The startup financing ecosystem is evolving, with successful former startup founders playing crucial roles in new ventures, creating a self-reinforcing process of development and capital supply (Karsai, 2020). However, the long-term stability of this market reorganization remains uncertain, especially in light of global economic challenges (Karsai, 2020).

Source : International Journal of Innovative Technology and Exploring Engineering (IJITEE) Growth Pattern and Trends in Startup Funding in India Madhusudan Narayan[1], Birajit Mohanty[2], Mahesh Kumar[3]

Key Findings from Literature Review

The literature on startup financing reveals significant trends influenced by technological advancements and evolving financial instruments. Recent studies highlight the increasing importance of fintech, entrepreneurial finance, and innovative funding mechanisms, which collectively shape the startup ecosystem. This overview will explore key trends in startup financing, including the rise of digital financing options, the role of venture capital, and the impact of government policies.

Digital Financing Instruments

- Emergence of New Funding Sources: Startups are increasingly utilizing digital financial instruments such as crowdfunding, Initial Coin Offerings (ICOs), and Business Angel Networks, which provide alternative financing avenues beyond traditional methods(Klein et al., n.d.).
- Fragmentation of Literature: Despite the proliferation of studies on digital financing, the literature remains fragmented, indicating a need for comprehensive frameworks to understand these new instruments(Klein et al., n.d.).

Role of Venture Capital

- Access to Capital: Venture capital is critical for startup growth, correlating positively with innovation outcomes. It offers not only funding but also expertise, which is essential for navigating early-stage challenges(Nurhayati, 2024)(Ermawati, 2024).
- Competitive Landscape: The competitive nature of venture capital funding necessitates that startups develop robust business models and strategies to attract investors(Ermawati, 2024).

Government and Policy Influence

- Supportive Ecosystems: Government initiatives play a vital role in fostering startup growth by creating favorable conditions for financing and innovation. Policymakers are encouraged to promote diversity in funding sources and support collaborative efforts between public and private sectors (Nurhayati, 2024).

While the trends in startup financing indicate a shift towards innovative and diverse funding mechanisms, challenges such as regulatory hurdles and the need for comprehensive research on the effectiveness of these instruments remain.

Addressing these issues is crucial for sustaining the growth and success of startups in a rapidly evolving financial landscape.

The various studies Reviewed and summarized as below

Journal Article•10.19053/01203053.v42.n76.2023.15964 **1. Fintech and Start-ups: A Systematic Literature Review** **Jhon Wilder Sanchez Obando, Néstor Darío Duque Méndez, Andrea Ximena Tapasco-Rueda** **4 Aug 2023-Apuntes del CENES** **PDFSummaryPodcast**	**The literature review identifies trends in startup financing, emphasizing fintech's role in enhancing business financing, innovation, and financial information. It highlights the need for regulatory adaptation to harmonize technological advances with financing opportunities for startups.**

Journal Article•10.48206/kceba.2024.8.5.307 **2. A Study on the Success of Start-ups Using Systematic Literature Review Method Analysis of research trends** **Yeonsoon Park, J. Nam** **30 Sep 2024-한국진로창업경영연구** **Request PDFPodcast**	**The paper does not specifically address trends in startup financing. It focuses on factors influencing startup success, emphasizing resource and management strategy dimensions, while suggesting a need for balanced research on founder and industrial environment factors.**
Journal Article•10.60079/aefs.v2i3.271 **3. The Role of Entrepreneurial Finance in Fueling Growth and Innovation** **Nurhayati Nurhayati** **30 Aug 2024-Advances in Economics & Financial Studies** **Request PDFPodcast**	**The literature review in the study highlights various forms of entrepreneurial finance, emphasizing the critical role of access to capital, particularly venture capital, in driving startup growth and innovation, while also addressing associated challenges and opportunities in financing trends.**
10.57229/2373-1761.1353 **4. Start-Up Financing in the Digital Age – A Systematic Review and Comparison of New Forms of Financing** **Maximilian Klein, Florian Neitzert, Thomas Hartmann-Wendels +1 more** **Request PDFPodcast**	**The paper conducts a systematic literature review of 85 peer- reviewed articles, highlighting trends in startup financing by categorizing instruments into traditional and novel forms, assessing their suitability, and exploring their roles as substitutes or complements in the financing landscape.**

Journal Article•10.60079/aefs.v2i2.283 **5. Entrepreneurial Finance Strategies for Startup Success** **Yana Ermawati** **30 May 2024-Advances in Economics & Financial Studies** **Request PDFPodcast**	**The literature review in the study highlights trends in startup financing, including the competitive nature of venture capital, the autonomy of bootstrapping, the community- driven approach of crowdfunding, and the importance of financial planning for sustainable growth and resource management.**
Journal Article•10.1108/nbri-03-2024-0025 **6. Funding sustainable entrepreneurship: a hybrid systematic literature review and bibliometric analysis** **Ayoub Derdabi, Ondřej Dvouletý** **24 Jan 2025-Nankai Business Review** **International Request PDFPodcast**	**The literature review identifies diverse trends in startup financing, highlighting a growing interest in alternative finance methods like crowdfunding. It emphasizes the need for further research on post-funding empirical studies and the effectiveness of regulations supporting sustainable entrepreneurship.**

Journal Article•10.1080/13691066.2023.2210757 **7. Evolution and trends in entrepreneurial finance: reflections and insights from COVID-19** **Purnima Rao, Sanjay Kumar, Shubhangi Verma** **17 May 2023-Venture Capital: An International Journal of Entrepreneurial Finance** **3** **Request PDFPodcast**	**The study conducts a systematic literature review of 127 articles, revealing trends in startup financing during COVID-19, including increased reliance on crowdfunding, Initial Coin Offerings, venture capital, P2P lending, and angel finance, highlighting evolving financing options and choices.**

•Journal Article•10.2139/SSRN.2967271 8. Institutional Seed Financing, Angel Financing, and Crowdfunding of Entrepreneurial Ventures: A Literature Review Johannes Wallmeroth, Peter Wirtz, Alexander Peter Groh 26 May 2017-Social Science Research Network 21 PDFSummaryPodcast	The literature review identifies major trends in startup financing, highlighting the evolution of institutional seed financing, angel financing, and crowdfunding, while also revealing research gaps, particularly in ownership structures, post-investment stages, and co-investments in cross-border settings.
•Journal Article•10.1080/13691066.2019.1607167 9. Emerging trends in entrepreneurial finance Stefano Bonini, Vincenzo Capizzi, Douglas J. Cumming 29 May 2019-Venture Capital: An International Journal of Entrepreneurial Finance 16 PDFPodcast	The paper discusses emerging trends in startup financing, highlighting new funding sources like technology parks, incubators, angel investors, and crowdfunding, which have reshaped the financing ecosystem, challenging traditional venture capital's role and creating new policy implications for investors and entrepreneurs.
Journal Article•10.53469/jgebf.2024.06(12).01 10. The Emergence of Alternative Financing Models: An In-depth Analysis of Revenue-Based Financing Arnab Dey 30 Dec 2024-Journal of Global Economy, Business and Finance Request PDFPodcast	The study analyzes revenue-based financing (RBF) as a growing trend in startup financing, highlighting its balance between debt and equity, market dynamics, and the projected $3.38 billion market by 2023, driven by demand for flexible financing options. Save to Notebook

Research Question

"What are the emerging trends in startup financing methods post-2000, and how have they influenced startup growth and sustainability?"

Research Objectives

- This research aims to examine and analyze the evolving trends in startup finance.
- To analyze the evolution of startup financing methods in India from 2000 to 2024.
- To identify emerging trends and alternative funding instruments post-COVID.
- To suggest policy recommendations and strategic approaches for startups.

4. Methodology The study employs a approach:

- Analysis of Literature to understand the trends
- **Timeframe:** 2000 to 2024, with pre-COVID (2000-2019), during-COVID (2020-2021), and
  post-COVID (2022-2024) segmentation.

5. Evolution of Startup Finance in India

5.1 Early 2000s: Dominated by bootstrapping, family funding, and informal angel networks. **5.2 2010- 2019:** Rise of formal VC funding, accelerators, and emergence of unicorns. **5.3 Post-2020:** Surge in venture debt, equity crowdfunding, and fintech-led financial platforms. Increased interest in healthtech, edtech, and climate tech startups.

6. Post-COVID Shifts in Investment Behavior

- Investors prefer startups with clear monetization models and path to profitability.
- Due diligence processes have become more data-driven.
- ESG metrics and impact investing have gained prominence.
- Increase in domestic capital participation and role of family offices.

7. Emerging Funding Instruments

- **Venture Debt:** Preferred by startups to minimize equity dilution.
- **Crowdfunding:** Gaining momentum through SEBI-regulated platforms.
- **Alternative Investment Funds (AIFs):** Category I and II AIFs focused on early and growth- stage startups.
- **Revenue-Based Financing (RBF):** A flexible model gaining ground with SaaS startups.

8. Challenges in Startup Finance

- Regulatory ambiguities and delays in fund disbursement.
- Limited access to early-stage capital in Tier II and III cities.
- Lack of financial literacy among first-time founders.

9. Policy and Strategic Implications

- Simplification of compliance for startups and investors.
- Incentives for domestic VC funds and angel networks.
- Expansion of credit guarantee schemes and co-investment models.
- Emphasis on financial education and mentorship programs.

Yearly Data on Startup Finance Post-COVID (2020–2024)

- **2020:** Total funding = $11.5 billion | Number of deals = 900+ | Focus sectors: healthtech, edtech
- **2021:** Total funding = $38.5 billion | Number of deals = 1600+ | Peak unicorn creation year (44 unicorns)
- **2022:** Total funding = $25.0 billion | Number of deals = 1200+ | Investor caution

begins due to global slowdown

- **2023:** Total funding = $20.2 billion | Number of deals = 1050+ | Surge in bridge rounds and down rounds
- **2024 (Est.):** Total funding = $23.0 billion | Number of deals = 1100+ | Growing investor focus on AI/ML, climate tech, and profitability

10. Conclusion Startup finance in India is undergoing a structural transformation characterized by digitization, innovation in financing, and evolving investor preferences. The post-COVID environment has accelerated the shift toward sustainable, data-backed, and impact-oriented investment practices. Future policy interventions should focus on inclusive access, regulatory clarity, and support for alternative funding pathways.

Summary Table: Startup Financing Methods Post-COVID (2020–Present)

Method	Type	Trend Post-COVID	Notes
Venture Capital	Equity	Selective but strong	Focus on resilient, tech-enabled startups
Angel Investment	Equity	More structured, digital	Cross-border via syndicates
Crowdfunding	Equity/Reward	Increased, community-driven	Improved regulations
Method	**Type**	**Trend Post-COVID**	**Notes**
Revenue-Based Financing	Non-dilutive	Rapidly growing	Great for SaaS and D2C startups
Venture Debt	Debt	Used alongside equity	Preferred for runway extension
DeFi / Token Sales / DAOs	Crypto/Web3	Fluctuating, under scrutiny	Regulatory risks remain
Government Support	Grant/Subsidy	Expanded for innovation	Pandemic recovery focus
Corporate Venture Capital	Equity	Increased in strategic areas	ESG, AI, cybersecurity in focus

Remote Accelerators/Incubators	Equity + Mentoring	Global, sector-focused	Virtualized and accessible globally
SPACs	Public Listing	Peaked and declined	Regulatory pressure, valuation issues

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A Study on Wealth Creation through SIP vs. Lump Sum Investments

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Abstract

The research paper titled “Wealth Creation through SIP vs. Lump Sum Investments" compares the efficacy of two popular mutual fund investing strategies: lump sum investments and systematic investment plans (SIPs). With an emphasis on how demographic factors like income, education, and investment experience affect financial behavior and decision-making, the study examines investor awareness, preferences, risk tolerance, and satisfaction with regard to both strategies. Using a standardized Google Form questionnaire, 182 respondents provided primary data, which was then processed with SPSS software to find statistical associations and test several hypotheses.

The results reveal that SIPs are generally preferred by investors with moderate to low income and conservative risk profiles, while Lump Sum investments appeal more too high-income

individuals with greater risk appetite and market knowledge. Statistical tests highlight that factors such as income and gender significantly influence investment preferences and risk perceptions. The findings suggest that while SIPs provide a disciplined, low-risk path for long-term wealth creation through rupee-cost averaging, Lump Sum investments can yield higher returns under favorable market conditions but carry higher risk. The research offers valuable insights for retail investors, financial advisors, and mutual fund companies in tailoring strategies for diverse investor segments and improving financial literacy for better investment outcomes.

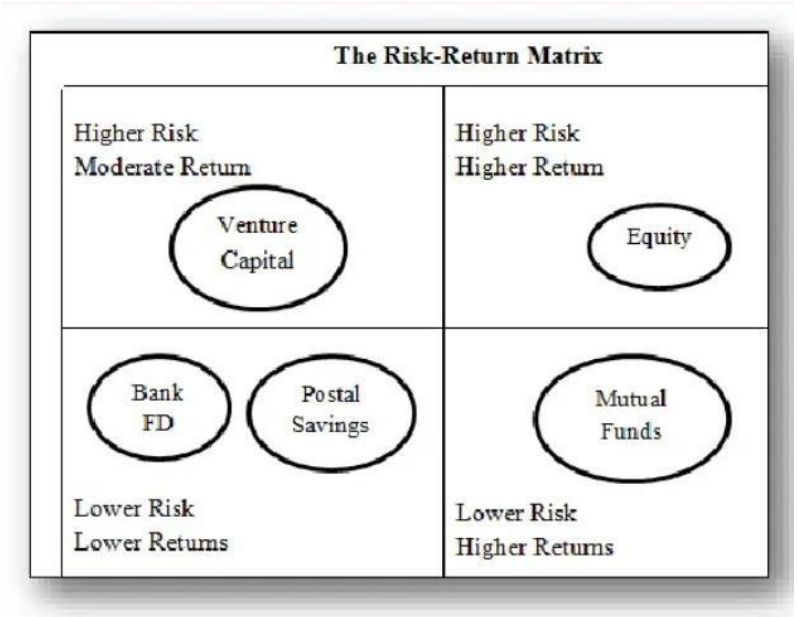
Keywords: *Mutual Funds, SIP, Lump Sum, Wealth Creation, Risk Tolerance, AMFI Data*

Introduction to Mutual Fund

One of the most popular investment products in the world is mutual funds. Its customer base has expanded dramatically on a global basis in recent years. Mutual funds have a long and successful history. The popularity of mutual funds has significantly increased. In developed financial economies like the US, mutual funds have almost overtaken bank deposits and the total assets of insurance funds. Today, there are many different investment options available in the financial market for an investor with investable excess. Bonds, company debentures, and bank deposits are examples of low-risk but low- return investments that he can make. He might invest in stocks of companies with a high level of risk and correspondingly high earnings. The bad trends that are now in place. Following stock market trends became popular after it was shown that the typical retail investor frequently loses money while making investments on behalf of stock market-savvy portfolio managers. As a result, wealth management services were provided by several firms. But they proved to be too costly for small investors. For these people, the mutual funds have turned out to be a safe haven. Contributions to a mutual fund are deposited into a common financial pool and invested in accordance with a predetermined objective. Consequently, all investors jointly or "mutually" own the fund. The ownership share of a single investor in the fund is equivalent to the investor's Percentage contribution to the fund's overall worth. A mutual fund is a trust that invests in a variety of securities, such as stocks, bonds, or a combination of the two, by pooling the money of several investors. An Asset Management Company (AMC) employs a

qualified fund manager to oversee it. Mutual funds are established as trusts that raise capital by investing in securities and selling units to the general public in accordance with the SEBI (Mutual Funds) Regulations, 1993. They provide affordable, experienced management, making them perfect for investors with little time or experience. Every scheme has a defined goal, and anyone with a small amount can invest. Investors receive returns based on the number of units them own.

Showing the risk- return matrix:



Mutual funds are easy to understand and require no deep financial knowledge to invest. They are accessible through banks, brokers, and online platforms. A single fund offers exposure to many securities, helping reduce risk. There are many fund types to choose from, including those focused on stocks, bonds, or specific sectors. Most funds have low minimum investment requirements, and SIPs make investing even easier. They are professionally managed by experts, saving investors time and effort. Mutual funds can be used for short- or long-term goals, offering flexibility in investment strategy. Investors receive regular updates on holdings and performance. They can also exit easily, with funds typically credited back within a day.

Mutual funds charge management fees and other expenses, which may reduce overall returns. These costs are deducted regardless of fund performance. Investors have no control over

specific investment choices, as fund managers make all decisions. Returns are not guaranteed, and market fluctuations can affect the fund's value. Even diversified funds can suffer losses during market downturns. Over- diversification may dilute gains, and similar holdings across multiple funds can reduce true diversification. Frequent buying and selling by fund managers may lead to higher capital gains taxes for investors. Also, some funds may have exit loads or lock-in periods, restricting quick withdrawal.

An investment in a mutual fund that involves making a sizable payment all at once is known as a lump sum investment. For a lump sum investment, a large payment must be made all at once, in contrast to systematic investment plans (SIPs), which need smaller, more frequent contributions. For individuals who have a sizable savings account and want to invest it all at once, this strategy may be alluring. Despite the possibility of higher returns in the event of a strong market, it also entails the risk of market volatility because the entire amount is subject to swings. Those who choose to invest in lump sums should carefully think about when to do so because doing so at a high time can lead to short-term losses. Those with a longer investing horizon and faith in the market's expansion tend to favour this approach. However, it is better suited for seasoned investors because it necessitates a certain amount of risk tolerance and market expertise. Because all of the money is invested at once, lump sum investments can also have the benefit of compounding interest. Some people may find that this approach makes it easier to swiftly diversify their holdings and capitalize on future market opportunities. When the investor carefully considers the risks and market conditions, a lump sum investment in a mutual fund can ultimately be a successful strategy for increasing wealth over time.

A systematic Investment Plan or SIP is a way to invest in Mutual Funds. These are simple and instant methods where the user needs to regularly invest a predetermined amount. SIPs are a great way to increase your wealth and grow the money over time. SIPs are ideal for reaching financial goals because they distribute assets, ensure market participation, and allow for the long-term benefits of compounding returns. SIP (Systematic Investment Plan) is a way of investing in Mutual Funds. You can invest a certain amount in funds on a weekly, monthly, or quarterly basis. SIPs are flexible and you can change the investment amount according to your financial circumstances.

SIPs help build wealth over time by reducing risks and averaging market highs and lows. Both

new and experienced investors who want to progressively achieve their financial goals without worrying about market timing will find it to be an excellent option.

Literature review

Gajera,A. (2020) This study aims to evaluate the risk and return of investing in mutual funds through a systematic investment plan versus a flat payment. This study compares the returns and risks of SIP versus lump sum investments using historical NAV data of 10 ELSS mutual fund schemes from top AMCs. It applies T-tests and F-tests for statistical analysis. Results show that lump sum investment is preferable when considering only risk and return. Patel, H., Srivastav, K., & Vidani, J. (2024).This study examines the relative benefits of SIPs versus Lump Sum Investments in connection with risk management, long-term wealth building, and investor behavior. The paper explores behavioral finance aspects, emphasizing how SIPs reduce market timing risk through dollar-cost averaging and promote disciplined investing. The study concludes that SIPs offer a more stable approach, especially for risk- averse and long-term investors. Dominic, R., Dominic, N., & Akhila, P. A. (2023). The purpose of this study is to investigate the utilization of mutual funds in SIPs and determine the driving forces behind SIP investments. Using a survey in Ernakulum District, this study analyzes demographic influences on SIP investment behavior. Findings suggest SIPs are preferred by salaried and first-time investors due to ease, low risk, and accessibility. Demographic variables like income and education showed independent effects on SIP awareness and preferences.

Sharma, K.B. (2023) The Performance Evaluation of Systematic Investment Plans (SIPs) in Mutual Funds. This study compares SIP performance using tools like Sharpe ratio, alpha, beta, and Sortino ratio on 30 selected mutual fund schemes. Benchmarked against BSE Sensex and Treasury bills, the analysis shows fluctuating performance, highlighting the importance of evaluating risk-adjusted returns to make informed investment choices.Salunkhe, H. A., Boralkar, M., & Hinge,P.K.(2021). Studies highlight that despite many investment options, awareness and understanding of mutualfunds remain limited. This literature-based study emphasizes the role of investor education, financial literacy, and demographics in mutual fund adoption. It identifies a gap between awareness and actual investment, underscoring the role of media, apps, and campaigns in bridging that gap. Pandey,A.(2021) The concept of

Systematic Investment Plan (SIP) has gained significant traction as a disciplined investment tool. Focusing on working professionals, this research identifies SIPs as tools for promoting financial discipline, literacy, and savings. It notes that factors like gender, age, and urban access influence SIP awareness. The role of digital platforms in boosting SIP popularity is also highlighted.

Borgaon H. (2020). Mutual funds have become a vital tool for financial well-being. The study uses CAGR for lump sum and XIRR for SIP performance to offer a simplified comparison for non-expert investors. It concludes that lump sum investment is advantageous for those with substantial funds to invest initially.

Singh,N.K.(2024). Mutual funds play a key role in raising funds for India's capital and financial markets. This research uses responses from 130 investors in Chennai to assess investor attitudes toward SIPs.

The study finds that tax benefits, risk reduction, and diversification are key motivators, and most investors express satisfaction with mutual fund returns via SIPs.

Research methodology

3.1 Research Objective

- To analyze investor preferences, knowledge, and behavior regarding Systematic Investment Plans (SIP) and Lump Sum investments, with the aim of evaluating their effectiveness in long- term wealth creation.
- To analyze investor perceptions regarding the risk, effectiveness, and return potential of Systematic Investment Plans (SIP) versus Lump Sum investments
- Analyze the wealth creation potential of Systematic Investment Plans (SIPs) versus lump sum investments across various market conditions and time periods.

3.2 Sources of Data

3.2.1 Primary Data

Research instrument – A structured questionnaire is the instrument used for data collection Number of Responses Collected – 182

3.2.2 Secondary Data

This literature review relies entirely on secondary data sources. These include: Books: Scholarly books and financial planning guides discussing mutual fund structures, investment strategies, and wealth creation models have been referenced to build a strong theoretical foundation for the study.

Industry Reports: Reports from AMFI (Association of Mutual Funds in India), SEBI, and Morningstar India have provided data on mutual fund performance, trends in SIP adoption, and risk-return analysis. These industry insights help understand investor preferences and market behavior.

Company Websites and Online Platforms: Information from mutual fund companies (e.g., SBI Mutual Fund, ICICI Prudential, HDFC Mutual Fund) and investment platforms (like Groww, Zerodha, and Value Research) have been used to understand real-time NAVs, historical returns, SIP calculators, and fund comparisons.

3.3 Sampling Method

Non-probability convenience sampling is the sample method used for this study.

This approach was chosen due to the ease of access to respondents and time constraints. The data was collected through a structured Google Form questionnaire, which was circulated among individuals via social media platforms, emails, and personal contacts.

3.4 Sample Size

Sample size is 182, as instructed by the project guide.

3.5 Research tools

- Data gathering : Google form questionnaire
- Data analysis through SPSS software and Microsoft excel software

3.6 Limitations of the Study

Limited Sample Size: The study is based on responses collected through a Google Form,

which may not represent the views of the entire investor population. A larger sample could have provided more reliable insights.

Geographical Constraints: Most of the respondents may be from a particular region or state (e.g., Gujarat), which may affect the generalizability of the findings across India.

Short Time Frame: The study is conducted over a limited period, and it does not account for long-term investment cycles, market volatility, or macroeconomic changes that impact wealth creation

Knowledge Gap: Respondents may have varying levels of financial literacy. Some might have misunderstood the concepts of SIP or lump sum investments, which can affect the accuracy of responses.

Data Analysis

Test: 1 Hypotheses for Which mode do you consider less risky? Across different levels of income, gender, and occupation.

H0 (Null Hypothesis): There is no significant difference in perception of investment risk across different levels of income, gender, or occupation.

H1 (Alternative Hypothesis): There is a significant difference in perception of investment risk across different levels of income, gender, or occupation.

		Sum of Squares	Df	Mean Square	F	Sig.
OCCUPATION	Between Groups	1.003	3	.334	.472	.703
	Within Groups	87.872	124	.709		
	Total	88.875	127			
Monthly income	Between Groups	15.269	3	5.090	4.086	.008
	Within Groups	154.473	124	1.246		
	Total	169.742	127			
GENDER	Between Groups	5.123	3	1.708	8.354	.000
	Within Groups	25.346	124	.204		
	Total	30.469	127			

Interpretation:

Reject H0 for gender and monthly income – these have significant effects on risk perception. Fail to reject H0 for occupation – it does not significantly influence risk perception.

The null hypothesis (H_0) is rejected for gender and monthly income, indicating that these factors have a statistically significant effect on risk perception; however, the null hypothesis is not rejected for occupation, suggesting that it does not have a significant influence on risk perception."

1.2 Hypotheses for which investment method do you believe is better for long-term wealth creation? Across different income, gender, or occupation groups.

H0: There is no significant difference in belief about the best method **for long-term wealth creation across different income, gender, or occupation groups.**

H1: There is a significant difference in belief about the best method for long-term wealth creation across different income, gender, or occupation groups.

		Sum of Squares	Df	Mean Square	F	Sig.
Occupation	Between Groups	1.030	3	.343	.491	.689
	Within Groups	124.487	178	.699		
	Total	125.516	181			
Monthly income	Between Groups	11.699	3	3.900	3.228	.024
	Within Groups	215.010	178	1.208		
	Total	226.709	181			
Gender	Between Groups	3.508	3	1.169	5.128	.002
	Within Groups	40.586	178	.228		
	Total	44.093	181			

Interpretation:

Monthly Income: $p = 0.024 < 0.05$ → There is a statistically significant difference in investment method preferences based on monthly income.

People in different income brackets believe differently about which method (SIP, Lump Sum, etc.) is best for long-term wealth creation.

Gender: $p = 0.002 < 0.05$ → There is a highly significant difference based on gender.

This suggests that males and females may prefer different investment methods when it comes to long- term returns.

Occupation: $p = 0.689 > 0.05$ → No statistically significant difference.

Beliefs about long-term wealth creation do not vary significantly by occupation.

Reject the null hypothesis for gender and income, as they significantly affect people's beliefs about the best method for long-term wealth creation; however, fail to reject the null hypothesis for occupation, indicating it does not significantly impact this belief.

1.3 Hypotheses for which investment mode do you think provides better long-term returns? Based on income, gender, or occupation.

H0: There is no significant difference in opinion about long-term returns from investment modes based on income, gender, or occupation.

H1: There is a significant difference in opinion about long-term returns from investment modes based on income, gender, or occupation.

		Sum of Squares	Df	Mean Square	F	Sig.
OCCUPATI O N	Between Groups	.333	2	.166	.238	.789
	Within Groups	125.387	179	.700		
	Total	125.720	181			
Monthly income	Between Groups	7.551	2	3.775	3.084	.048
	Within Groups	219.158	179	1.224		
	Total	226.709	181			
GENDER	Between Groups	1.110	2	.555	2.311	.102
	Within Groups	42.984	179	.240		
	Total	44.093	181			

Interpretation:

Monthly Income: $p = 0.048 < 0.05$ → this is statistically significant.

- People in different income groups differ significantly in their opinion on which investment mode provides better long-term returns.

Gender: $p = 0.102 > 0.05$ → Not significant.

- Opinion does not vary significantly based on gender.

Occupation: $p = 0.789 > 0.05$ → Not significant.

- Opinion does not vary significantly by occupation.

Reject the null hypothesis only for monthly income – income has a significant effect on

opinions about long-term returns. Fail to reject the null hypothesis for gender and occupation – no significant effect found.

"Reject the null hypothesis only for monthly income, indicating that income has a significant effect on opinions about long-term returns, while fail to reject the null hypothesis for gender and occupation, suggesting no significant effect."

TEST 2

H_0 (Null Hypothesis):

There is no significant relationship between investment experience and the belief that SIP or Lump Sum is better for long-term wealth creation.

H_1 (Alternative Hypothesis):
Investors with more experience are more likely to prefer Lump Sum investments, while less experienced investors tend to favor SIP for long-term wealth creation.

		Which investment method do you believe is better for long-term wealth creation?				
		Systematic Investment Plan (SIP)	Lump Sum(invest one time)	Depends on market conditions	No opinion	Total
	Less than 1 years	16	4	4	9	33
Investment Experience (Years)	1 years to 3 years	51	10	16	14	91
	3 years to 6 years	16	9	13	7	45
	6 years to 9 years	5	3	5	0	13
Total		88	26	38	30	182

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.990[a]	9	.091
Likelihood Ratio	16.416	9	.059
Linear-by-Linear Association	.051	1	.821
N of Valid Cases	182		

The Pearson Chi-Square value is 14.990 with 9 degrees of freedom (df) and a p-value of 0.091.

1. p-value (0.091) > 0.05 → Fail to Reject the Null Hypothesis (H_0)

This means that there is no statistically significant relationship between investment experience and belief about the best investment method for long-term wealth creation at the 5% significance level.

2. Likelihood Ratio (16.416, p = 0.059)

This is slightly closer to significance, but still above the 0.05 threshold.

If a more relaxed significance level (like 10% or 0.10) was considered, we might argue there is some weak evidence of a relationship.

3. Linear-by-Linear Association (p = 0.821)This suggests no clear linear trend between experience and investment preference.

Accept H_0 (Null Hypothesis): There is no statistically significant relationship between investment experience and belief about the best investment method for long-term wealth creation.

TEST 3

H_0 (Null Hypothesis): There is no significant relationship between an individual's monthly income and their risk tolerance.

H_1 (Alternative Hypothesis): Higher monthly income is associated with higher risk tolerance, meaning individuals with higher incomes are more likely to describe themselves as aggressive investors, while those with lower incomes are more conservative.

		How would you describe your risk tolerance?			Total
		Conservative (Low risk, low return)	Moderate	Aggressive (High risk, high return)	
Monthly income	Less than 25000	20	18	2	40
	25000to 50000	25	11	6	42
	50000 to 100000	28	20	11	59
	100000 to 200000	15	9	11	35
	More than 200000	0	2	3	5
Total		88	60	35	182

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.162[a]	8	.028
Likelihood Ratio	18.351	8	.019
Linear-by-Linear Association	7.688	1	.006
N of Valid Cases	182		

Key Observations:

1. Lower Income Groups Prefer Conservative Investments:
    - Among those earning less than ₹25,000, 20 out of 41 (≈49%) describe themselves as conservative.

- Similarly, in the ₹25,000–₹50,000 group, 25 out of 42 (≈60%) are conservative.

2. Higher Income Groups Are More Risk-Tolerant:
   - In the ₹50,000–₹1, 00,000 category, risk-taking increases: 12 out of 60 (20%) are aggressive investors.
   - Among those earning ₹1, 00,000–₹2, 00,000, 11 out of 35 (≈31%) are aggressive investors.
   - The highest-income group (>₹2, 00,000) has 3 out of 5 (60%) identifying as aggressive investors.
3. Moderate Risk-Takers Are Spread Evenly:
   - Across all income groups, moderate risk tolerance is fairly distributed.
   - The ₹50,000–₹1, 00,000 income range has the highest number of moderate investors (20 out of 60).

Chi-Square Test Analysis: Monthly Income vs. Risk Tolerance

1. Pearson Chi-Square Value = 17.162, df = 8, p = 0.028
2. Likelihood Ratio = 18.351, p = 0.019
3. Linear-by-Linear Association = 7.688, p = 0.006

The p-value for the Pearson Chi-Square test (0.028) is less than 0.05, indicating a statistically Significant relationship between Monthly Income and Risk Tolerance. The Linear-by-Linear Association (p = 0.006) suggests a clear trend where risk tolerance increases with higher income.

Reject the Null Hypothesis (H_0): There is a significant association between monthly income and Risk tolerance. Higher-income individuals tend to have higher risk tolerance, while lower-income individuals prefer conservative investments.

Findings

- Young Investors (18–35 years) are more active in mutual fund investments, especially through SIPs.
- Male respondents dominate the survey, and gender significantly influences risk perception and investment preferences.

- Graduates and postgraduates show higher awareness and participation in mutual fund investments.
- Salaried and self-employed individuals are the most active investor categories in mutual funds.
- Middle-income groups (₹50,000–₹100,000) are the most engaged, and income significantly affects investment behavior and risk tolerance.
- Most respondents (50%) have 1–3 years of investment experience, showing that mutual funds are popular among relatively new investors.
- Mutual funds (70.2%) and stock market (57.4%) are the most preferred investment avenues among the sample.
- Long-term wealth creation (57.8%) is the primary investment objective, followed by regular income and short-term goals.
- Risk Tolerance: Most investors identify as conservative (49%), especially those with lower income. Risk appetite increases with income.
- SIP is considered less risky and more suitable for long-term investment by a majority of respondents.
- Lump sum investment is more favored by investors with higher income and greater market confidence.
- Income and gender significantly influence opinions on risk, long-term wealth creation, and expected returns—occupation does not.
- Investment experience does not significantly influence whether one prefers SIP or Lump Sum for long-term wealth creation.
- Higher-income groups are more likely to be aggressive investors and prefer Lump Sum investments for faster capital growth.

Systematic Investment Plan (SIP) is considered a better method for long-term wealth creation for the majority of investors in this study. It offers consistent returns, reduces risk through rupee cost averaging, and suits a wide range of income levels and risk profiles. SIP also helps inculcate financial discipline and is ideal for individuals with limited market knowledge or a conservative approach to investing.

On the other hand, **Lump Sum investment**, while potentially offering higher returns in bullish market conditions, is best suited for experienced and high-income investors who can handle short-term volatility and time their investments effectively. SIP vs. Lump Sum ultimately comes down to the investor's income, risk tolerance, and market knowledge.

Conclusion

According to the analysis and results, Systematic Investment Plans (SIPs) are preferred by most investors for long-term wealth buildup because of their systematic approach, Risk mitigation through rupee cost averaging, and ease of regular investing. SIPs are especially suitable for individuals with limited market knowledge, moderate to low income, and conservative risk profiles. The survey indicates that SIPs are more popular among young investors and salaried individuals who prefer a stable and gradual investment strategy.

Lump Sum investment, although riskier, is preferred by investors with higher income levels and greater risk appetite. It offers the potential for higher returns if the market is timed correctly. However, this method is suitable only for those who have sufficient capital to invest at once and are confident in their understanding of market trends. The study also shows that gender and income significantly influence perceptions of risk and return expectations, while occupation and investment experience have a lesser impact. While SIP is widely accepted as the more favorable method for long-term wealth creation due to its consistent returns and ability to manage risk across varying income levels, Lump Sum investment still holds value for certain investors. It is more suitable for experienced individuals with high income and the ability to handle short-term market volatility. Ultimately, the decision between SIP and Lump Sum depends on the investor’s financial goals, income stability, risk appetite, and overall understanding of the market.

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A comparative analysis of Environmental Accounting and reporting practices: A case study of SUN Pharma and CIPLA Ltd.

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Abstract

The pharmaceutical industry, integral to global healthcare, faces increasing pressure to address its environmental footprint through robust accounting and reporting practices. This study conducts a comparative analysis of the environmental accounting and reporting practices of two leading Indian pharmaceutical companies, Sun Pharma and Cipla Ltd., utilizing secondary data sourced from their sustainability reports, annual disclosures, and industry frameworks. The research evaluates the adoption of global standards such as the Global Reporting Initiative (GRI) and the Carbon Disclosure Project (CDP), focusing on key environmental metrics including greenhouse gas emissions, energy consumption, water management, and waste reduction. It examines the structure, transparency, and frequency of their environmental disclosures, highlighting how each company integrates environmental

accounting into its strategic framework. The findings reveal distinct approaches: Sun Pharma emphasizes detailed quantitative metrics with a focus on renewable energy adoption, while Cipla prioritizes narrative-driven reports highlighting community-focused environmental initiatives. The study identifies strengths, such as Sun Pharma's data granularity, and weaknesses, including Cipla's limited disclosure of scope-specific emissions. By comparing their practices, the paper uncovers gaps in standardization and transparency, offering insights into how these firms align with global sustainability goals amidst India's regulatory landscape. This analysis contributes to understanding the role of environmental accounting in enhancing corporate accountability in the pharmaceutical sector, emphasizing the need for consistent, accessible, and comprehensive reporting to address stakeholder expectations and environmental challenges effectively.

Keywords: *Environmental Accounting, Environmental Reporting, Sun Pharma, Cipla Ltd., Pharmaceutical Industry.*

1. INTRODUCTION

Environmental accounting and reporting have emerged as critical tools for organizations to demonstrate their commitment to sustainable practices and transparency in addressing environmental impacts. In the pharmaceutical industry, where production processes and supply chains significantly affect the environment, adopting robust environmental accounting practices is essential for regulatory compliance and stakeholder trust. This study conducts a comparative analysis of the environmental accounting and reporting practices of two leading Indian pharmaceutical companies, Sun Pharma and Cipla Ltd. Utilizing secondary data from annual reports, sustainability disclosures, and other publicly available documents, the research examines how these companies integrate environmental considerations into their financial and non-financial reporting. By evaluating their approaches to environmental cost measurement, disclosure of ecological impacts, and adherence to global sustainability standards, this paper aims to highlight best practices and identify gaps in their environmental accountability frameworks. The findings seek to contribute to the broader discourse on sustainable business practices in the pharmaceutical sector, offering insights for policymakers, industry stakeholders, and researchers.

1.1 Background of the Study

Environmental accounting and reporting have emerged as critical tools for organizations to address growing global concerns about sustainability and environmental responsibility. With increasing regulatory pressures, stakeholder expectations, and public awareness of climate change, industries, particularly pharmaceuticals, face scrutiny for their environmental impact due to resource-intensive operations and waste generation. In India, where the pharmaceutical sector is a significant economic contributor, companies like Sun Pharma and Cipla Ltd. Play a pivotal role in adopting sustainable practices. This study focuses on comparing the environmental accounting and reporting practices of these two leading pharmaceutical firms, utilizing secondary data to evaluate their approaches to environmental disclosure, compliance with regulations, and integration of sustainability metrics. By analyzing their practices, the research aims to highlight strengths, identify gaps, and provide insights into how these companies contribute to environmental accountability in a rapidly evolving regulatory and social landscape.

1.2 Relevance of Environmental Accounting in India's Pharmaceutical Industry

Environmental accounting is increasingly vital in India's pharmaceutical industry due to its significant environmental footprint, including high water consumption, chemical waste, and energy-intensive processes. It enables companies like Sun Pharma and Cipla Ltd. To systematically measure, monitor, and report environmental costs and impacts, fostering sustainable practices. By integrating environmental costs into financial frameworks, these firms can enhance resource efficiency, comply with stringent regulations, and meet stakeholder expectations for transparency. This practice supports risk management, improves corporate reputation, and aligns with India's sustainability goals, contributing to long-term ecological and economic resilience in the sector.

1.3 Need for Comparative Analysis between Sun Pharmaceutical Industries Ltd. and Cipla Ltd.

The comparative analysis of environmental accounting and reporting practices between Sun Pharmaceutical Industries Ltd and Cipla Ltd is essential to understand how these leading Indian pharmaceutical companies address environmental sustainability. As major players in a rapidly growing industry projected to reach $130 billion by 2030, both companies face

increasing regulatory and societal pressures to adopt sustainable practices. Comparing their approaches to environmental accounting such as resource consumption, waste management, and carbon footprint tracking highlights their commitment to environmental stewardship and compliance with global standards. This analysis also reveals differences in their reporting transparency, stakeholder engagement, and integration of environmental strategies into business operations. By examining these aspects, the study provides insights into best practices, identifies gaps, and offers valuable lessons for the pharmaceutical sector to enhance environmental accountability and contribute to sustainable development.

1.4 Statement of the Problem

The growing emphasis on environmental sustainability has increased the need for robust environmental accounting and reporting practices in the corporate sector. However, the extent to which pharmaceutical companies in India, such as Sun Pharma and Cipla Ltd., integrate environmental accounting principles and transparently report their environmental impacts remains underexplored. Variations in reporting standards, data consistency, and disclosure quality may hinder stakeholders' ability to assess these companies' environmental performance accurately. This study seeks to examine the differences in environmental accounting and reporting practices between Sun Pharma and Cipla Ltd., identifying gaps, compliance levels, and the effectiveness of their disclosures in addressing environmental concerns, using secondary data to provide insights into their sustainability efforts.

1.5 Objectives of the Study

1) Evaluate Sun Pharma and Cipla Ltd.'s environmental accounting frameworks for ecological impact management.

2) Compare transparency and compliance in environmental reporting practices of Sun Pharma and Cipla Ltd.

3) Identify similarities and differences in environmental performance metrics reported by both companies.

4) Assess alignment of Sun Pharma and Cipla Ltd.'s environmental disclosures with global sustainability standards.

5) Examine regulatory and market influences on environmental accounting practices of the two firms.

1.6 Research Questions

1) How do Sun Pharma and Cipla Ltd. Differ in embedding environmental accounting in their financial reports?
2) What environmental performance metrics do Sun Pharma and Cipla Ltd. Disclose in their sustainability reports?
3) To what extent do Sun Pharma and Cipla Ltd. Align with global environmental reporting standards like GRI or TCFD?
4) How do Sun Pharma and Cipla Ltd.'s environmental accounting practices meet regulatory and stakeholder demands?
5) What differences exist in the transparency of environmental cost reporting between Sun Pharma and Cipla Ltd.?

1.7 Significance of the Study

The significance of this study lies in its examination of environmental accounting and reporting practices within the Indian pharmaceutical industry, focusing on Sun Pharma and Cipla Ltd. By analyzing secondary data, the research highlights how these companies integrate environmental considerations into their financial and operational frameworks, shedding light on their sustainability efforts. It contributes to understanding the role of environmental accountability in corporate decision-making, offering insights for stakeholders, policymakers, and industry peers to enhance sustainable practices and regulatory compliance in the pharmaceutical sector.

1.8 Scope of the Study

This study focuses on analyzing the environmental accounting and reporting practices of Sun Pharma and Cipla Ltd., two leading pharmaceutical companies in India. It examines their environmental disclosures, sustainability initiatives, and compliance with relevant regulatory frameworks based on secondary data from annual reports, sustainability reports, and other publicly available documents. The research compares their approaches to environmental accountability, highlighting best practices, gaps, and areas for improvement. The scope is limited to data available up to the study period, excluding primary data or real-time operational insights. The findings aim to contribute to understanding corporate environmental responsibility in the pharmaceutical sector.

2. REVIEW OF LITERATURE

1) **(Mulchandani, Mulchandani, & Vishnani, 2023)** The study examined the implications of COVID- 19 and Indian data to see if ESG reporting affected profitability. The study was tenacious in its exploration of how ESG reporting affects the calibre of earnings. All of the research's foundation was secondary data. The study's sample size comprised three hundred organisations that were listed on the Nifty 50. The study's time frame was 2015–2020. To analyse the data, regression analysis was employed. ESG has no effect on the quality of discretionary wages, the study's findings indicate. Additionally, ESG and earnings quality improved in the fiscal year that ended when the outbreak struck the market.
2) **(Sachdeva & Taneja , 2023)** In order to determine the factors impacting the adoption of lean and green manufacturing techniques in Indian enterprises and to suggest a framework for further research, the study looked into these practices. 180 business diligences were gathered using exploratory factor analysis and dependability. Governments and corporations can use the data to create sustainable models and promote a greener society.
3) **(Soshte, 2023)** India's environmental accounting and reporting are examined in the study. Apart from showcasing different methods, guidelines, and future developments for environmental accounting and reporting in India, the study aimed to investigate the benefits and favourable outcomes of its application. The study used descriptive research as a charitable endeavour. Secondary sources served as the investigation's cornerstone. Future trends, such as the inclusion of ESG considerations, technology-driven reporting, and a focus on the ideas of the circular economy, reflect a dynamic and evolving environment, according to the study's results. In the future, stakeholder involvement, legal changes, and the connection to sustainable financing will all have a significant impact on how environmental reporting evolves.
4) **(Bala, 2022)** The relationship between green practices and the market value of Indian enterprises was examined in this study. Using multiple regression analysis, the relationship between market value and green score was examined for a sample of 195 businesses. According to the findings, market valuation and the green practices of Indian

businesses are positively and statistically significantly correlated.

5) **(Karlapudi & Reddy, 2022)** The ESG disclosure policies of Indian electricity firms are compared in this study. The study's objective was still to determine which ESG factors a sample of Indian power firms revealed the most and the least. The study's foundation is a comparative study of five private and uncontrolled power production businesses in India. From 2019 to 2022, the sustainability and ESG reports of the sample corporations were still analysed using "content analysis." The analysis's conclusions show that India's public and private sector power providers differ significantly in their ESG disclosure policies.
6) **(PwC Global, 2021)** A global ESG reporting survey revealed that only 25% of pharma companies fully aligned with TCFD recommendations, particularly in climate risk disclosures. The report recommended increasing Scope 3 emissions reporting and board-level ESG oversight to meet stakeholder expectations.
7) **(UNEP FI, 2020)** The United Nations Environment Programme's Finance Initiative found that pharmaceutical companies globally are lagging behind in water risk disclosures and biodiversity impact assessments. The report calls for integration of nature-related financial disclosures (TNFD) along with GRI standards to ensure ecosystem protection.
8) **(Eccles & Krzus, 2018)** This global study highlighted the importance of integrated reporting for enhancing transparency in ESG disclosures. It found that firms aligned with GRI and TCFD frameworks received higher investor trust, particularly in sectors with significant environmental impact, such as pharmaceuticals and energy.

3. RESEARCH GAP

While existing studies on environmental accounting and reporting practices provide insights into corporate sustainability, there is limited research comparing these practices within the Indian pharmaceutical sector, specifically between leading firms like Sun Pharma and Cipla Ltd. Most prior work focuses on global or cross-industry contexts, overlooking sector-specific nuances and regional regulatory frameworks. Additionally, there is a lack of in-depth analysis using secondary data to evaluate how these companies align their environmental reporting with global standards like GRI or TCFD, and how their practices influence

stakeholder perceptions and financial performance. This study aims to address these gaps by examining the distinct approaches of Sun Pharma and Cipla Ltd. In environmental accounting and their implications within the Indian context.

4. RESEARCH METHODOLOGY

4.1 Nature of the Study

This study adopts a descriptive and analytical approach to examine the environmental accounting and reporting practices of Sun Pharma and Cipla Ltd. It aims to describe the extent and nature of environmental disclosures while critically analyzing their alignment with global standards and frameworks.

4.2 Research Approach

The research employs a mixed-method approach, integrating qualitative and quantitative content analysis. Qualitative analysis focuses on interpreting the narrative and thematic elements of environmental disclosures, while quantitative analysis measures the frequency, scope, and quality of reported environmental metrics.

4.3 Data Sources

The study relies exclusively on secondary data, collected from the following sources:

1) **Annual Reports:** Financial and non-financial disclosures from Sun Pharma and Cipla Ltd.
2) **Sustainability/CSR Reports:** Documents detailing environmental initiatives and performance.
3) **Company Websites:** Official environmental policies and sustainability commitments.
4) **Public Filings:** Regulatory submissions to SEBI, MCA, and GRI databases for compliance and transparency data.
5) **Academic Journals and Articles:** Peer-reviewed publications to contextualize industry practices and standards.

4.4 Period of the Study

The analysis covers a five-year period from 2019-20 to 2023-24, allowing for a comprehensive evaluation of trends and changes in environmental reporting practices over time.

4.5 Parameters of Comparison

The study compares Sun Pharma and Cipla Ltd. Based on the following parameters:

1) **Environmental Disclosure Index (EDI):** A customized index to assess the comprehensiveness and quality of environmental disclosures.
2) **Environmental Key Performance Indicators (KPIs):** Metrics such as carbon emissions, energy consumption, water usage, and waste management.
3) **Compliance with GRI and SDGs:** Adherence to Global Reporting Initiative (GRI) standards and alignment with Sustainable Development Goals (SDGs).

4.6 Tools Used

The following tools facilitate the analysis:

1) **Content Analysis:** Systematic coding and categorization of textual and numerical data to identify patterns and themes in environmental reporting.
2) **Comparative Tables:** Structured tables to juxtapose disclosure practices and KPIs between Sun Pharma and Cipla Ltd.

5. COMPANY AND INDUSTRY OVERVIEW

5.1 Indian Pharmaceutical Industry and Environmental Impact

The Indian pharmaceutical industry is a global leader, ranking third in production volume and fourteenth in value, with a market size projected to reach $130 billion by 2030 and $450 billion by 2047. Comprising approximately 3,000 drug companies and 10,500 manufacturing units, it is a vital contributor to global healthcare, offering affordable generic medicines. However, the sector faces significant environmental challenges due to its resource-intensive operations. Pharmaceutical manufacturing generates substantial waste, including hazardous by-products, and contributes to high carbon emissions, with the industry producing 48.55 tonnes of CO2 equivalent per $1 million earned— 55% higher than the automotive sector. Emissions are projected to triple by 2050 if unchecked, driven by energy-intensive processes, water usage, and supply chain impacts. Additionally, pharmaceutical residues in waterways pose ecological risks, necessitating robust environmental accounting and reporting to align with global sustainability goals like the Sustainable Development Goals (SDGs) and Global Reporting Initiative (GRI) standards.

5.2 Company Profiles

5.2.1 Sun Pharmaceutical Industries Ltd.

Founded in 1983 and headquartered in Mumbai, Sun Pharma is one of India's largest pharmaceutical companies, with operations in over 100 countries and 43 manufacturing facilities worldwide. Its product portfolio includes specialty and generic drugs across psychiatry, cardiology, oncology, and dermatology. In FY 2023–24, it reported revenue of ₹48,496.9 crore (US$5.8 billion), with a strong global market presence.

5.2.2 Cipla Ltd.

Established in 1935 and also headquartered in Mumbai, Cipla operates in more than 85 countries, with a notable presence in India, Africa, and North America. With 47 global manufacturing facilities, Cipla produces over 50 dosage forms across therapeutic areas including respiratory, cardiovascular, and antiretroviral drugs. In FY 2023–24, its revenue stood at ₹25,455 crore (US$3.06 billion).

5.3 ESG and Sustainability Priorities of Both Companies

Both companies have integrated ESG principles into their operations but with different emphases.

Sun Pharma has achieved a 44% reduction in water intensity (since 2020), increased renewable energy usage, and focuses on reducing hazardous waste through innovation. Its sustainability disclosures follow the GRI framework and are externally verified, aligned with SDGs and India's BRSR mandates.

Cipla Ltd., on the other hand, is more aggressive in renewable energy adoption (34% of total energy), emphasizes water neutrality, and runs strong community-based environmental programs. While Cipla aligns with GRI and SDGs, some disclosures remain narrative-based and lack third-party assurance.

6. ENVIRONMENTAL ACCOUNTING AND REPORTING PRACTICES– INDIVIDUAL ANALYSIS

6.1 SUN PHARMA

6.1.1 Environmental Policy and Mission

Sun Pharmaceutical Industries Ltd. Emphasizes sustainable operations through a structured environmental policy focused on reducing ecological impact and promoting responsible

resource management. The company's mission integrates environmental stewardship with business objectives, prioritizing compliance with regulations and long-term sustainability.

6.1.2 Emissions and Waste Management Disclosures

Sun Pharma discloses data on greenhouse gas (GHG) emissions and waste management in its annual sustainability reports. It tracks Scope 1 and Scope 2 emissions, aiming to reduce carbon footprints through process optimization. Waste management practices include segregation, recycling, and safe disposal, with efforts to minimize hazardous waste generation from manufacturing.

6.1.3 Resource Use and Energy Efficiency

The company invests in energy-efficient technologies, such as upgrading manufacturing equipment and adopting renewable energy sources. Water conservation measures, including recycling and rainwater harvesting, are implemented to optimize resource use, particularly in water-stressed regions.

6.1.4 CSR/ESG Initiatives

Sun Pharma's Corporate Social Responsibility (CSR) and Environmental, Social, and Governance (ESG) initiatives include community-based environmental programs, such as afforestation and pollution control projects. It aligns its efforts with global sustainability goals, focusing on reducing environmental impact and enhancing stakeholder trust.

6.1.5 Reporting Frameworks Used

Sun Pharma adheres to globally recognized frameworks like the Global Reporting Initiative (GRI) and Business Responsibility and Sustainability Reporting (BRSR) mandated by Indian regulations. It also aligns its disclosures with the Sustainable Development Goals (SDGs), emphasizing transparency in environmental performance metrics.

6.2 CIPLA LTD.

6.2.1 Environmental Policy and Sustainability Goals

Cipla Ltd. Has a robust environmental policy centered on sustainable development and climate action. Its sustainability goals include reducing carbon emissions, promoting renewable energy, and ensuring responsible waste management, with a commitment to achieving net-zero emissions in the long term.

6.2.2 Reporting on Emissions, Energy, and Waste

Cipla provides detailed disclosures on emissions, energy consumption, and waste management in its sustainability reports. It monitors Scope 1, Scope 2, and select Scope 3 emissions, with initiatives to lower energy intensity. Waste reduction strategies focus on recycling, reusing materials, and managing pharmaceutical waste responsibly to prevent environmental harm.

6.2.3 Environmental Projects/Initiatives

Cipla undertakes projects like renewable energy adoption (e.g., solar and wind power) and water stewardship programs to address local environmental challenges. Community-driven initiatives, such as tree plantation and clean water access, reflect its commitment to environmental and social impact.

6.2.4 Reporting Standards Followed

Cipla follows the Global Reporting Initiative (GRI) framework for structured environmental reporting and complies with India's Business Responsibility and Sustainability Reporting (BRSR) requirements. Its sustainability efforts are aligned with the SDGs, ensuring comprehensive and comparable disclosures.

7. COMPARATIVE ANALYSIS

This section provides a compact comparative examination of environmental accounting and reporting between Sun Pharmaceutical Industries Ltd. and Cipla Ltd., based on publicly available secondary data from annual and sustainability reports.

7.1 Environmental Disclosure Index (EDI) Comparison

The Environmental Disclosure Index (EDI) is developed using selected parameters like emissions reporting, waste management, water conservation, and energy disclosures. Sun Pharma achieved a relatively higher index score due to detailed and regular disclosures, while Cipla's reporting was consistent but somewhat less comprehensive.

Company	EDI Score (out of 100)	Disclosure Highlights
Sun Pharma	82	Provides comprehensive ESG disclosures with GRI alignment, numerical KPIs, and performance trends
Cipla Ltd.	71	Offers integrated sustainability details within the annual report, but lacks some depth in KPI breakdown

(Sources: Annual Reports)

7.2 Environmental KPI Performance Comparison

This point compares key performance indicators related to environmental sustainability. Though both companies demonstrate commitment, their strengths vary across specific indicators.

Environmental KPI	Sun Pharma	Cipla Ltd.
GHG Emission Intensity (tons CO_2e per unit)	Lower intensity; improved reduction per unit produced	Slightly higher intensity; stable but slower reduction pace
Water Use Efficiency (kiloliters per unit)	Uses more water per unit due to complex operations	More efficient water usage across manufacturing sites
Renewable Energy Share (%)	Moderate use of renewable sources (21% of total energy mix)	Higher adoption of green energy, constituting 34% of total consumption
Hazardous Waste Reduction (Year-on- Year %)	Achieved a 6% reduction year- over-year through improved waste handling processes	Reduced by 4% with selective implementation of waste segregation methods
Energy Consumption per Unit (in MJ)	135 Mega joules per unit; more optimized in terms of energy management	148 Mega joules per unit; slightly higher due to older infrastructure

(Sources: Annual Reports)

7.3 Compliance with Global Reporting Frameworks

Both companies align their environmental disclosures with global standards. However, the depth and frequency differ.

Global Framework / Standard	Sun Pharma	Cipla Ltd.
GRI (Global Reporting Initiative)	Fully aligned with GRI Standards; includes index mapping in reports	Partially aligned; refers to GRI principles but lacks mapping or full alignment
SASB (Sustainability Accounting Standards Board)	Selective indicators from SASB referenced in ESG disclosures	SASB framework not explicitly mentioned in disclosures
TCFD (Climate-related Financial Disclosures)	Partially aligned; climate risks acknowledged with limited strategy details	Mentions climate impact areas but lacks structured TCFD-aligned disclosure
ESG Assurance (Third-party Verification)	Environmental data assured by third-party auditors with limited assurance report	No independent verification or external ESG assurance reported

(Sources: Annual Reports)

7.4 Quality and Depth of Environmental Reporting

The quality of environmental reporting was assessed based on criteria such as data assurance, visual presentation, goal setting, and narrative depth. Sun Pharma's disclosures were broader and visually richer, whereas Cipla's were more integrated within its financial reports.

Assessment Criteria	Sun Pharma	Cipla Ltd.
Availability of Quantitative KPIs	Detailed numerical indicators for emissions, energy, water, and waste presented year-wise	Some indicators provided, mostly in cumulative form or percentage changes
Year-on-Year Performance Trends	Clear trend lines with multi-year comparative data included	Trend data is provided occasionally and not consistent across all indicators

Use of Visuals (Graphs, Charts, Infographics)	Uses various visual elements to simplify complex environmental data	Heavily narrative; limited use of visuals or infographics
External Assurance of Reports	Environmental disclosures reviewed by third parties; assurance scope stated	No assurance provider or audit scope mentioned
Long-Term Environmental Vision	Net Zero target announced for 2040; roadmap and milestones identified	Broad sustainable development goals mentioned; no defined roadmap or measurable milestones

(Sources: Annual Reports)

7.5 Comparative Summary Table

Comparison Dimension	Sun Pharma	Cipla Ltd.
Environmental Disclosure Index (EDI)	82 – Comprehensive, ESG-focused with full KPI and GRI integration	71 – Integrated into annual report with some missing disclosures
GHG Emission Intensity	Lower intensity due to improved energy and emissions technology	Slightly higher intensity; reduction progress is moderate
Renewable Energy Adoption (%)	Moderate – 21% of total energy usage from renewable sources	High – 34% of total energy mix from renewables
GRI Compliance	Full GRI adherence with detailed indicator mapping	Partial adherence without structured indicator disclosure
ESG Assurance by Third Party	Yes – External audit included for sustainability metrics	No – No third-party verification reported
Sustainability Report Format	Standalone ESG/Sustainability Report published annually	Sustainability content embedded within the Integrated Annual Report

(Sources: Annual Reports)

7.6 Global Framework Compliance Matrix: GRI, SASB, and TCFD

To provide a more structured and visual comparison of how Sun Pharmaceutical Industries Ltd. and Cipla Ltd. comply with global sustainability frameworks, the following matrix summarizes their alignment with key indicators from the Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), and Task Force on Climate-related Financial Disclosures (TCFD).

7.6.1 GRI Framework Comparison

GRI Indicator	Sun Pharma	Cipla Ltd.
GRI 302 – Energy Use	Fully disclosed with energy source breakdown and year-on-year data.	Disclosed in narrative form; lacks detailed breakdown.
GRI 303 – Water Use	Reported with efficiency targets and regional conservation data.	Reported; mentions water neutrality goal, fewer specifics.
GRI 305 – GHG Emissions	Discloses Scope 1 & 2 emissions with reduction trends.	Discloses Scope 1, 2, and limited Scope 3.
GRI 306 – Waste Management	Covers hazardous/non-hazardous waste, disposal, and reduction.	Focuses on pharma waste, some recycling strategies outlined.
GRI Index Table in Report	Included with detailed mapping.	Not included; references only selected indicators.

(Sources: Annual Reports)

7.6.2 SASB Framework Comparison

SASB Topic	Sun Pharma	Cipla Ltd.
Energy Management	Describes reduction initiatives and renewable energy percentage.	Briefly mentioned; no standard SASB metric used.
Water & Wastewater Management	Detailed disclosures by facility and risk zones.	General description of initiatives without SASB mapping.

GHG Emissions & Air Quality	Provides intensity ratios; some alignment with SASB metrics.	Emission goals stated but not SASB-formatted.
Employee Health & Safety	Strong focus with injury rates disclosed.	Focused on training and well- being; lacks quantifiable data.
Product Lifecycle Impact	Minimal coverage in SASB format.	Some efforts on packaging and green chemistry noted.

(Sources: Annual Reports)

7.6.3 TCFD Framework Comparison

TCFD Pillar	Sun Pharma	Cipla Ltd.
Governance	ESG oversight by Board-level committee disclosed.	ESG policies mentioned, but governance structure not detailed.
Strategy	Identifies climate risks and Net Zero by 2040 roadmap.	Climate goals stated, but lacks scenario planning.
Risk Management	Discusses physical and transitional climate risks.	General environmental risk narrative, no formal structure.
Metrics & Targets	GHG metrics, water targets, and energy goals reported.	Provides some KPIs, but no TCFD- specific target linkage.
External Assurance	Yes – third-party limited assurance provided.	No independent assurance disclosed.

(Sources: Annual Reports)

This matrix demonstrates that while both companies show commitment to environmental responsibility, Sun Pharma maintains higher alignment and disclosure transparency compared to Cipla Ltd., especially regarding external assurance, metric-based reporting, and framework mapping.

8. Key Findings and Discussion

Sr. No.	Aspect	Sun Pharma	Cipla Ltd.	Comparative Insight
1	**Data Summary**	Strong emphasis on sustainability disclosures in annual reports. Uses GRI standards and detailed emission metrics.	Focuses on sustainable manufacturing and energy efficiency. Disclosures less detailed than Sun Pharma.	Sun Pharma has a more structured and quantified approach; Cipla is more operationally driven in disclosures.
2	**Reporting Approach**	Follows integrated reporting with global frameworks like GRI and SDG references. ESG section is more standardized.	Provides environmental info within CSR section, loosely referencing frameworks. Less integration of ESG benchmarks.	Sun Pharma uses a more formal and standardized reporting model, while Cipla adopts a narrative-based approach.
3	**Company Philosophy & Structure**	Corporate governance and top-level ESG leadership drive consistent reporting. Structured sustainability department.	Sustainability is embedded in operations but lacks a centralized ESG unit. Reporting led by CSR division.	Differences stem from internal structure: centralized vs. integrated reporting philosophy.
4	**Stakeholder Implications**	Investors get clear ESG metrics for decision-making. Better alignment with global expectations.	Society and local communities are prioritized, but investor-focused disclosures are limited.	Sun Pharma is investor-aligned; Cipla is more community-focused. Regulators may push Cipla for higher disclosure compliance.

(Sources: Annual Reports)

9. Limitations of the study

1) **Data Constraints:** The study relies on secondary data, such as annual reports and sustainability disclosures, which may lack completeness or consistency, limiting the depth of analysis for Sun Pharma and Cipla Ltd.
2) **Time Frame Restriction:** The analysis may cover a specific period, potentially missing long-term trends or recent shifts in environmental reporting practices.
3) **Geographic and Sectorial Bias:** The findings may be influenced by India-specific regulations and pharmaceutical industry dynamics, reducing generalizability to other regions or sectors.
4) **Lack of Primary Data:** Absence of direct stakeholder inputs (e.g., interviews with company executives) may limit insights into internal motivations or challenges.
5) **Standardization Issues:** Variations in reporting frameworks (e.g., GRI, SASB) used by Sun Pharma and Cipla may hinder direct comparisons.

10. Recommendations for improving environmental reporting

1) **Adopt Standardized Frameworks:** Both companies should align with global standards like GRI or ISSB to enhance comparability and transparency in environmental disclosures.
2) **Enhance Scope 3 Reporting:** Focus on comprehensive reporting of Scope 3 emissions (e.g., supply chain, product lifecycle) to reflect the full environmental impact.
3) **Leverage Technology:** Use AI and data analytics to improve the accuracy and efficiency of environmental data collection and reporting.
4) **Increase Stakeholder Engagement:** Regularly involve stakeholders (investors, communities) to ensure disclosures address their expectations and build trust.
5) **Transparent Metrics:** Disclose specific, quantifiable environmental KPIs (e.g., carbon footprint, water usage) to demonstrate progress and accountability.

11. Suggestions for policymakers and regulators

1) **Mandate ESG Reporting:** Enforce mandatory, standardized environmental, social, and governance (ESG) reporting for pharmaceutical companies to ensure consistency.
2) **Incentivize Sustainability:** Offer tax benefits or subsidies for firms adopting

robust environmental accounting practices.

3) **Strengthen Compliance Monitoring:** Establish regulatory bodies to audit and verify environmental disclosures, ensuring credibility.
4) **Promote Sector-Specific Guidelines:** Develop tailored sustainability reporting standards for the pharmaceutical industry, addressing unique challenges like waste management.
5) **Support Capacity Building:** Provide training and resources to help companies, especially smaller ones, implement effective environmental reporting systems.

12. Suggestions for future research

1) **Cross-Industry Comparisons:** Study environmental reporting practices across other high-impact sectors (e.g., chemicals, textiles) to identify best practices.
2) **Longitudinal Analysis:** Conduct long-term studies to track the evolution of Sun Pharma and Cipla's environmental reporting and its impact on performance.
3) **Stakeholder Perspectives:** Incorporate primary data from stakeholders to understand the effectiveness of current reporting practices.
4) **Impact of Regulations:** Investigate how mandatory ESG regulations influence reporting quality and financial outcomes in the pharmaceutical sector.
5) **Technology Integration:** Explore the role of emerging technologies (e.g., block chain, AI) in enhancing the accuracy and transparency of environmental accounting.

Conclusion

The comparative analysis of Sun Pharma and Cipla Ltd. Reveals distinct approaches to environmental accounting and reporting, shaped by their strategic priorities and regulatory compliance. While both companies demonstrate commitment to sustainability, Sun Pharma appears to emphasize innovation-driven environmental strategies, whereas Cipla focuses on stakeholder trust and broader ESG integration. However, inconsistencies in reporting standards and limited Scope 3 disclosures highlight areas for improvement. The study underscores the need for standardized frameworks, enhanced transparency, and stronger regulatory oversight to align pharmaceutical firms with global sustainability goals. Despite limitations in data availability, the findings suggest that robust environmental reporting can

enhance corporate reputation, reduce financial risks, and support sustainable development in the industry.

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A comparative study on investor preferences between equity and Cryptocurrency for wealth creation in Gujarat

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Abstract

The financial landscape is undergoing a transformation driven by technological advancements, economic shifts, and evolving investor preferences. This research paper delves into a comparative analysis of investor preferences between equity and cryptocurrency investments, aiming to uncover key determinants influencing their choices and shedding light on the factors driving this shift in wealth creation strategies. The study employs a mixed-methods approach, combining quantitative surveys and qualitative interviews to gather

insights from a diverse pool of investors. Through statistical analysis and thematic exploration, the research identifies risk tolerance, investment goals, technological literacy, and socio-economic factors as pivotal in shaping investor decisions. The findings reveal a nuanced landscape where traditional equity investments continue to hold sway among conservative investors seeking stability and long-term growth, while the allure of high returns and decentralization attracts a growing segment towards cryptocurrency. Moreover, the study highlights the role of demographic variables such as age, income, and education in shaping these preferences. The research contributes to a deeper understanding of the evolving investment ecosystem, offering valuable implications for financial advisors, policymakers, and market participants navigating the intersection of traditional and digital assets. By capturing the dynamic interplay of risk, reward, and individual attributes, this study provides actionable insights to inform investment strategies and regulatory frameworks in an era of financial innovation.

Keywords: *Equity market, Cryptocurrency, Investor preference, Risk tolerance, Wealth creation.*

Introduction

Equity markets have undergone significant evolution over the centuries, transitioning from rudimentary, informal trading practices to complex and globally interconnected financial institutions. This evolution has been shaped by a variety of factors, including technological advancements, regulatory changes, economic growth, and the lessons learned from financial crises. The development of equity markets has not only reflected the changing needs of investors but also the broader socio-economic and political landscapes of each period.

Equity trading traces its origins to the 17th century, where it first began to take form in Europe. The concept of raising capital by selling shares of ownership in a company had existed in rudimentary forms earlier, but it was in this period that the formalized trading of equity securities started. One of the earliest and most notable examples is the Dutch East India Company (VOC), founded in 1602. This company offered investors the opportunity to buy shares, which entitled them to dividends based on the company's profits. This marked a crucial

step in the development of modern equity markets, providing a blueprint for future capital raising and market activities. “The primary market is concerned with the issue of new securities, while the secondary market deals with the trading of already issued securities” (Khan, 2011).

In 1602, the Amsterdam Stock Exchange was established, which is widely recognized as the first official stock exchange in history. This innovation provided a more structured and secure environment for the trading of securities compared to earlier, informal methods. The Amsterdam Stock Exchange was pivotal in reducing counterparty risks—risks associated with the failure of one party in a transaction to meet their obligations. By creating an organized platform for share trading, the Amsterdam Stock Exchange laid the groundwork for the development of modern capital markets. It became the foundation for efficient securities trading, allowing investors to buy and sell shares in a standardized manner, thus creating a framework for broader market activity and capital formation. “The Bombay Stock Exchange is Asia’s first stock exchange and plays a vital role in Indian securities trading” (BSE India, 2023).

The Industrial Revolution of the 18th and 19th centuries was a period of rapid economic transformation, during which the need for large amounts of capital grew exponentially. As industries expanded, financing was needed for infrastructure projects like railroads, canals, and factories. Capital markets, which had previously been relatively small and regional, began to expand in response to this growing demand. The proliferation of publicly traded companies during this period was a direct result of the increasing need for investment to fund industrial ventures. Stock exchanges began to multiply, with major exchanges established in Europe and the United States, paving the way for the next stages of market evolution.

“Capital markets are the markets for buying and selling equity and debt instruments. They channel savings and investment between suppliers of capital and users of capital” (Fabozzi, 2002). The development of stock exchanges continued throughout the 19th century. In 1801, the London Stock Exchange (LSE) was officially established, creating standardized rules for trading and ushering in a new era of market structure. This was followed by the formation of the New York Stock Exchange (NYSE) in 1792, which was formally institutionalized with

the signing of the Buttonwood Agreement. These exchanges brought increased transparency, liquidity, and security to the markets, allowing for more efficient price discovery and broader access for investors. During the 20th century, equity markets began to undergo significant technological advancements. One of the most notable shifts occurred in the 1970s with the advent of electronic trading. The first fully electronic exchange, NASDAQ, was launched in 1971, revolutionizing how securities were traded. With computerized systems, trading became faster, more efficient, and more accessible, as investors could now execute trades remotely rather than relying on physical trading floors. The introduction of algorithmic trading in the late 20th century further enhanced market efficiency by automating decision-making processes and executing trades at speeds and volumes previously unimaginable.

The late 20th and early 21st centuries saw the rise of emerging markets, such as those in China, Brazil, and India, which increasingly became integrated into the global financial system. These markets saw the establishment of their own stock exchanges, and as their economies grew, they attracted greater foreign investment. The National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE) in India, for instance, have gained significant prominence and play a key role in global equity markets today. As these emerging markets developed, they provided a new avenue for investment and diversified the global capital markets, creating more opportunities for investors and facilitating the growth of the global economy. “The National Stock Exchange has brought transparency to the Indian capital market by offering a fully automated screen-based electronic trading system” (NSE India, 2023).The stock market crash of 1929, which precipitated the Great Depression, was one of the most significant events in the history of equity markets. The crash was a result of rampant speculation, unsustainable investment practices, and the absence of adequate regulations. It caused widespread economic devastation and highlighted the vulnerabilities of an unregulated financial system. In response to the chaos, the U.S. Securities and Exchange Commission (SEC) was established in 1934, along with various other regulatory reforms aimed at preventing such a disaster from happening again. The introduction of regulations such as the Glass-Steagall Act sought to curb speculation, separate investment and commercial banking activities, and protect investors from the types of financial practices that had contributed to the crisis.

Literature Review

Filinov, Efimov, and Parshakov (2022) investigated how cryptocurrency markets respond to news events using an event study and regression analysis. Their results showed that markets react significantly to news, with positive events producing short-term surges and negative events leading to prolonged downturns. The study concluded that market efficiency remains low, reflecting speculative behavior, and highlighted the importance of sentiment analysis for traders and regulators.

Gupta and Patel (2022) analyzed how demographics affect investment choices between equity and cryptocurrency. Their study showed that younger investors (20–35 years) preferred cryptocurrency for its return potential, whereas older investors preferred equities for stability. Higher education was linked with diversified portfolios combining both asset classes.

Maheshwari and Dave (2022) conducted a comparative risk-return analysis between equities and cryptocurrencies, finding that although cryptocurrencies produced higher returns, equities performed better on a risk-adjusted basis and showed resilience during downturns. The study suggested hybrid strategies to balance risks and rewards.

A comparative study (2021) on cryptocurrencies and equities revealed that cryptocurrencies offered higher returns but were far more volatile than stocks. While equities were preferred for their stability and regulation, younger investors leaned toward cryptocurrencies for quick gains. The findings emphasized that financial advisors must tailor recommendations according to investor age and risk profile.

Shrivastava and Sharma (2021) surveyed Indian investors to evaluate awareness and acceptance of cryptocurrencies. They found that while awareness was high among urban youth, adoption was limited due to regulatory ambiguity, security concerns, and lack of knowledge. The study suggested that improving financial literacy and regulatory clarity would enhance responsible adoption.

Ahmed and Chinnadurai (2021) explored retail investors' motivations for entering cryptocurrency markets and found that quick wealth creation and social media influence were the primary drivers, with limited attention given to risk management. This highlighted the need for investor awareness programs and stricter regulation.

Finally, Desai and Vyas (2021) examined India's regulatory landscape for cryptocurrencies. Their findings revealed inconsistent policies, bans, and unclear tax guidelines as major barriers to adoption. However, recent initiatives such as central bank digital currencies (CBDCs) and tax frameworks indicated a shift toward regulated acceptance, highlighting the need for a comprehensive legal framework.

Sharma and Singh (2020) examined the role of financial literacy in crypto investments and concluded that higher literacy levels are positively associated with rational decisions and diversification. Conversely, low literacy investors tended to rely on trends and emotions, often lacking knowledge of blockchain fundamentals.

Mikhaylov (2019) examined cryptocurrency markets through econometric modeling and time-series analysis, comparing them with traditional assets. The study found that cryptocurrencies are highly volatile and pose risks to financial stability, with limited institutional adoption due to regulatory uncertainty and price fluctuations. The author suggested that policymakers should implement clearer frameworks to reduce speculation and encourage stable integration.

Giglio, Maggiori, Stroebel, and Utkus (2019) developed a structural model to analyze how investor beliefs influence cryptocurrency pricing. They concluded that expectations of future adoption significantly impact prices, often creating a gap between perceived and fundamental values. Investors with higher risk tolerance were found to allocate more to crypto assets, underscoring the role of psychology in valuation.

Liu and Roache (2019) applied Bayesian statistical techniques to cryptocurrency return data. Their findings indicated that Bayesian models outperform traditional prediction methods, but extreme volatility and non-normal return distributions make forecasting difficult. The study suggested that portfolio optimization in crypto markets requires caution due to frequent price shocks.

Laryea, Ababio, Mba, and Byens (2019) showed that investors often overreact to short-term market movements, resulting in herd behavior. Younger investors displayed higher risk tolerance, reinforcing the need for investor education programs to mitigate impulsive decision-making and improve risk management strategies.

Research Methodology

This study adopts a descriptive research design to compare investor preferences between equity and cryptocurrency for wealth creation. The objective is to understand which investment avenue is more popular, identify the level of awareness among investors, and examine how demographic factors influence investment decisions.The research uses both primary and secondary data sources. Primary data has been collected through a structured questionnaire designed to capture investor perceptions, preferences, and behavioural patterns toward equity and cryptocurrency investments. Secondary data has been sourced from research articles, official financial reports, websites of regulatory authorities like SEBI, RBI, NSE, and BSE, and reputed financial databases.

The questionnaire was distributed to respondents across Gujarat through online platforms using Google Forms. A total of 101 responses were received and used for data analysis. The sample comprises a diverse group of individuals across different age groups, occupations, and income brackets. The sampling technique used for data collection is convenience sampling, where respondents were selected based on ease of access and willingness to participate.The study covers various aspects including risk tolerance, investment experience, preferred investment mode (online or offline), factors influencing decision-making (such as returns, volatility, diversification, and market news), and overall satisfaction with past investments.

The collected data has been analysed using statistical tools such as SPSS. Descriptive analysis

was used to understand the profile and preferences of investors. Further, Chi-Square tests were applied to examine associations between demographic variables (like age, income, and occupation) and their investment behavior. Factor analysis was also conducted to identify the underlying variables that influence investor decisions. Duration of the study is 2 months i.e. April and May 2025.

Limitation of the study: The study is based on 101 respondents, which is relatively small for generalizing investor behavior across Gujarat. The research is limited to Gujarat, so findings may not be applicable to investors in other Indian states or at the national/international level.

Research Objectives

1. To identify investor preferences between equity and cryptocurrency for wealth creation in Gujarat.
2. To analyze the influence of demographic factors (such as age, income, occupation, and education) on investor decisions regarding equity and cryptocurrency.
3. To assess the risk perception and return expectations of investors for both asset classes.
4. To evaluate the factors that drive investment decisions, including awareness, accessibility, and market trends.
5. To compare satisfaction levels and usage patterns across investors who prefer equity and those who prefer cryptocurrency.

Analysis and Interpretation:

Objective 1

To analyze the factors influencing investor preferences for equity and Cryptocurrency in Gujarat.

Hypothesis 1

Null Hypothesis (H_0): There is no association between age and investment preference.

Alternative Hypothesis (H_1): There is an association between age and investment reference.

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Age * Preference	101	100.0%	0	0.0%	101	100.0%

Age * Preference Crosstabulation					
			Preference		Total
			Equity (Stocks, Mutual Funds,ETFs)	Crypto - currency	
Age	26-35	Count	51	10	61
		%within Age	83.6%	16.4%	100.0%
	36-45	Count	14	13	27
		%within Age	51.9%	48.1%	100.0%
	46-55	Count	2	3	5
		%within Age	40.0%	60.0%	100.0%
	56 and above	Count	8	0	8
		%within Age	100.0%	0.0%	100.0%
Total		Count	75	26	101
		%within Age	74.3%	25.7%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.723[a]	3	.001
Likelihood Ratio	16.658	3	.001
Linear-by-Linear Association	.685	1	.408
N of Valid Cases	101		
a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.29.			

Interpretation: Based on the Chi-Square Test results provided, the Pearson Chi-Square value is 15.723 with 3 degrees of freedom and a significance level (Asymp. Sig.) of 0.001, which is less than the standard alpha level of 0.05. This indicates a statistically significant association between age and investment preference. Therefore, we reject the null hypothesis (H_0), which stated there is no association between age and investment preference, and accept the alternative hypothesis (H_1), concluding that age does have a significant influence on whether individuals prefer equity (such as stocks and mutual funds) or cryptocurrency for investment.

Hypothesis 2

Null Hypothesis (H_0): There is no significant relationship between income and expected return.

Alternative Hypothesis (H_1): There is a significant relationship between income and expected return.

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Income * Expected_Return	101	100.0%	0	0.0%	101	100.0%

Income * Expected_ReturnCrosstabulation							
			Expected_Return				Total
			Below 5%	5-10%	10-20%	Above 20%	
Income	Rs.50,000-Rs.1,50,000	Count	1	9	13	6	29
		% within Income	3.4%	31.0%	44.8%	20.7%	100.0%
	Rs.1,51,000-Rs.2,50,000	Count	0	1	27	4	32
		% within Income	0.0%	3.1%	84.4%	12.5%	100.0%
	Rs.2,51,000 - Rs.3,50,000	Count	0	0	17	15	32
		% within Income	0.0%	0.0%	53.1%	46.9%	100.0%
	Above Rs.3,51,000	Count	0	1	3	4	8
		% within Income	0.0%	12.5%	37.5%	50.0%	100.0%

Total	Count	1	11	60	29	101
	%within Income	1.0%	10.9%	59.4%	28.7%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig.(2-sided)
Pearson Chi-Square	32.336[a]	9	.000
Likelihood Ratio	32.746	9	.000
Linear-by-Linear Association	14.254	1	.000
N of Valid Cases	101		
a. 10 cells (62.5%) have expected count less than 5. The minimum expected count is .08.			

Interpretation: Based on the chi-square test results shown in the output, the Pearson Chi-Square value is 32.336 with a significance level (Asymp. Sig.) of 0.000, which is less than the standard threshold of
0.05. This indicates that there is a statistically significant relationship between income and expected return. Therefore, we reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1), concluding that income has a significant influence on expected return among the respondents.

Objective 2

To compare the risk perception and return expectations of investors in equity versus Cryptocurrency.

Factor Analysis (equity)

Reliability Statistics	
Cronbach's Alpha	N of Items
.883	6

Interpretation: The Cronbach's Alpha value is 0.883, which indicates high internal consistency among the six variables (Risk, Returns, Trends, Liquidity, Diversification, Volatility). This suggests that the items are reliably measuring a common underlying construct related to equity investment preferences or perceptions.

Correlation Matrix[a]							
		Risk	Returns	Trends	Liqui - dity	Diversifi - cation	Volati- lity
Correlation	Risk	1.000	.646	.504	.592	.577	.750
	Returns	.646	1.000	.507	.369	.548	.649
	Trends	.504	.507	1.000	.372	.456	.680
	Liquidity	.592	.369	.372	1.000	.642	.563
	Diversifi- cation	.577	.548	.456	.642	1.000	.690
	Volatility	.750	.649	.680	.563	.690	1.000
a. Determinant = .030							

Interpretation: This matrix shows the inter-correlations between the six variables. All variables are positively correlated, suggesting they are related and potentially part of the same underlying factor structure. For example, Risk has a strong correlation with Volatility (0.750) and Returns (0.646), implying these factors tend to move together in investor perception. The determinant value of
0.030 is greater than 0.00001, indicating that multicollinearity is not severe and factor analysis is appropriate for this dataset.

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Risk	3.872	64.529	64.529	3.872	64.529	64.529
Returns	.738	12.308	76.837			
Trends	.529	8.823	85.660			
Liquidity	.400	6.672	92.332			
Diversification	.286	4.768	97.101			
Volatility	.174	2.899	100.000			
Extraction Method: Principal Component Analysis.						

Interpretation: Only one component has an eigenvalue greater than 1 (3.872), which explains 64.529% of the total variance. This suggests a strong single underlying factor influencing all

variables. Other components contribute much less and are not retained in the final model, as indicated by the Extraction Sums of Squared Loadings showing values only for Component 1.

Factor Analysis (Cryptocurrency)

Reliability Statistics	
Cronbach's Alpha	N of Items
.880	6

Interpretation: The Cronbach's Alpha is 0.880, which suggests a high level of internal consistency among the six items (Risk Factor, Returns, Market Trends, Liquidity, Diversification, Volatility). This means the variables used in the factor analysis are reliably measuring the underlying construct (likely investor perception of cryptocurrency).

Correlation Matrix[a]							
		Risk Factor	Returns	Market_ Trends	Liqui-dity	Diversifi - cation	Volatility
Correlation	Risk_Factor	1.000	.959	.701	.400	.525	.546
	Returns	.959	1.000	.691	.438	.554	.575
	Market _Trends	.701	.691	1.000	.591	.581	.478
	Liquidity	.400	.438	.591	1.000	.509	.186
	Diversifi-cation	.525	.554	.581	.509	1.000	.791
	Volatility	.546	.575	.478	.186	.791	1.000
a. Determinant = .004							

Interpretation: All variables show moderate to strong correlations with each other, notably high between Risk Factor and Returns (0.959), and Diversification and Volatility (0.791). This suggests these items may load on common factors. The determinant of 0.004 is above the threshold of 0.00001, indicating multicollinearity is not severe and factor analysis is appropriate.

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Risk_Factor	3.885	64.755	64.755	3.885	64.755	64.755
Returns	.892	14.869	79.624			
Market_Trends	.756	12.607	92.231			
Liquidity	.301	5.016	97.247			
Diversification	.127	2.117	99.364			
Volatility	.038	.636	100.000			
Extraction Method: Principal Component Analysis.						

Interpretation: This table indicates how much variance each principal component explains. The first component has an eigenvalue of 3.885 and explains 64.755% of the total variance, which is substantial. The second component adds another 14.869%, bringing the cumulative to 79.624%. Together, the first two components explain nearly 80% of the total variance, which is generally acceptable in social sciences for data reduction purposes. Beyond these, the components contribute progressively less, and may not be as meaningful individually.

Key Findings

Based on the objectives, hypotheses testing, and factor analysis, the following findings were observed:

1. Investor Preference by Age:

   There is a statistically significant association between age and investment preference. Younger investors (aged 26–35) prefer equity-based instruments (stocks, mutual funds, ETFs), whereas investors aged 36–45 show increasing interest in cryptocurrency.

2. Occupation vs. Investment Horizon:

   No significant association was found between occupation and investment time horizon. This suggests that regardless of whether an individual is salaried, self-employed, or a business owner, their choice of short-, medium-, or long-term

investment does not vary significantly.

3. Income vs. Return Expectation:

   A significant relationship exists between income level and return expectation. Higher-income investors expect higher returns, with a notable proportion expecting returns above 20%.

4. Equity Investment Influencing Factors (Factor Analysis):

   All six variables—risk, returns, market trends, liquidity, diversification, and volatility— showed strong reliability and loaded significantly on a single factor, indicating that these factors jointly influence investor preference for equity.

5. Cryptocurrency Investment Influencing Factors (Factor Analysis):

   Similar to equity, the same six factors also influence cryptocurrency preferences. The dominant component explains over 64% of variance, suggesting that investors evaluate crypto through an equally consolidated risk-return framework, despite its volatility.

Conclusion

The study concludes that while both equity and cryptocurrency markets offer unique advantages, investor preferences are shaped primarily by demographic factors such as age and income, and psychographic variables such as risk tolerance and return expectations.
Younger and high-income investors tend to lean towards cryptocurrency due to its perceived high return potential and market trends. Meanwhile, equity remains a preferred choice among traditional investors due to stability, regulatory framework, and long-term performance.
The factor analysis confirmed that perceptions of risk, return, liquidity, diversification, and volatility significantly influence investor behavior across both asset classes. These findings have important implications for financial advisors, fintech platforms, and policy makers aiming to educate and guide investors toward informed, goal-based financial planning.

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A Study Comparing the Strategic Financial Management of a Few Gujarat Municipal Corporations

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Abstract

This study aims to evaluate and contrast the financial performance of two prominent municipal corporations in Gujarat that is Ahmedabad Municipal Corporation (AMC) and Surat Municipal Corporation (SMC) by examining their per capita income and expenditure over the period from 2016- 17 to 2020-21. Utilizing secondary data sourced from official government reports and statistical databases, the research applies statistical tools such as Analysis of Variance (ANOVA) to determine the significance of differences observed across the years. The findings highlight fluctuations in per capita financial indicators and reveal that AMC consistently reports higher per capita income and expenditure compared to SMC. The study underscores the importance of strategic financial management in urban local governance and draws attention to the reliance of municipal bodies on external financial sources for sustainable development.

Keywords: *Per capita income, Per capita expenditure, Financial Management, Municipal Corporation, Gujarat*

Introduction

Urbanization has emerged as a defining trend of the contemporary era, significantly impacting the socio- economic landscape of nations worldwide. As cities expand, the financial management of municipal bodies becomes critically vital in ensuring the delivery of essential services and infrastructure development. Effective fiscal strategies are fundamental to

stabilizing municipal finances, optimizing resource allocation, and fostering sustainable urban growth.

Local self-governments, especially municipal corporations, play a central role in managing urban affairs. These entities oversee a broad spectrum of functions including sanitation, water supply, healthcare, and urban planning, financed through a combination of local taxes, government grants, and borrowings. In India, municipal financial management is complex due to varying economic, demographic, and infrastructural factors across cities.

This research focuses on two major municipal corporations in Gujarat—Ahmedabad and Surat— aiming to compare their strategic financial management practices based on key financial indicators: per capita income and per capita expenditure. By analysing their financial performance over five years, the study seeks to provide insights into their fiscal health, operational efficiency, and reliance on external funding sources.

Strategic Financial Management Concept

a) The term "strategic" pertains to the planning or process aimed at guiding efforts towards the attainment of long-term objectives.

b) The act of obtaining or securing financial resources, along with their application, is known as financial management.

c) The phrase "strategic financial management" denotes the process of organizing and overseeing the finances of an entity (such as a corporation) to fulfil its long-term goals. This management approach involves the development of a strategic plan through the application of diverse financial techniques and tools.

Strategic Financial Management of Municipal Corporations in India

A significant entity of local self-governance is the Municipal Corporation. In India, the municipal organization for smaller towns is referred to as Nagarpalika, while the governing body for larger cities is termed Municipal Corporation.

A corporation refers to a significant urban region that includes a ward committee and encompasses one or more wards, serving an area with a population of three hundred thousand

or more.

As per the 2011 census of India, there exist 210 municipal enterprises across 26 states and 5 municipal enterprises within 2 Union Territories. The most prominent municipal corporations in India include Mumbai, Delhi, Kolkata, and Chennai. The panchayati raj system facilitates direct engagement between the state government and the local community, although it is administratively integrated into the district where it is situated.

A municipal corporation, known as City Corporation, Mahanagar Palika, Nigam, or urban development board, or Nagara Sabha, serves as a local government in India that oversees urban regions with populations exceeding one million. The rising population and urbanization in numerous Indian cities have made it essential to establish a local governing body capable of delivering vital community services such as water supply, healthcare, sanitation, education, and urban housing. The municipality is responsible for collecting property taxes and fixed grants from the state government.

Segments of Total Income and Expenditure for the Municipal Corporation:

Sources of Income

- Operating Income (Revenue): This includes money the corporation raises itself and funds it receives from other government bodies.
    - Self-Generated Revenue: This is broken down into Tax Revenue (taxes collected from the public) and Non-tax Revenue (income from fees, permits, and other services).
    - External Funding: This consists of money from the central and state governments in the form of grants, transfers, and assigned revenues.
- Capital Income: This category includes funds used for large-scale projects and investments.
    - Sale of Assets: Money earned from selling municipal land.
    - Loans: Borrowed money from financial institutions or the state government.
    - Government Grants: Financial assistance for capital projects received

from both the central and state governments.

Categories of Expenditure

- Operating Expenses (Revenue Expenditure): These are the costs associated with the day-to-day functioning of the corporation.
  - Salaries and Administration: Paying staff and covering general administrative costs.
  - Operations and Maintenance: Expenses for maintaining infrastructure and services.
  - Interest Payments: The cost of servicing debt from loans.
  - Other Expenses: Any other regular costs not covered by the above categories.
- Capital Expenditure: This refers to money spent on long-term investments and city development.
  - Development Projects: Funding for infrastructure and welfare projects initiated under state or central government schemes.
  - Loan Repayments: The repayment of the original principal amount of borrowed loans.
  - Other Capital Costs: Additional spending on major projects or assets.

A Look into the Finances of Gujarat's Municipal Corporations

Annual income for all of Gujarat's municipal corporations is made up of two parts: Revenue Income and Capital Income. Similarly, their total expenditure is categorized as Revenue Expenditure and Capital Expenditure.

An administrative body has been established by the government to oversee all civic facilities within the city. The local government is working to improve public services and management to better serve its community. Essential services being enhanced include water, roads, drainage, healthcare, and street lighting. The core goal of public administration is to make these services more effective and readily available, while management aims to integrate

modern technology to make facilities both cost-effective and easy to use. There is a total of eight municipal corporations in Gujarat. The table below illustrates the year of establishment, population, area, number of councillors, and other relevant details.

Table No.1 List of Selected Municipal Corporation in Gujarat

Particular	City of Gujarat State	
Municipal Corporation	AMC	SMC
Established year	1950	1966
Geographical Area	466 Sq.Km	326.515 Sq.K.m
Population Census:2011	5,577,940	4,467,797
Number of Wards	48	29
Number of Councilors	192	116

Components affecting the Key Monetary Administration of Metropolitan Organizations

The key budgetary administration of a civil enterprise is affected by different inside and outside components.

a. Inner components incorporate the administration show, sorts of consumptions, income source and other budgetary components
b. Outside variables include socioeconomics, populace elements, patterns in suburbanization, portability designs, instructive fulfilment, pay levels and accessibility of health care administration.

Literature Review:

Serageldin, M. et al. (2008) outlined the extensive challenges associated with financing urban development and the response of authorities to the significant transformation in the economic foundation brought about by the reduction of trade barriers and the globalization of the economy. The focus was on the obstacles encountered, domestic financial management and performance, as well as collaboration to tackle urgent urban issues and the evolving trends in capital investment financing.

Patel (2016) conducted a comprehensive comparative study of the financial performance of six major municipal corporations in Gujarat — namely Ahmedabad, Vadodara, Bhavnagar, Jamnagar, Rajkot, and Surat — over the period from 1996-97 to 2005-06. The research examined key fiscal parameters including total income, income from revenue sources, total expenditure, and capital-related income and spending. The findings highlighted significant discrepancies in the accounting methods and budgeting practices followed by these urban local bodies. Based on the analysis, the study strongly recommended the adoption of consistent accounting standards, enhanced financial discipline, and improved transparency in the budgeting process. Furthermore, the author advocated for a standardized classification system for income and assets, as well as the implementation of a uniform budgeting format across all municipal corporations to ensure more accurate financial comparisons and informed policy decisions.

Sharma, R., "Fundamentals of Local Governance", Sage Publications, New Delhi, (2022), p. 312 Local self-government denotes the democratic governance of local affairs by elected municipal institutions. These local bodies deliver essential public services while also acting as agents to uphold democratic participation at the grassroots. In this model, self-government exists without sovereign authority—meaning such institutions operate under the supervision of central or, in federal systems, state/regional governments. The central aim is often to assess and compare per-capita revenue generation and per-capita expenditure across municipal systems, such as that between AMC (Ahmedabad Municipal Corporation) and SMC (Surat Municipal Corporation).

In research work by **Prof. R.K. Menon (2023)**, the focus was on the practical application of the 3R concept—Reduce, Reuse, and Recycle—in the context of solid waste management. Prof. Menon elaborated on the shared responsibilities involved in effective waste management, highlighting the roles of city governments, state governments, and pollution control boards. The study emphasized the importance of integrated efforts and policy implementation at multiple levels of governance to achieve sustainable urban waste management.

Khan, A., & Banerjee, R. (2024), Urban Financing in a Globalising Economy, Global Development Press, London, p. 152 This study examines the complex challenges

confronting urban authorities in financing city development amid the accelerating forces of globalization and trade liberalization. It focuses on how municipal and subnational authorities have responded to the transformation of economic structures by adapting domestic fiscal strategies, improving public financial management, and engaging with broader institutional partners. Key themes include the constraints to mobilizing capital for infrastructure investment, evolving public-private collaboration mechanisms, and emerging trends in financing modalities such as municipal borrowing, PPPs, and blended finance instruments.

In a recent study conducted by **Dr. Meera Sinha (2024)**, the researcher analyzed the overall scenario of solid waste management in India by focusing on the regional distribution of urban waste generation. The study categorized India into regions such as North, East, South, and West to evaluate the urban waste generation rates. Dr. Sinha undertook field visits to major metropolitan cities to observe and document the various physical characteristics of municipal solid waste in different urban areas. Through this research, data was gathered on the quantity of waste generated and the amount collected across 34 Indian states. This comprehensive evaluation helped to identify which states are underperforming in terms of waste collection. Furthermore, the study provided valuable insights into the operational efficiency of different municipal corporations in handling solid waste in urban India.

Research Methodology:

Research Statement:

"A Study Comparing the Strategic Financial Management of a Few Gujarat Municipal Corporations"

Objectives of Study:

The objective of this study is to analyse and compare the per capita income and per capita expenditure of two selected municipal corporations, specifically the Ahmedabad Municipal Corporation (AMC) and the Surat Municipal Corporation (SMC), within the framework of strategic financial management of municipal corporations. Additionally, the study aims to examine the disparity between the per capita income and per capita expenditure of AMC and SMC.

Sources of Data:

This research undertakes to compare strategic financial management practices between AMC and SMC. This study relies on secondary data primarily gathered from the statistics of municipal towns and cities in Gujarat, covering the period from 2016-17 to 2020-21, as provided by the Director of Economics and Statistics in Gandhinagar, as well as the websites of the Ahmedabad and Surat Municipal Corporations.

Study Hypothesis:

H0: The data indicates that the per capita income of the chosen municipalities shows no significant variation.

H1: The data indicates that the per capita income of the chosen municipalities shows significant variation.

H0: The data indicates that the per capita expenditure of the chosen municipalities shows no significant variation.

H1: The data indicates that the per capita expenditure of the chosen municipalities shows significant variation.

Tools and Techniques used for Analysis:

The major techniques used for analysis are as
following. Simple Average Method and
Standard Deviation Method ANOVA
T- test with SPSS Analysis.

Limitation of the Study:

1. This research is founded on historical data.

2. The research depends on secondary sources, such as annual reports and magazines, along with additional information sourced from www.gujecostat.gujarat.gov.in.

3. The accounting methods and statistical techniques employed in this research, including simple averages, standard deviations, and T-tests, each have their own limitations. These are

derived from historical data, thus making future predictions unhelpful.

4. Financial statements are fundamentally based on cost principles. Consequently, they do not reflect the current situation.

5. Qualitative aspects are excluded from income statements as they cannot be quantified in monetary terms.

Data Analysis & Interpretation:

Table No. 2.0 Total Income and Expenditure

YEAR	TOTAL INCOME (in lakh)		TOTAL EXPENDITURE (in lakh)	
	AMC	SMC	AMC	SMC
2016-17	36,53,68,66,227	20,80,92,74,835	27,65,48,06,978	20,24,82,73,623
2017-18	39,43,20,93,764	25,60,82,16,893	31,58,94,34,393	24,65,00,99,446
2018-19	42,68,51,56,380	29,04,54,36,722	34,71,06,95,632	25,72,99,85,811
2019-20	43,94,81,64,227	28,37,37,37,779	35,87,64,16,490	28,36,10,47,853
2020-21	52,03,37,96,941	27,85,62,38,842	44,06,84,68,968	30,24,93,28,512

(Sources: Director of Economics and statistics Gandhinagar)

Table No. 2.1 Population of city

YEAR	POPULATION	
	AMC	SMC
2016-17	72,14,225	62,51,620
2017-18	74,85,321	65,64,897
2018-19	79,69,302	68,74,332
2019-20	80,59,221	69,03,041
2020-21	89,50,326	74,94,053

(Sources: Website of Municipal Corporation)

Hypothesis Testing:

H0: The data indicates that the per capita income of the chosen municipalities shows no significant variation.

H1: The data indicates that the per capita expenditure of the chosen municipalities shows significant variation.

Table No. 3 Per Capita Income

Year	Per Capita Income			
	AMC	GROWTH (%)	SMC	GROWTH (%)
2016-17	5,064.56		3328.62	
2017-18	5,267.92	4.015	3900..78	17.19
2018-19	5,356.20	1.68	4,225.20	8.32
2019-20	5,453.15	2.37	4,110.32	-2.72
2020-21	5,814	6.62	3,717.11	-9.57
AVERAGE	5,391.09		3,845.31	
SD	276.3118919		407.4107298	
T CAL	2.15631643			
T CRIT.	2.306004135			
P VALUE	0.063150797			
Decision	The data indicates that the per capita income of the chosen municipalities shows no significant variation.			

Hypothesis Testing:

H0: The data indicates that the per capita expenditure of the chosen municipalities shows no significant variation.

H1: The data indicates that the per capita expenditure of the chosen municipalities shows significant variation.

Table No. 4 Per Capita Expenditure

Year	Per Capita Expenditure			
	AMC	GROWTH (%)	SMC	GROWTH (%)
2016-17	3,833.37		3238.89	
2017-18	4,220.18	10.08	3754.83	15.93
2018-19	4,355.55	3.2	3,742.90	-0.318
2019-20	4,451.60	2.2	4,108.49	9.77
2020-21	4,933	10.8	4,036.44	1.75
AVERAGE	4,358.67		3,776.31	
SD	397.882297		342.202076	
T CAL	2.48134775			
T CRIT	2.306004135			
P VALUE	0.038031673			
Decision	The data indicates that the per capita expenditure of the chosen municipalities shows significant variation.			

The per capita costs were 3833.37 rupees in 2016-17 in AMC. Within the same year, it was 3238.89 rupees in SMC. Within the year 2020-21, per capita cost increments at 28.69% in AMC. In chosen Civil Enterprise, the per capita wage was expanded generally. In final monetary year 2020-21, the per capita salary of AMC was 14.80% and got to be 5814 rupees, whereas it was expanded by 11.67% in SMC within the same year. In AMC, the most noteworthy per capita cost was 4933 rupees and lower per capita cost was 3833.37 rupees. In SMC the most noteworthy per capita cost was 4108.49 rupees and lower was 3238.89 rupees.

Conclusion:

The examination leads us to conclude that the entire per capita income and per capita consumption within the chosen Civil Enterprise changed from 2016-17 to 2020-21. A comparative think about uncovered an eminent difference between the per capita salary and per capita consumption of AMC and SMC in each year. Consequently, it is not feasible to compare the income and expenditures of each Municipal Corporation. Furthermore, it was observed that the expenses of the selected Municipal Corporation are considerably high in

relation to their income, indicating that both Ahmedabad and Surat Municipal Corporations heavily rely on grants and loans from the State Government. The per capita pay and use are higher of AMC when compared to SMC. Given the contrasts in region, population, industrialization and business environment among the civil enterprises, the T-Test (ANOVA) does not illustrate uniformity in per capita income and per capita expenditure among the chosen municipalities.

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A Comparatives study on Customer Attitudes of The Ahmedabad region toward Traditional Vs. Digital Banking Services

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Abstract:

Due to digital technologies, there have been transformative changes in the banking sector. As compared to traditional banking, digital banking provides convenience, speed, and 24/7 access to financial services, which are the major concerns in the case of traditional banking systems. Not only this, but face-to-face interactions and personalized services are also time-consuming not only for the customers but also for the bank employees. This study aims to compare the attitudes of customers toward both traditional and digital banking services by focusing on various factors like trust, satisfaction, ease of use, accessibility, and perceived risk. For this purpose, primary data have been used, and primary data were collected through questionnaires from 100 respondents from Ahmedabad city. The findings of the study indicate that due to convenience, customers are favoring digital banking for routine transactions as compared to traditional banking. Factors like age, income, and digital literacy are significant factors that determine the customer attitude. At last, the study also gives some recommendations in order to enhance customer satisfaction.

Key Words: *Customer Attitude, Traditional Banking, Digital banking,*

1. Introduction

1.1 Meaning and Overview of Banking Sector

The Banking sector is backbone of the economic growth of a county. The financial system is a key role of allows the transfer of money between savers and borrowers. the institutions act as intermediaries which mobilize savings and facilitate the fund. Financial system is a complex and closely interconnected financial institutions, market, investments, services and capital formation. In short, banks are that institution which deals in money and credit.

- **History and Growth of Banking System in India**

The Indian banking system traces sack its history to 1786, when the first bank general bank of India was established. In the 19th century, the East India Company established the Bank of Bengal in 1809, the Bank of Bombay in 1840 and the Bank of Madras in 1843. These were later merged in 1920, as Imperial Bank of India. Later in 1865, Allahabad Bank was established followed by Punjab National Bank in 1894. In between 1906 and 1913 Bank of India, Central Bank of India, Bank of Baroda, Indian Bank, Canara Bank and Bank of Mysore were set-up.

Reserve Bank of India came into being in 1935. After independence, the Imperial bank of India was nationalized under the state bank of India Act of 1955 and become known as the State Bank of India. In 1959, seven subsidiaries of SBI were also nationalsed and 19th July, 1969, 14 major banks were nationalised.

In liberalization period 1991, to provide stability and profitability to the Nastionalised.

The government decided to banking committee set up under the chairmanship of Mr. M. Narsimham to manage the various reforms in the Indian banking industry.

Banks are classified into two types i.e. commercial banks and cooperative banks. Commercial banks are established with an objective of collecting money from general public and giving loans to general public by way of cash credit, overdrafts etc. commercial bank classified into scheduled and non- scheduled banks. Scheduled commercial banks are those banks which are registered in the second schedule of RBI Act, 1934 and classified into Public, Private and Foreign Sector Banks. Non-scheduled banks are not mentioned in the Second Schedule of the RBI Act, 1934 and

they not receive benefit from the RBI.

1.2 Overview of Traditional Banking

Traditional Banking represents the traditional form of banking where customers primarily visit physical bank branches. It involves face-to face interactions between bank employees and customers for services including deposits, withdrawals, loans, account management, and financial advising. People have to visit banks only during the working hours.

- **What are the key features of traditional banking?**
  - Physical presence
  - Fixed Working Hours
  - Deals with money/ Cash Based Transactions
  - Provides loans
  - Withdrawal and payment facilities
  - Branches at different locations

1.3 Overview of Digital Banking

Digital banking represents the digitization of all traditional activities and services. It involves to access financial services anytime, anywhere, without visiting a physical bank branch. Use of technology to offer banking services over the internet and mobile platforms allowing customers to reach the bank facilities. Digital banking offers new and innovative ways to manage finance, and it's transforming the way people interact with their money. It's features like Net banking, Mobile banking, instant transfers, and other digital tools.

- **What are the key features of Digital banking?**
  - Customers can access their account 24*7
  - Online Account Management such as real time balance check, transaction history and fund transfer
  - Applying for loans or updating personal information are available digitally

- Seamless transfer through NEFT, RTGS, IMPS
- Mobile wallets and QR code-based payments are also integrated
- Banks offer secure apps and websites with user friendly interfaces
- Automated services like bill payment, EMI reminders, and standing instructions can be automated.
- Enhanced security like two factor authentication, OTP verification, biometrics, and encryption to ensure data and transaction security.
- Reducing paperwork because all Communications are electronically form.

2. Literature Review

- Rai, A. (2025), "Customer Preference for Online Banking Vs. Traditional Banking" this study has found that why customers want to shift from traditional banking to online banking. to assist financial institutions in enhancing their services, improving customer satisfaction, and promoting financial inclusion for this reason customers choose online banking.
- Mery Agravante, M. et. al, (2025), "Digital vs. Traditional Savings: A Comparative Study of User Preferences, Satisfaction, and Perceived Benefits." The findings indicate that digital and traditional savings offered similar services and increasingly aligned their offering in terms of saving accounts and interest rates and fees and also indicate that some users may find digital saving appealing due to their convenience and higher interest rates, while others may prefer the personal interaction and perceived security of traditional savings.
- C. Jeya Gowri and Dr. S. Dani Romansingh (2024) "Perception on Digital Payment Towards E- wallets" In this study, the researcher investigated the perception on digital payment with special reference to e-wallets. The researcher used convenient sampling techniques, and the sample size was 90. They conclude the study that there is a high degree of correlation between monthly income and the amount spend through digital payment, and in the forthcoming year, people will hardly use cash to make payment first for perception towards digital payment. In India the use of mobile apps has across various sectors like healthcare,

groceries, and shopping.

- K. Naveen Kumar and R. Renuka (2024) investigate e-payment adoption and user satisfaction on digital payment trends. Their research highlighted that clear trend towards digitalization of banking. The transition from cash-based transactions to digital payment platforms such as Paytm, BHIM, and Phone Pe signifies a fundamental shift in consumer payment behavior. This study examined the key concerns associated with digital payment systems and the evolving consumer acceptance of e- commerce based financial transactions. Technological advancements have played a pivotal role in enhancing the efficiency, transparency, and convenience of digital payments, thereby fostering greater consumer confidence.
- Saiganesh and Sahitya S. Patil (2025) examined a study that explores the factors influencing consumer adoption of digital wallets and mobile payment apps, with a particular focus on security concerns. The study identified a significant age gap in the survey sample and highlighted the need for strategies to expand adoption among different demographics, particularly working professionals and non-working individuals. The findings emphasize the need for digital wallet providers to prioritize user education, enhance security measures, and address the specific needs of different user groups to further drive adoption and build trust in these technologies.

3. Research Methodology

3.1 Research design

Explanatory research design has been used in this study.

3.2 Sampling design

Convenience Sampling design has been used in this study.

3.3 Research Objectives

- To examine Customer Attitudes of the Ahmedabad Region Toward Traditional Vs. Digital Banking Services

- To identify the advantages of digital banking over traditional banking in the perception of customers.
- To compare customers satisfaction with traditional and digital banking services.
- To assess trust and security concerns related to digital banking among customers in Ahmedabad Region.

3.4 Source of data & Data collection

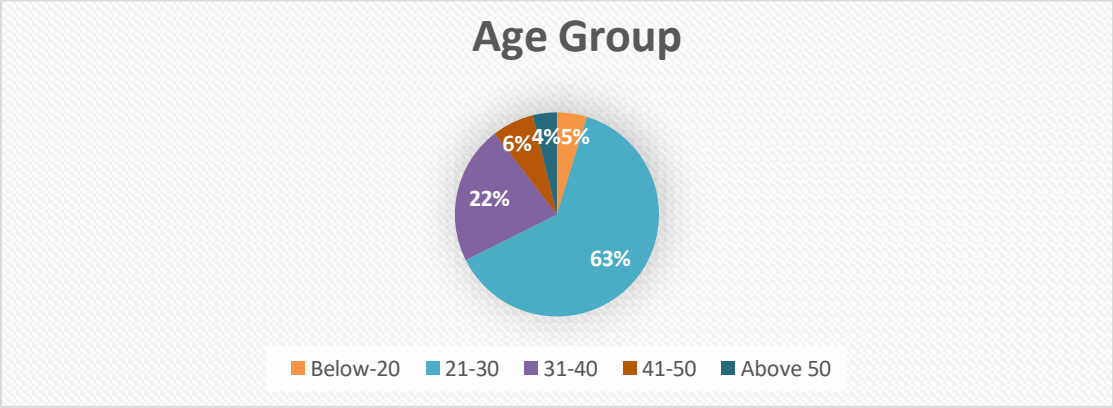
- Primary Data is used for this study, which is collected through structured questionnaires from 100 respondents from Ahmedabad city. This questionnaire covers aspects such as customer awareness, satisfaction, preferences and other benefits or concerns related to traditional and digital banking.

3.5 Limitation of the study

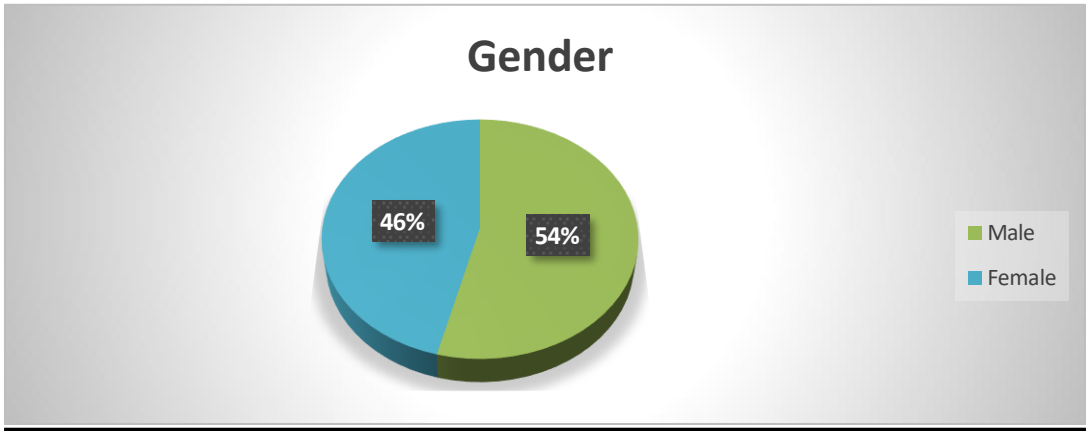
- The study is limited to the Ahmedabad region and the sample size is 100 respondents only. The use of convenience sampling may not fully represent the entire population.

4. Data Analysis and Interpretation

The interpretation and analysis of the data collected from the survey questionnaire are shown below:

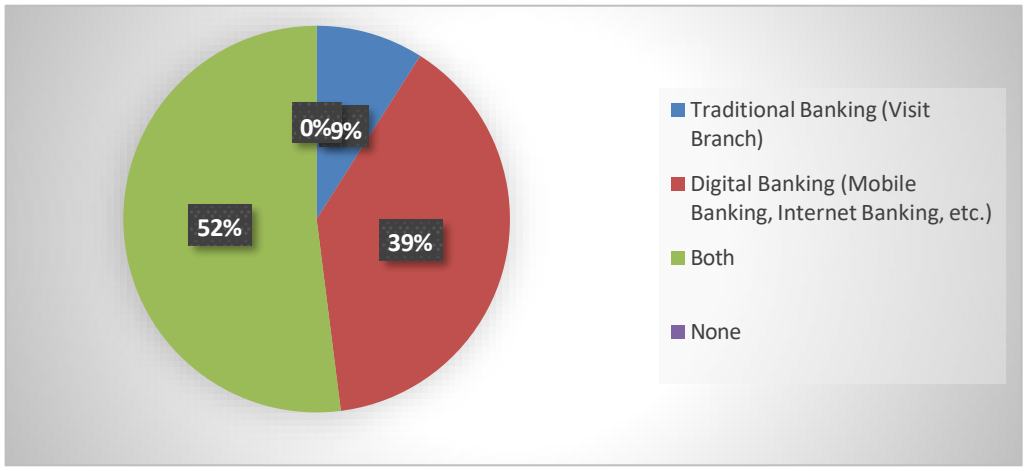


On the basis of survey of 100 respondent it 's found that 63% respondent are from age group of 21 to 30, 22% respondent are from age group of 31 to 40, 6% respondent are from age group of 41 to 50. Majority of the respondents have their age group between 20 to 30.



From the survey of 100 respondents, it's found that 54% respondents are male and 46% of respondents are female.

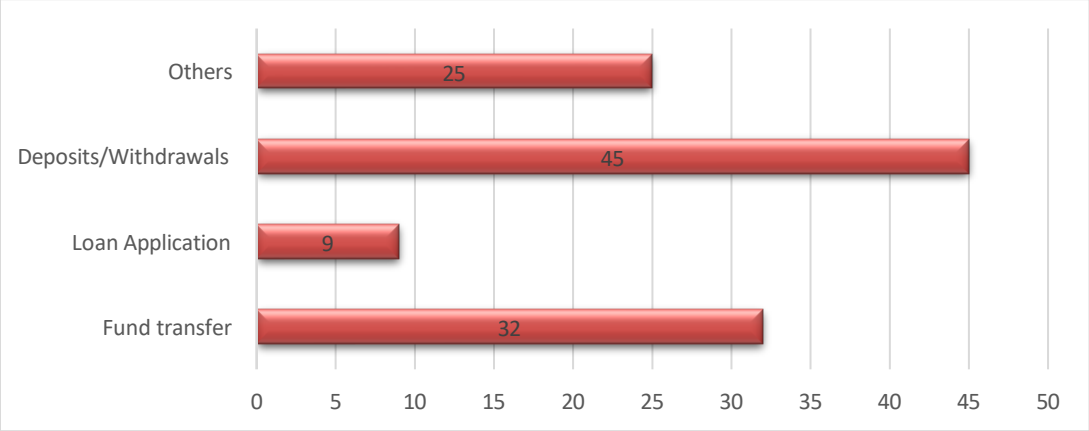
- **Which banking mode do you prefer?**



On the basis of survey of 100 respondents, it's found that 52% of respondents have preferred both the mode i.e. traditional banking and digital banking while 39% respondents are preferring digital banking mode.

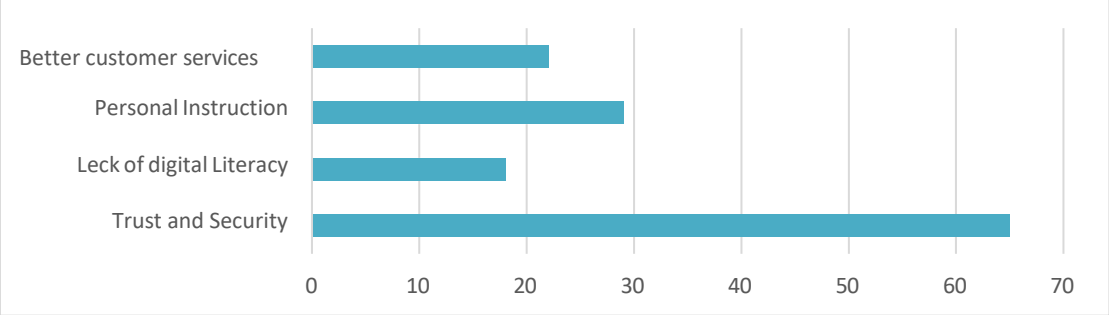
- **What type of banking transactions do you perform the most in traditional**

banking?



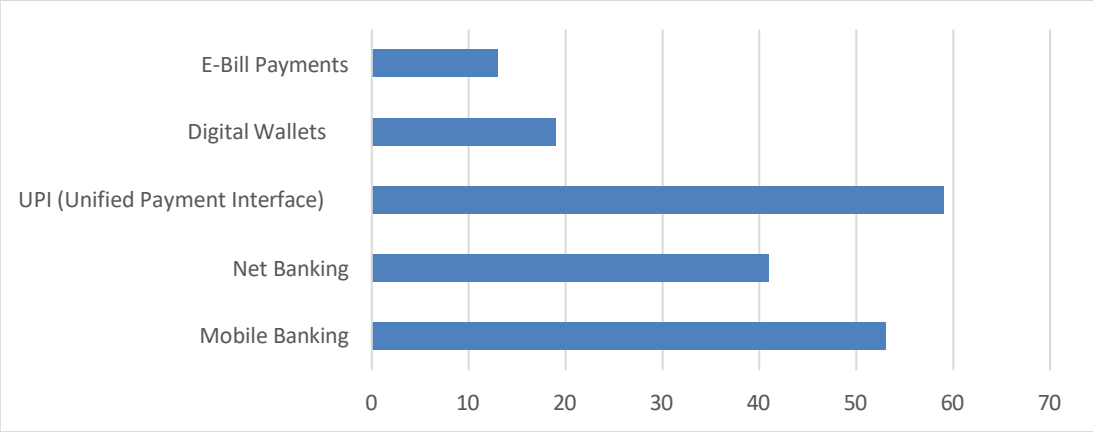
The above chart indicates that from the traditional banking, deposits/withdrawal are the most performing transaction followed by the fund transfer, and loan application.

- **Why do you prefer traditional banking over digital banking?**



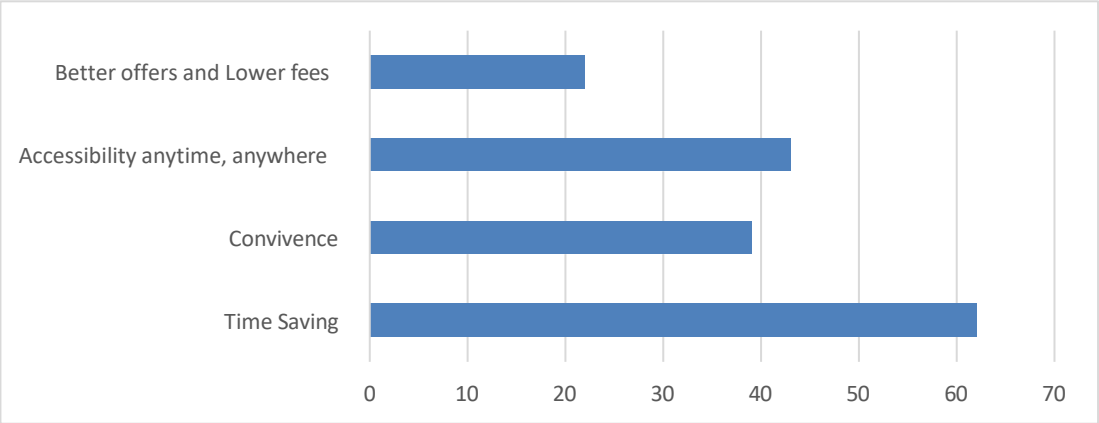
The survey data highlights that due to trust and security and personal interaction, people prefer traditional banking over digital banking.

- **Which digital banking channels do you prefer to use?**



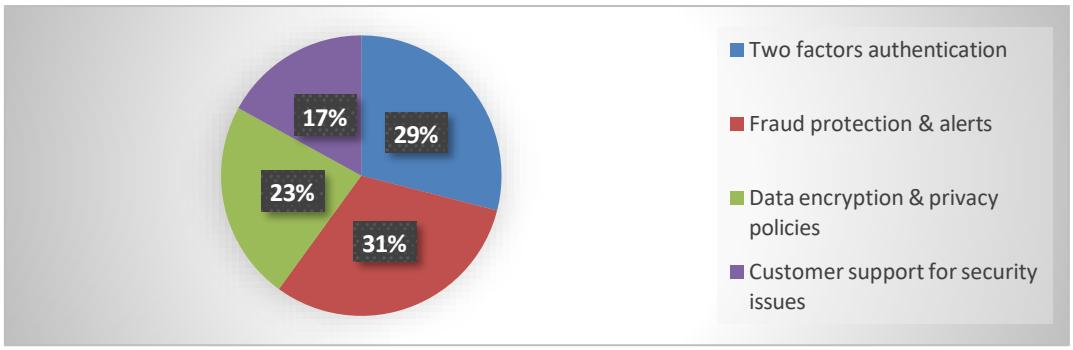
The above table highlighted that majority of the respondents are frequently using UPI, mobile banking and net banking.

- **Why do you prefer digital banking over traditional banking?**



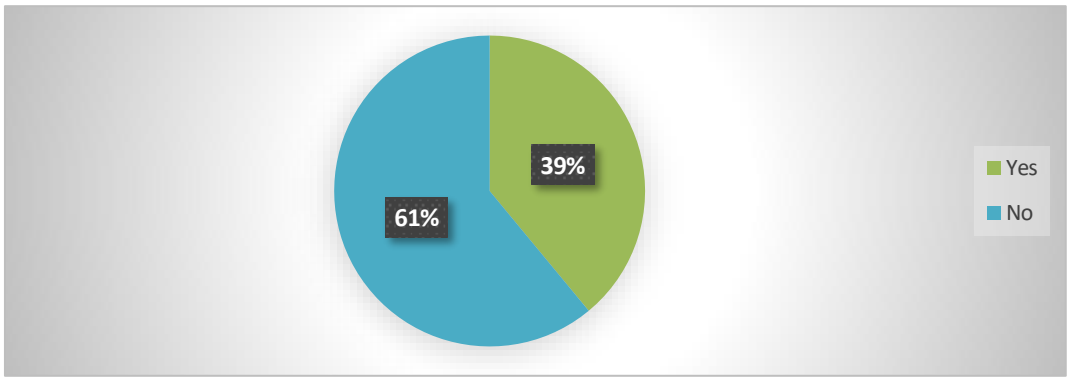
The above chart indicates that many customers are satisfied with the services provided by digital banking due to reasons such as time saving, accessibility at any time anywhere, and convenience, which has led them to switch from traditional banking to digital banking.

- **What security features do you consider essential for Digital banking?**



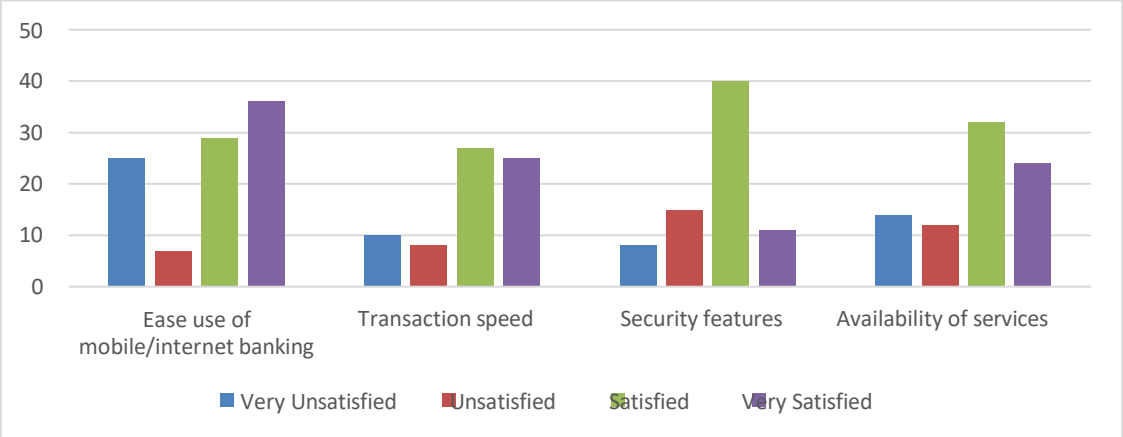
On the basis of the survey, 31% of respondents selected fraud protections & alerts. Two-factor authentication (29%) also scored high, reflecting the need for an additional layer of protection beyond username and password.

- **Have you ever faced a security breach or fraud in digital banking?**

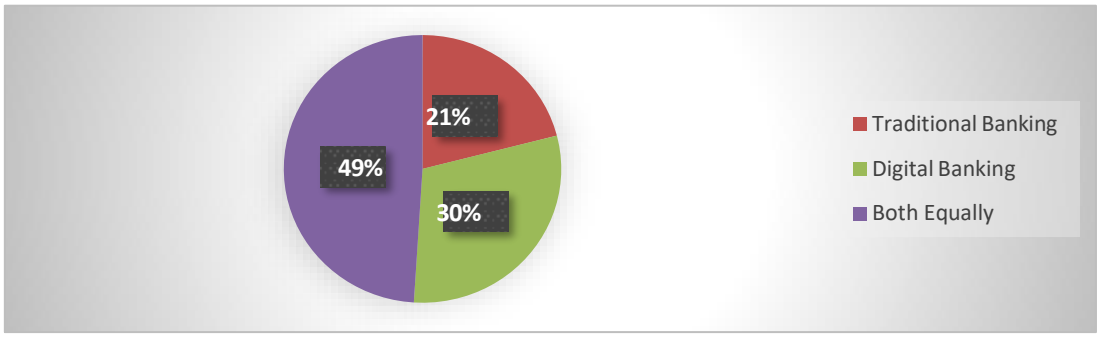


The majority of respondents (61%) reported not having experienced any security breach or fraud, which implies a relatively high level of trust and perceived safety in digital banking platforms. This reflects positively on the effectiveness of security mechanisms currently in place, such as OTPs, biometrics, and alerts.

- **Rate your satisfaction with digital banking services**



This graph indicates that digital banking services is favorably viewed, with two-thirds of customers satisfied. Only 13% of respondents are either unsatisfied or very unsatisfied, which is relatively low.



- **Which banking method do you trust more?**

The data indicates that 49% respondents are trusting both the banking method, digital banking (30%) is rapidly gaining ground. This shows a progressive shift in user attitude, suggesting that digital trust is building steadily.

5. Finding, Conclusion, and Suggestions

5.1 Findings:

- From the analysis of customer attitudes of the Ahmedabad region toward traditional vs. digital banking services, it is clear that both banking methods equally benefit from customer perception.
- When examining the digital banking over traditional banking in the perception of customers, there are several advantages of the Digital Banking like time saving, accessibility anytime and anywhere, convenience, better offers, low fees etc.
- manage finances on the go without visiting branch hours, banks must continue improving app quality, security, and reliability to ensure a seamless experience.
- Digital banking slightly outperforms traditional banking in customer satisfaction due to convenience, speed, and flexibility. However, traditional banking remains relevant for personalized service and in-person interactions. Banks should focus on hybrid services for best results.
- The study indicates that customers are becoming more confident, have reduced fear of fraud, and security concerns remain high in using digital banking. A majority of customers express positive inclination toward digital banking services.

5.2 Conclusion:

- This analysis clearly shows that traditional banking remains popular for high-value transactions, while digital banking is more widely adopted due to its convenience, speed, and accessibility. While many customers are satisfied with digital banking, they are concerned about security, fraud, and technical issues. Traditional banking still holds importance for customer support but is less

suitable for everyday transactions due to limitations like restricted hours and longer processing times. Ahmedabad region is witnessing a shift toward digital banking, mostly among younger, educated, and higher-income users.

5.3 Suggestions:

- To improve traditional banking, banks should extend operating hours, reduce wait times through better queue systems, and integrate more seamlessly with digital services. Enhancing staff training and accessibility for all users is also crucial. For digital banking, improvements should focus on stronger cybersecurity, user-friendly interfaces, 24/7 human support, and personalized financial insights.

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The Role of Financial Analytics in Advancing ESG And Responsible Investment

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Abstract

Financial analytics has a critical role in strengthening sustainable and socially responsible investment decisions. A long-term-focused investment strategy, "Sustainable and Responsible Investment" (SRI), incorporates with considerations of the "environmental, social, and governance" (ESG) into the investigation, selection and evaluation of securities for a portfolio. This study mainly focuses on investigating how financial analytics supports informed, responsible investment decisions and highlights their role in advancing sustainability objectives. Through employing a secondary qualitative method for data collection, the research explores existing reports, industry practices and literature to draw meaningful results.

The findings of the study indicate that the financial analytics tools like predictive modelling, ESG scorecards and scenario analysis are highly used by investors for analysing long-term value creation opportunities that align with the sustainability goals. Further, the study explores that the financial analytics provide a powerful tool for ESG integration, its potential is maximised when combined with ongoing innovation, robust data governance and cross-sector collaboration of analytics techniques. The finding of the study also indicates that

financial analytics tools, like predictive modelling and ESG scorecards used by investors to explore a long-term value creation opportunity. However availability of data in emerging markets and certain industries also constrains effectiveness of financial analytics.

Keywords: *SRI, ESG, investment, sustainable, financial analytics, policymakers, scorecards*

Introduction

Recently, growing awareness of ESG issues has reshaped the landscape of investment. Financial analytics, driven by predictive tools and advanced data processing, enables alignment of investment strategies with socially and sustainably responsible goals. Investors, corporations and policymakers are highly reliant on analytics-driven insights for assessing long-term risks and returns associated with the ESG-focused portfolios. The integration of financial analytics helps to robust evaluation of non-financial factors, value creation, promoting transparency and accountability beyond profit. Even though SRI is becoming more popular due to investors' growing demand for sustainable products and transparent information about how they operate (risks, return, associated costs, etc.) (Sciarelli et al. 2022), "Asset Management Companies" (AMCs) still need to create more efficient plans which allow to strike a balance between ESG-related content and communication, trust-building and accountability.

***Aim*:**

The study aims to analyse the role of financial analytics in supporting sustainable and socially responsible investment decisions.

***Objective*:**

- To assess how financial analytics tools and techniques are applied in evaluating ESG-related investment opportunities.
- To evaluate challenges and limitations in integrating financial analytics for sustainable and socially responsible investments.
- To examine the practices which allow for the enhancement of the effectiveness of financial analytics in promoting responsible investment decisions.

Literature Review

According to Narayanan et al. (2024), the urgent problems of social injustice, human rights

abuses, global warming, and the need to meet sustainable development goals, investment ethics are more crucial than ever. Investors actively look for investment possibilities that support these goals as they become more conscious of their critical role in advancing moral behaviour. Investing in businesses that value moral behaviour, promote sustainable development, and produce profitable returns is known as socially responsible investment, or SRI. However, both in reality and in theory, sustainable investing and ESG-related investments are not consistent across different geographic locations, despite their increasing popularity globally (Amini & Rahmani, 2023). For a variety of reasons, ESG practices have also resulted in inconsistent choices on sustainable investments. When developing portfolios, asset managers and investor are frequently place varying weights on each of the ESG criterion; also, governance viewed as another pillar, similar to society and the environment, rather than as a key component that unifies ESG strategies.

Leverage from SRI can hasten the shift to a more sustainable, long-term economic structure. In light of this, the “European Commission” has released an action plan on sustainable finance, which is considered essential to achieving both the “Paris Climate Accord's 2-limit” and the “United Nations' 17 Sustainable Development Goals”. The “EU High-Level Expert Group” on “Sustainable Finance and the Technical Expert Group on Sustainable Finance” have produced results that emphasise the importance of sustainable finance action plan, and implementation efforts have already started (Koenigsmarck & Geissdoerfer, 2021). However, other countries, including India, China and the US, have a far bigger impact on global environmental initiatives. Hence, recently at the nexus of finance and the SDGs, sustainable finance has become a significant idea (Kumar et al. 2025). The European Union's efforts by themselves are by no means sufficient to meet the collective targets outlined in the Paris Climate Accord. Furthermore, a 1.5-degree objective would be required to prevent long-term harm to the environment, which appears to be much more difficult to accomplish. Hence, green finance's effectiveness also accomplishes that the dynamic of SDGs is influenced by investors' desire to invest in sustainable initiatives, standardisation and transparency of sustainability reporting. Green finance allows to makes it possible to financing and investing in sustainable development projects, supporting global initiatives towards sustainability (Fu et al. 2023). The GSIA report from 2016, states that during the start of that year $22.89 trillion in assets was professionally managed globally through using

SRI strategies (Martini, 2021). This accounted for 26% of all professionals, who manage assets and represented a 25% growth since 2014. Though the term “ethical investment” could exactly characterise the process of decision-making of such value-based organisations when applying internal ethical principles for an investment strategy, it does not seem to apply to the profit-maximising practices of fund management firms which offer ethical unit trusts.

Methodology

This study employs a secondary qualitative research methodology to investigate the integration of financial analytics in supporting sustainable and socially responsible investment decisions. The approach mainly relies on analysing existing academic literature, regulatory guidelines, ESG performance frameworks, industry reports, and case studies published by financial analytics and credible organisations. Data sources involve peer-reviewed journal articles, news, sustainability reports from financial institutions and asset management firms. As per Cheong et al. (2023), secondary source databases are found in different forms, whether one is already in a structured format or can be developed through aggregating different sources. The study uses thematic analysis to synthesise and interpret information, focusing on the recurring concepts and patterns related to the financial analytics used in ESG evaluation.

A coding table used to organise data in themes aligned with objectives of the study, like analytics tools application, challenges of integration, and its best practices. Coding is a purposeful link between qualitative data collection and analysis, based on the selection of data (Jnanathapaswi, 2021). It is an initial step for meaningful and meticulous analysis and interpretation for final reports. The process for data selection underscores recent publications (within the last 5 years) to ensure alignment and relevance with contemporary practices. The secondary qualitative research design and interpretivist philosophy also enables the study to capture diverse perspectives of geographies and industries through offer a comprehensive view on the current trends and gaps of this domain. However, as per Cheong et al. (2023), the key issues that arise from the use of secondary qualitative data are related to limited clarity of the whole process of data collection, data quality and data fitness.

Limitations

However, reliance on the secondary data introduces some limitations that influence findings'

generalisability. First, ESG data from the rating agencies may indicate selective disclosure or methodological biases by firms, which limits the objectivity of the study. Second, coverage of ESG metrics is also uneven across industries mainly in the emerging markets, which reporting standards are less mature. These gaps indicate that the study's conclusions not fully represent sectors with low availability of data. Future research can address these issues through incorporating primary data collection, such as survey with the managers for validates findings.

Result

Thematic Analysis Coding

The coding table developed through a structured thematic analysis process involving two coders with research training in sustainable finance. Initially, both coders independently reviewed the secondary data sources to explore the recurring concepts relevant to the study objectives. These concepts then collated into preliminary codes. In the second stage, the coders jointly discussed discrepancies to reach consensus, ensuring reliability of coding decisions. The final coding table aligned three main themes, application of analytics tools, challenges of integration, and best practices, directly with the study objectives.

Sl. No.	Themes	Description	Thematic coding
1.	Evaluation of financial analytics tools and techniques in ESG investment opportunities.	Investments in businesses or initiatives that exhibit excellent performance in environmental sustainability, social responsibility, and solid corporate governance are referred to as ESG "(Environmental, Social, and Governance)" linked investment opportunities (Wang, 2024).	ESG investment, environmental sustainability, and social responsibility

2.	Challenges and limitations in integrating financial analytics for sustainable and socially responsible investments.	Uncertainty in regulatory contexts is an unavoidable risk when integrating ESG into financial operations for sustainable and socially responsible investments (Ge & Zhang, 2025). .	Financial operations, socially responsible investments, and unavoidable risk.
3.	Practices and frameworks to enhance the effectiveness of financial analytics.	A framework for assessing the ethical effects and sustainability of corporations comprises ESG elements and Social considerations look at how a company interacts with its stakeholders through an effective data mining process (Singh, 2025).	Framework, ethical effects and sustainability, Social considerations, data mining process.

Table 1: Thematic coding

Thematic Analysis

Theme 1:

Evaluation of financial analytics tools and techniques in ESG investment opportunities

ESG standards have become a crucial topic of discussion in the global financial sector as a result of the growing public concern for sustainable development in modern society. Investing responsibly is becoming more and more important, guiding funds toward businesses and projects with higher sustainability. In light of this, incorporating ESG standards into financial operations presents financial institutions with both a big task and an opportunity (Wang, 2024). In order to comply with growing legal requirements and satisfy investors' expectations of social responsibility, architects and suppliers of financial goods and services are progressively integrating ESG considerations into their decision- making procedures. However, there are several difficulties with this shift. Concurrently, increased investor and consumer awareness of corporate social responsibility has led financial product and service providers and designers to include ESG factors as essential evaluation criteria for businesses and investments. The adoption of ESG integration of the financial operations is also being accelerated by regulatory authorities' constant reinforcement of standards about

ESG reporting and transparency. Even though there are many obstacles to overcome, integrating ESG not only encourages the development of financially sustainable goods and services but also offers investors and financial institutions new opportunities for expansion and innovation.

The effects of ESG standards on financial organisations frequently shift the emphasis to the opportunities they present in the long run (Zournatzidou et al. 2025). Unquestionably, incorporation of ESG design new areas for new corporate governance paradigm and the finance industry. The trust relationship between financial institutions and investors can strengthened through adoption of ESG criteria. Investors are also drawn to organisation which takes a proactive approach to environmental and social responsibilities of modern day, as public begin to examine corporate sustainability. In response of this tendency, financial institutions raise appeal of its products asset management while also allow to grow their clientele. At the same time, financial institutions can also leverage advantage of potential in green financing industry thanks to their commitment towards ESG principles. As the need for sustainability grows on a worldwide scale, financial products like green bonds are issued.

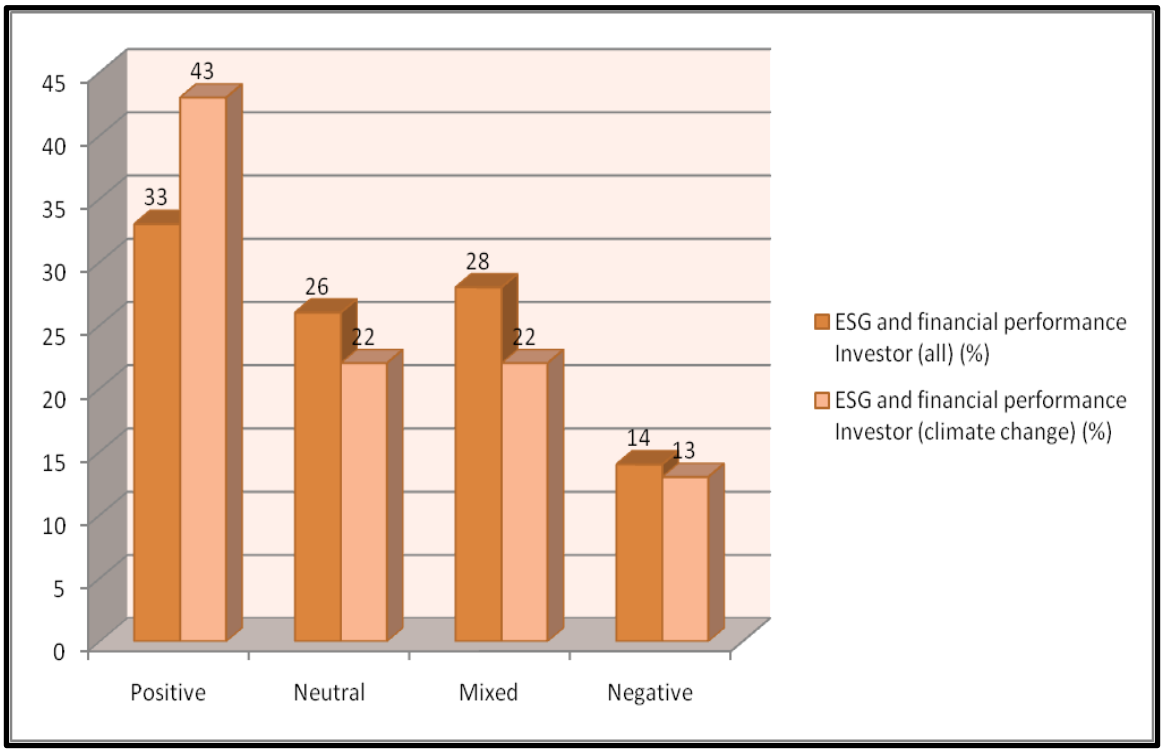

Figure 1: ESG and financial performance
(Source: Self-Developed based on Whelan *et al.* 2021)

The above figure has been developed by analysing 245 studies to emphasise correlations between ESG and financial performance for different investors. The investor-focused studies are tend to look at direct relationship between ESG and its performance based on benchmarks of themes like governance structure or materiality (Whelan et al. 2021). Through providing these financial solutions, financial institutions meet market need and also put themselves in a competitive position. Furthermore, financial organisations' operational risks are greatly reduced when ESG principles are followed. Financial institutions can prevent unsustainable aspects in investments by better identifying possible problems through a thorough study of the environmental and social risks of businesses. This lowers credit risks and protects against potential financial losses brought on by them.

For example, “BlackRock’s Aladdin” platform combines complete trading operational tools and portfolio management with risk analytics through fusing conventional financial modelling with machine learning and cutting-edge AI approaches. Aladdin has become a crucial tool of the financial industry, with 55,000 global users, like “non-financial institutions and $21.6 trillion under management” (Czyżewski, 2024). BlackRock’s neural network model is used by “more than 17,000 traders at banks”, sovereign wealth funds, insurance firms and other institutions to help them in making decisions regarding investment. Cybersecurity and systematic risk is the subject of concern as different financial institutions are relying on this analytics model during decision-making.

Similarly, MSCI ESG Ratings offer institutional investors a comparative score which directly influences sell/buy/hold decisions. Based on “MSCI ESG STATS”, firms with better social performance get benefits from high ratings provided by credit rating agencies (Billio et al. 2021). Firms with important sustainability and environmental performance benefitting from a high credit rating score. Relevance of ESG disclosure on the organisation market value for “55 Dow Jones Sustainability World Index” among the listed companies. Based on the data of MSCI ESG, ESG information positively influences to valuation of the organisation and its performance. The precise channels for these effects are lower exposure to tail risk, reduced capital costs, higher profitability and higher valuations

Theme 2:

Challenges and limitations in integrating financial analytics for sustainable and socially responsible investments

Issues with Acquisition and Data Quality in the Realisation of ESG Integration:

ESG has become a highly sought-after topic in the world of contemporary financial operations, with its incorporation seen as a crucial step in enhancing company sustainability and accountability. However, the problems of data collection and quality become extremely difficult areas when integrating ESG measures into frameworks for reporting and decision-making. Due to its complexity and lack of clarity, ESG-related data is targets to inconsistency. The main challenge faced by financial organisations while collecting and analysing relevant data is the variety of sources. These data points are dispersed throughout various locations and take many different forms, from labour policies of retailers to pollution reports of mining companies. As a result, financial institutions must be able to effectively synthesise and integrate information despite its multifaceted and fragmented nature (Wang, 2024). The accuracy and dependability of the data are then examined. ESG data rarely truly reflects a company's actual performance because there are no standardised measurement and reporting criteria in place. Furthermore, data timeliness is equally important.

Data that is out of date is almost equivalent to nullity in the rapidly evolving world of trade. To make sure that their ESG evaluations and choices represent the most recent information, financial institutions must continuously monitor the most recent data (Chiu, 2025). The demand to address data- related problems is becoming louder.

Regulatory Environment Uncertainty and Its Effect on the ESG Integration:

The regulatory environment in which financial institutions operate is always changing. It includes clauses on corporate governance, social responsibility, and environmental norms (Ge and Zhang, 2025). Alongside policy changes, regulatory policy inconsistencies occur not just between nations and regions but also within the same authority. These differences increase the intricacy of long- term investment choices and strategic planning for financial institutions, exposing enterprises to a certain level of risk. Through ESG-related legislation, regulatory agencies hope to promote sustainable finance; however, overzealous changes and a lack of vision may make it difficult for market participants to integrate ESG practices. Financial operations must continue to be flexible and adaptable in order to quickly react to changes in the regulatory environment. Additional compliance is frequently required due to the unpredictability of regulatory standards. The efforts made by businesses, increasing

expenses and preventing the effective use of resources. Furthermore, businesses compete unfairly as a result of regulatory ambiguity.

Requirements for social and environmental governance may be more relaxed in some areas while stricter or coercive in others. Generally speaking, regulatory ambiguity offers both opportunities and many obstacles (Lee et al. 2025). In order to adjust to legislative changes, it exhorts financial institutions to give risk management first priority, streamline decision-making procedures, and encourage product and service innovation. Financial organisations that can predict and adjust to changes in regulations have a higher chance of a competitive advantage in the complex field of ESG, as this skill will be essential to their placement in the market going forward.

Insufficient Knowledge of ESG Value by Market Players:

At the time of examining the problem of market participants' inadequate comprehension of ESG values, it is important to recognise how complex and deeply ingrained this issue is. Market participants' actions frequently result from their instinctive reactions to profitability and a basic understanding of risk management, but many financial professionals are still inexperienced with the process of incorporating ESG factors into decision-making models. The main causes of inadequate value comprehension are information asymmetry and market shortcomings. Even though ESG frameworks and standards have evolved recently, there is still a lack of uniformity in the gathering, evaluating, and reporting of ESG data, which raises questions about its comparability and quality (Palm, 2025). Accurately estimating long-term returns on ESG investments is made more difficult by the under appreciation of the relationship between financial and ESG performance.

As a result, for many participants of the market, the issue is not that they do not recognise the significance of ESG aspects, but rather that they do not know how to successfully integrate these variables into their day-to-day operations. Nevertheless, chances present themselves in the face of these obstacles. Market players need to quicken their comprehension and implementation of ESG practices and information as investors and regulatory agencies increase their demands for ESG conduct (Ngwa et al. 2025). Professionals with ESG experience will become more in demand as businesses gradually realise that superior ESG performance is essential to attracting premium investments and retaining customers.

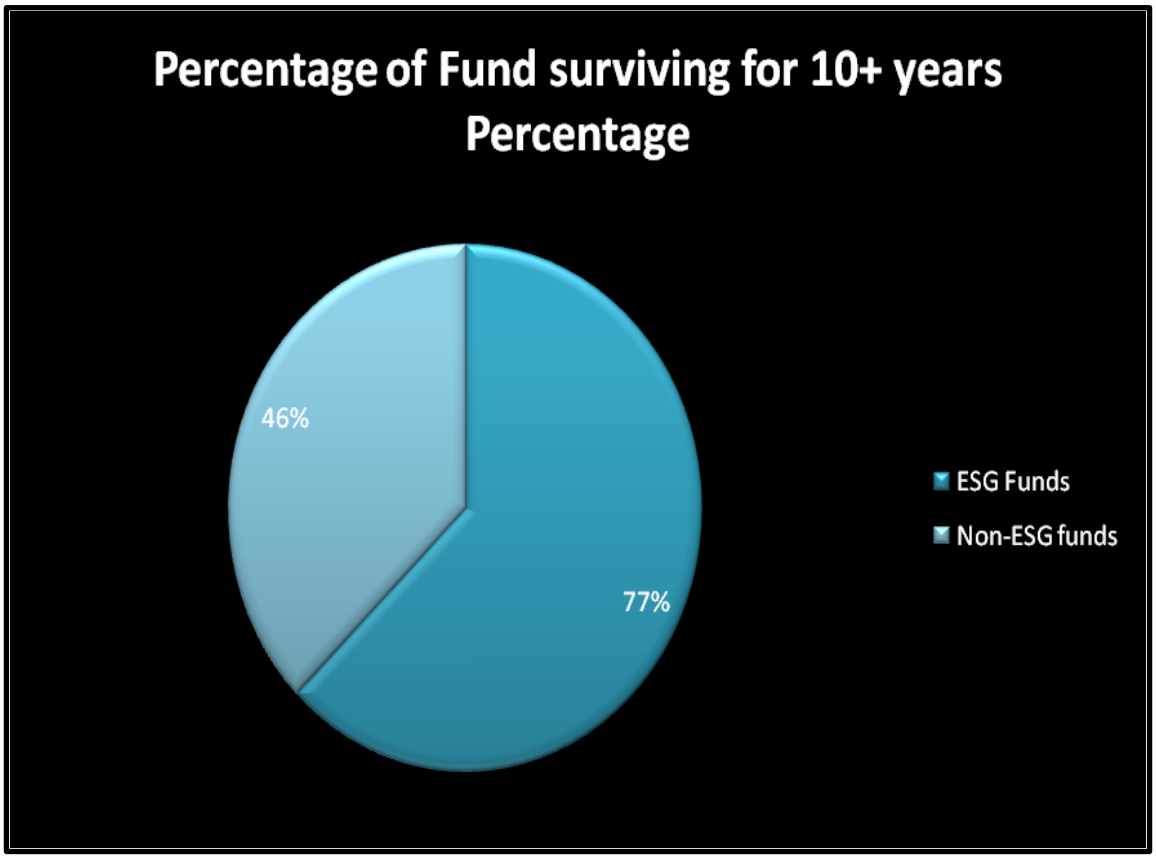

Figure 2: ESG and financial performance

(Source: Self-Developed based on keyesg.com, 2025)

ESG initiatives have been implemented by 88% of publicly traded corporations. A growing number of European investors view ESG as essential to their investment strategy (keyesg.com, 2025). Compared to non-ESG funds, sustainable funds have higher survivorship rates. Compared to "46% of typical funds, 77% of ESG funds" were accessible ten years ago are still in existence on average. Numerous factors, from performance to the expectations and motivations of investors, can account for this.

Theme 3:

Practices and frameworks to enhance the effectiveness of financial analytics for sustainable investment

A framework for assessing the ethical effects and sustainability of corporations comprises ESG elements. Beyond conventional financial indicators, these interrelated criteria function as essential measurements for evaluating an organisation's performance. Environmental aspects include how an organisation interacts with the natural environment's carbon

emissions, biodiversity, resource consumption, waste management, and energy efficiency. These measures have become especially important as environmental legislation and concerns about climate change have grown. Social considerations look at how a company interacts with its stakeholders (Singh, 2025). This component includes things like supply chain management, community interactions, health and safety procedures, labour practices, and employee welfare. This dimension includes data and product safety. The internal control systems, protocols, and practices that guide and oversee an organisation are addressed by governance factors. These include executive compensation plans, shareholder rights, business ethics, efforts to avoid corruption, board diversity and composition, and corporate reporting transparency. These elements have changed from being ancillary to being crucial to company strategy, risk assessment, and investment analysis.

Finding patterns, correlations, and anomalies in large datasets through the use of database systems, statistics, and machine learning is known as data mining. One advanced analytical field that methodically extracts significant patterns, connections, and insights from data is data mining. tons of data, both structured and unstructured. This interdisciplinary field combines elements of statistics, machine learning, database administration, and artificial intelligence to convert unprocessed data into knowledge that can be put to use. Regression analysis, association rule mining, clustering, and classification are fundamental data mining approaches (Sıcakyüz et al. 2025). Based on their characteristics, classification algorithms group data points into predetermined classifications, whilst natural groupings within datasets are identified by clustering without predetermined categories. Association rule mining uncovers meaningful relationships between variables, and regression analysis models the relationships between dependent and independent variables for predictive purposes. Advanced applications of data mining extend to text mining, which extracts patterns from unstructured textual data, and sequence mining, which analyses ordered data points.

Recent developments in deep learning have significantly increased the capacity to handle complex, high-dimensional datasets, particularly in domains like computer vision and natural language processing. Data mining is used practically in a wide range of fields, including customer behaviour research, healthcare diagnostics, and financial fraud detection (Anwar and Hossain, 2025). Nonetheless, issues with algorithmic bias, computing efficiency, and data privacy still exist. With new approaches and technologies, the sector is developing

quickly, especially in the areas of real-time analytics and large data processing. Modern decision-making processes increasingly rely on this methodical approach to knowledge discovery, which gives organisations the ability to leverage their data assets to extract insightful information. Deep Learning in ESG Analysis: Because deep neural networks can recognise complicated patterns across a variety of data modalities, they have completely changed the way complex ESG data is processed.

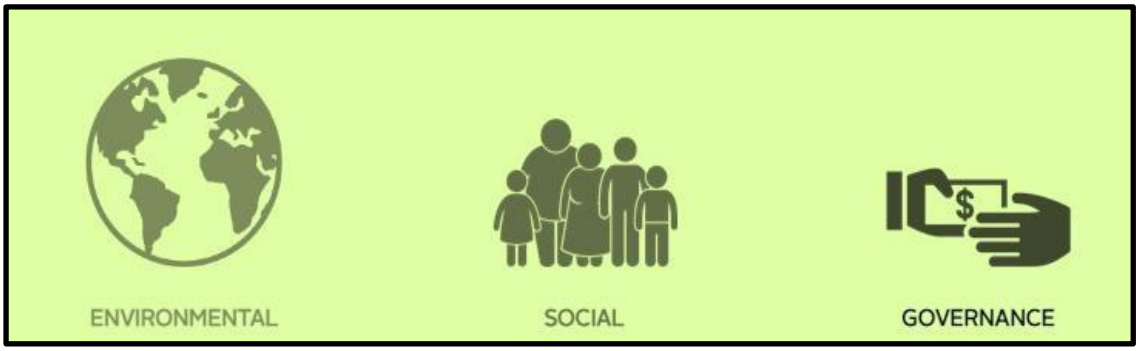

Figure 3: ESG framework performance

(Source: Self-Developed based on unpri.org, 2025)

ESG framework performance fosters investment decisions and affecting assets or businesses, responsible investment entails taking of ESG factors into account. It allows enhancing the conventional process of financial analysis and portfolio design (unpri.org, 2025). While avoiding any harmful effects, some of them want to make money and achieve favourable results for environment and people. These designs are excellent at using advanced feature extraction techniques to analyse corporate governance indicators, environmental measurements, and textual disclosures, all at once. Convolution and recurrent designs specifically address geographical and temporal dependencies in sustainability data, whereas multi-layer neural networks show exceptional effectiveness in capturing non-linear relationships within ESG metrics (Yu and Luo, 2025). A more thorough assessment of business ESG performance is made possible by the capacity to interpret unstructured data, such as sustainability reports and social media sentiment, in addition to structured indicators. The accuracy and resilience of ESG analytics have been significantly improved by the integration of various data sources using deep learning frameworks.

Discussion

The findings of the study emphasise that financial analytics plays an important role in strengthening sustainable and socially responsible decisions for investment; however, its integration into ESG evaluation presents both challenges and opportunities as well. Results of the study revealed that financial analytics tools, including predictive modelling, ESG scorecards and scenario analysis, are used by the investors to explore a long-term value creation opportunity, which further aligns with the sustainability goals. These tools enable deeper insights into environmental risks, social impact, and governance structures, going beyond traditional financial metrics to support more ethical and forward- looking decisions. However, one of the significant challenges identified is the lack of standardisation in the analytics frameworks and ESG data. Despite growth of ESG data providers, inconsistent methods and metrics often produce conflicting portfolio assessments. This inconsistency weakens the confidence of the investor and makes comparative analysis challenging. Furthermore, the availability of data in emerging markets and certain industries remains limited, which constrains effectiveness of financial analytics as well. The finding of the study indicates that BlackRock's neural network model is used by traders at banks for making decisions regarding investment. MSCI ESG Ratings provide institutional investors a comparative score that influences different decisions of the organisation related to buying, selling and holding.

Best practices underscore in analysis suggest that integration of financial analytics with multi- stakeholder input (like regulatory, environmental and community voices) enhances the process of decision-making. Additionally adopting a consistent and transparent reporting framework allow in mitigating challenges regarding data. The most widely used and rapidly expanding strategy for sustainable investing is still the integration of ESG considerations. Overall, the discussion emphasises that while financial analytics provides a powerful tool for the integration of ESG factors, its potential is maximised when it is combined with ongoing innovation, robust data governance and cross-sector collaboration of analytics techniques.

Conclusion

This study emphasises crucial role of financial analytics in advancing sustainable and socially responsible investment decisions. Through enabling investors for systematically explore ESG factors alongside with the traditional financial indicators, financial analytics focuses on more ethical, informed and transparent investment practices. The integration of analytics tools, including risk modelling, scenario analysis and ESG scorecards help in enhanced stakeholders' ability to explore long-term opportunities for value creation which align with sustainability objectives. Hence, the research also emphasises persistent challenges, like a lack of standardised metrics of ESG, gaps in coverage and data

inconsistencies across regions and industries. Addressing these limitations needs collaborative efforts between the investors, data providers and regulatory bodies, also for

developing harmonised frameworks and improving data quality. In conclusion, as financial analytics is a powerful enabler of the dynamics related to responsible investing, its full potential may be realised by implementing continued innovative dynamics in analytics methodologies, improved data governance and greater transparency.

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Investor Reactions to Public Announcements: An Empirical Study in the Indian Context

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Abstract

Behavioural finance encompasses the impact of investor psychology and its resulting effect on markets. Behavioral finance is fascinating as it clarifies the reasons and ways in which markets could be inefficient. The main aim of this study was to examine investor behavior regarding the public announcement. A total of 384 participants are surveyed for the research utilizing a judgmental sampling method. This research emphasized two types of public announcements: dividend announcements and financial performance announcements. The research discovered that investors are highly conscious of public announcements and place moderate significance on them when making investment decisions. The research additionally found that dividend declarations have a certain impact and financial results announcements have a minimal effect on stock prices. Investors perceive a notable variation in knowledge about public announcements among different age groups of respondents, and they also see a

significant difference in the importance placed on public announcements during investment decisions across these age groups

Keywords: *Behavioral finance, Dividend declaration, Financial result, Investor's behaviour, Investment decision, Public announcement.*

1. Introduction

The stock market is a platform where shares are issued and traded, either through stock exchanges or over-the-counter (OTC) markets. Also known as the equity market, it plays a crucial role in the economy by enabling companies to access capital and allowing investors to acquire ownership stakes in businesses, with the potential for financial gains based on future performance.

Several scholars have explored the concept of behavioural finance, which studies how investor psychology influences market outcomes. It offers an explanation for market inefficiencies (Sewell, 2007). One of the earliest works in this domain was Selden's Psychology of the Stock Market (1912), where he noted, "This book is based upon the belief that the movements of prices on the exchanges are dependent to a very large degree on the mental attitude of the investing and trading public." A central premise in behavioural finance theories is the notion of the rational investor, as emphasized by Miller and Modigliani (1961). Public announcements are significant events wherein corporate entities share information with the general public, such as dividend declarations, earnings reports, or strategic decisions. These announcements are typically disseminated through the media and are available equally to all investors. While individual investors may not have access to insider or private corporate information, public disclosures influence their investment decisions. The relevance and content of these announcements may vary across sectors, and their interpretation can significantly impact investor perceptions and actions.

Public announcements, therefore, play a critical role in shaping investor behaviour, especially among individuals. The behavioural response of investors to such information can lead to noticeable changes in stock prices. Understanding how investors react to these

announcements helps explain patterns of price volatility and investment trends in the market.

2. Review of Literature

Numerous studies have examined the factors influencing investor behaviour in the stock market. Key behavioural variables include financial risk tolerance, emotional stability, and financial literacy (Dharmaja et al., 2012). Factors such as occupation, age, and education also significantly impact investment decisions. For instance, younger investors (below 35) tend to prefer online trading platforms over traditional methods (Bhatt, 2013).

Patel and Patel (2012) found that the proportion of income allocated to equity investments is related to monthly income levels, while investment behaviour during bearish markets is influenced by prior experience. Additionally, stock market prediction ability correlates with educational background. According to Kothari (2013), investment decisions are guided by the need for safety, liquidity, and return, as well as the availability of investment avenues. Brahmabhatt et al. (2012) noted that although investors prioritize safety and return, they often lack financial management skills.

Flammer (2013) highlighted that environmental CSR practices affect stock market reactions; firms with stronger CSR policies see less intense reactions to both positive and negative news. In Egypt, investors tend to favour cash or stock dividends, preferring some return over none (Gad and El Din, 2013). Jains and Dashora (2012) observed that while many investment decisions are rational and based on market information, investors often adopt a cautious, “wait-and-watch” strategy, influenced by psychological and behavioural aspects. In Pakistan, stock selection is affected by a variety of factors including dividends, volatility, media visibility, and corporate reputation (Ali & Rehman, 2013).

Tuyon and Ahmad (2016) reported asymmetric patterns in price predictability and risk-return relationships across various market segments. Varadharajan and Vikkraman (2010) found that low self- monitors—investors who rely less on external cues—tend to make quicker decisions and, on average, earn better returns than high self-monitors. Das (2012) found that investors in Assam consider as many as 38 factors before selecting stocks. Investment

horizons also influence the choice of analysis techniques used by professionals (Maditinos et al., 2007). Rehman and Arif (2015) noted that investors on the Karachi Stock Exchange often behave irrationally, particularly regarding dividend preferences and speculative investments.

Mane (2016) discovered that most investors avoid modern investment tools like mutual funds, opting instead for low-risk alternatives. Similarly, Muthumeenakshi (2017) noted a preference among Indian investors for bank deposits, often linked to goals such as home ownership or long-term savings. Voronkova and Bohl (2005) identified herding behaviour among Polish pension fund investors, who tend to follow market trends and practice feedback trading, more so than their counterparts in mature markets.

Research Gap

A review of existing literature reveals that while considerable research has been conducted on investor behaviour, few studies have specifically focused on the role of public announcements in shaping these behaviours, especially in the Indian context. Most studies rely on secondary data and overlook direct feedback from investors. Given this gap, the present study aims to investigate investor behaviour by collecting and analyzing primary data, thereby providing a more grounded and empirical understanding of how public announcements affect retail investor sentiment and action.

3. Research Methodology

The primary objective of this research was to analyses the investor behavior with respect to the public announcement. Descriptive research design (single cross-sectional) is used for studying investor's behaviour towards the public announcement (Bajpai, N., 2011). Total 384 respondents are surveyed for the study using a judgmental sampling. Participants were selected based on specific characteristics, qualities, or expertise relevant to the research question. This study focused on two public announcements, dividend announcement and financial result announcement. Researcher discretion and purposively chosen sample was the limitation of the study. The data collection pattern is shown in figure

1. The study covered analytical tools such as mean score analysis, ANOVA, Chi-Square test

and independent sample t-test. Here, the sample size of 384 has been decided using a sample determination method suggested by (Kothari, C. R. 2010).

Sample Size Calculation

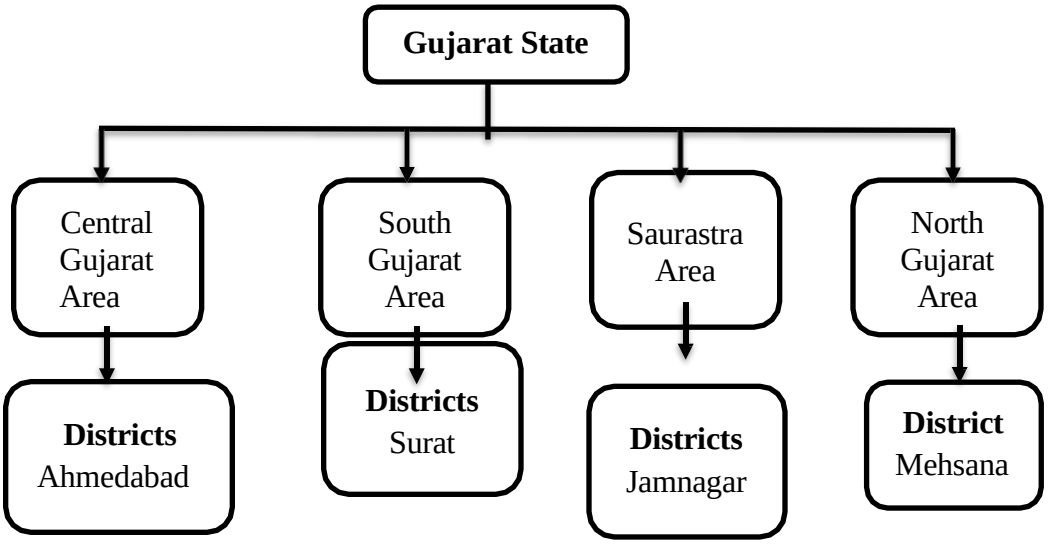
$$n = \frac{Z^2 \times p \times q}{e^2}$$

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2}$$

$$n = \frac{0.9604}{0.0025}$$

$$n = 384$$

Figure 1. Data collection Pattern



4. Data Analysis and Interpretation

4.1 Personal Information of the Respondent

Table 1. Personal Information

Personal Details	Particular	Respondents	%
Gender	Male	305	79.43%
	Female	79	20.57%
Age	Below 20	4	1.04%
	20-30	135	35.16%
	31-40	125	32.55%
	41-50	73	19.01%
	51-60	25	6.51%
	Above 60	22	5.73%
Occupation	Government Employee	65	16.93%
	Employee in Private Sector	170	44.27%
	House wife	15	3.91%
	Self Employed	122	31.77%
	Student	12	3.13%
Educational Qualification	Till HSC	27	7.03%
	Undergraduate	30	7.81%
	Graduate	138	35.94%
	Post Graduate	167	43.49%
	Other	22	5.73%
Monthly Income	Below 10,000	17	4.43%
	10,000-20,000	91	23.70%
	20,001-30,000	105	27.34%
	30,001-40,000	57	14.84%
	40,001-50,000	65	16.93%
	50,001 – 75000	27	7.03%
	75,001 – 100000	9	2.34%
	More than 100000	13	3.39%

(Source: Authors compilation)

The demographic profile of the respondents reveals that the majority are male (79.43%), indicating a gender imbalance in financial participation. In terms of age, most respondents fall within the 20–40 age group (67.71%), representing a younger, working-age population actively involved in financial decision- making. Occupationally, private sector employees (44.27%) and self-employed individuals (31.77%) dominate the sample, suggesting that the respondents primarily consist of income-earning individuals with a tendency to engage in investment activities. Educational qualifications show a highly literate sample, with

graduates and postgraduates accounting for 79.43%, implying a better understanding of financial markets and investment tools. Regarding income, 65.88% of respondents earn between ₹10,000–₹50,000 per month, highlighting a predominantly middle-income group with a moderate capacity for investment. The relatively low representation of females, students, and housewives suggests that these groups may have less access to or involvement in investment-related decisions. Overall, the data reflects a profile of financially literate, working-age males with stable incomes, making them suitable subjects for studying behavioural patterns and responses in the financial market, particularly in the context of public announcements and investment decisions.

4.2 Information Consider as Important at the Time of Investment

Table 2. Importance of information while investment

Sr. No.	Factor	Mean	SD
1	Information from the company as a basis for a fundamental analysis	2.03	0.72
2	Recommendations and advice form stock brokers	1.42	0.69
3	Forecasts from professional investors	2.18	0.92
4	Overall past performance of the market	2.39	0.92
5	Information from various medias	2.72	1.07
6	Information from the internet	2.37	1.08
7	Own study of future performance	1.55	0.91

(Source: Authors compilation)

The objective behind this question is to know, which information consider as important by investors at the time of investment. The study found that recommendations and advice form stock brokers (M=1.42) and own study of future performance (M=1.55) were an important factor before making an investment.

4.3 Knowledge Regarding Public Announcement

Table 3. Knowledge regarding public announcement

Particulars	Respondents	%
Extremely Aware	168	43.75%
Very Aware	135	35.16%
Moderately Aware	43	11.20%
Slightly Aware	19	4.95%
Not at all Aware	19	4.95%
Total	**384**	**100**
Mean	2.08	
S.D.	1.14	

(Source: Authors compilation)

The objective behind this question is to know the level of knowledge of the investor's regarding the public announcement. The result shows that currently the investors very aware (Mean = 2.08, S.D. = 1.14) about the public announcement.

4.4. Importance to Public Announcements for Investment Decision

Table 4. Importance regarding public announcement

Particulars	Respondents	%
Highly Important	97	25.26%
Important	119	30.99%
Moderately Important	67	17.45%
Slightly Important	62	16.15%
Not Important	39	10.16%
Total	**384**	**100**
Mean	2.64	
S.D.	1.32	

(Source: Authors compilation)

The objective behind this question is to know the importance of investors in Public announcements for their investment decision. The investors give moderate importance (Mean = 2.64, S.D. = 1.32) to the public announcement for their investment decision.

4.5 Monitor Returns Before and After Public Announcement

Table 5. Monitor returns while public announcement

Particulars	Dividend Announcement		Financial Result Announcement	
	Respondents	**%**	**Respondents**	**%**
Yes	84	21.88%	68	17.71%
No	300	78.13%	316	82.29%
Total	**384**	**100**	**384**	**100**

(Source: Authors compilation)

The objective behind this question is to know, whether investors monitor their return before and after the public announcement. From the above table, it can be concluded that mostly the respondents do not monitor their returns before and after the dividend and financial result announcement.

4.6 Public Announcements Could Influence the Stock Price

Table 6. Impact of public announcement on stock market

Particulars	Dividend Announcement		Financial Result Announcement	
	Respondents	**%**	**Respondents**	**%**
Yes	243	63.28%	157	40.89%
No	141	36.72%	227	59.11%
Total	**384**	**100**	**384**	**100**

(Source: Authors compilation)

The objective behind this question is to check, whether the dividend and the financial result announcement influence to the stock price or not. 243 (63.28%) respondents believe that dividend announcement could influence the stock price and 141 (36.72%) respondents believe that dividend announcement could not influence the stock price. While 157 (40.89%) respondents believe that financial result announcement could influence the stock price and 227 (59.11%) respondents believe that financial result announcement could not influence the stock price.

4.7 Level of Influence for the Particular Public Announcement

Table 7. Level of influence for public announcement

Particulars	Dividend Announcement		Financial Result Announcement	
	Respondents	**%**	**Respondents**	**%**
Extremely Influential	39	10.16%	25	6.51%
Very Influential	64	16.67%	32	8.33%
Somewhat Influential	87	22.66%	47	12.24%
Slightly Influential	43	11.20%	53	13.80%
Not at all Influential	141	36.72%	227	59.11%
Total	**374**	**100**	**384**	**100**
Mean	3.21		3.99	
S.D.	1.4		1.3	

(Source: Authors compilation)

The objective of this question is to know the level of public announcement influence to the stock price. From the above data, it can be concluded that dividend announcement somewhat influence and financial result announcement slightly influence to the stock price.

4.8. **Reliability Test**

Table 8. Reliability Statistics

Cronbach's Alpha	N of Items
.887	31

(Source: Authors compilation)

The Cronbach's Alpha is done to check, whether the scale is reliable or not. Scale is reliable when Cronbach's alpha is greater than 0.60. Here the Cronbach's alpha is 0.887 which further confirm that the scale is reliable and further test can be applied. (Ngoc, 2013)

4.9 Chi-Square Analysis

Table 9. Chi Square Analysis

Sr. No.	Null Hypothesis	Significance Value	Result
H_01	Reaction of the investors with respect to dividend announcement is independent on gender of the respondent	0.445	Accepted
H_02	Reaction of the investors with respect to dividend announcement is independent on age of the respondent	0.786	Accepted
H_03	Reaction of the investors with respect to dividend announcement is independent on occupation of the respondent	0.331	Accepted
H_04	Reaction of the investors with respect to dividend announcement is independent on educational qualification of the respondent	0.033	Rejected
H_05	Reaction of the investors with respect to dividend announcement is independent on monthly income of the respondent	0.336	Accepted
H_06	Reaction of the investors with respect to dividend announcement is independent on district of the respondent	0.191	Accepted
H_07	Reaction of the investors with respect to financial the result announcement is independent on gender of the respondent	0.56	Accepted
H_08	Reaction of the investors with respect to the financial result announcement is independent on age of the respondent	0.330	Accepted
H_09	Reaction of the investors with respect to the financial result announcement is independent on occupation of the respondent	0.940	Accepted
H_010	Reaction of the investors with respect to the financial result announcement is independent on educational qualification of the respondent	0.043	Rejected
H_011	Reaction of the investors with respect to the financial result announcement is independent on monthly income of the respondent	0.533	Accepted
H_012	Reaction of the investors with respect to the financial result announcement is independent on district of the respondent	0.180	Accepted
H_013	Perception regarding dividend announcement influence the stock price is independent on gender of the respondent	0.619	Accepted

$H_0$14	Perception regarding dividend announcement influence the stock price is independent on age of the respondent	0.873	Accepted
$H_0$15	Perception regarding dividend announcement influence the stock price is independent on occupation of the respondent	0.583	Accepted
$H_0$16	Perception regarding dividend announcement influence the stock price is independent on educational qualification of the respondent	0.607	Accepted
$H_0$17	Perception regarding dividend announcement influence the stock price is independent on monthly income of the respondent	0.601	Accepted
$H_0$18	Perception regarding dividend announcement influence the stock price is independent on district of the respondent	0.200	Accepted
$H_0$19	Perception regarding the financial result announcement influence the stock price is independent on gender of the respondent	0.661	Accepted
$H_0$20	Perception regarding the financial result announcement influence the stock price is independent on age of the respondent	0.079	Accepted
$H_0$21	Perception regarding the financial result announcement influence the stock price is independent on occupation of the respondent	0.439	Accepted
$H_0$22	Perception regarding the financial result announcement influence the stock price is independent on educational qualification of the respondent	0.516	Accepted
$H_0$23	Perception regarding the financial result announcement influence the stock price is independent on monthly income of the respondent	0.091	Accepted
$H_0$24	Perception regarding the financial result announcement influence the stock price is independent on district of the respondent	0.369	Accepted

(Source: Authors compilation)

From the above table, the study found that reaction of the investors with respect to dividend announcement and financial result announcement is dependent on educational qualification of the respondent.

4.10 One Way ANOVA Analysis

Table 10. One-way ANOVA Analysis

Sr. No.	Null Hypothesis	Significance Value	Result
H_01	There is no significant difference in knowledge regarding the public announcement between different age groups of the respondent	0.002	Rejected
H_02	There is no significant difference in knowledge regarding the public announcement between different occupation of the respondent	0.181	Accepted
H_03	There is no significant difference in knowledge regarding the public announcement between different educational qualification of the respondent	0.184	Accepted
H_04	There is no significant difference in knowledge regarding the public announcement between the different monthly income of the respondent	0.492	Accepted
H_05	There is no significant difference in knowledge regarding the public announcement between different districts of the respondent	0.236	Accepted
H_06	There is no significant difference in level of importance to the public announcements while investment decision between different age groups of the respondent	0.013	Rejected
H_07	There is no significant difference in level of importance to the public announcements while investment decision between different occupation of the respondent	0.289	Accepted
H_08	There is no significant difference in level of importance to the public announcements while investment decision between different educational qualification groups of the respondent	0.081	Accepted
H_09	There is no significant difference in level of importance to the public announcements while investment decision between different monthly income groups of the respondent	0.395	Accepted
H_010	There is no significant difference in level of importance to the public announcements while investment decision between different districts of the respondent	0.982	Accepted
H_011	There is no significant difference in opinion regarding the level of influence for the dividend announcement between different age groups of the respondent	0.463	Accepted

$H_0$12	There is no significant difference in opinion regarding the level of influence for the dividend announcement between different occupation of the respondent	0.568	Accepted
$H_0$13	There is no significant difference in opinion regarding the level of influence for the dividend announcement between different educational qualification of the respondent	0.286	Accepted
$H_0$14	There is no significant difference in opinion regarding the level of influence for the dividend announcement between different monthly income groups of the respondent	0.860	Accepted
$H_0$15	There is no significant difference in opinion regarding the level of influence for the dividend announcement between different districts of the respondent	0.043	Rejected
$H_0$16	There is no significant difference in opinion regarding the level of influence for the financial result announcement between different age groups of the respondent	0.315	Accepted
$H_0$17	There is no significant difference in opinion regarding the level of influence for the financial result announcement between different occupation of the respondent	0.567	Accepted
$H_0$18	There is no significant difference in opinion regarding the level of influence for the financial result announcement between different educational qualification of the respondent	0.212	Accepted
$H_0$19	There is no significant difference in opinion regarding the level of influence for the financial result announcement between different monthly income groups of the respondent	0.306	Accepted
$H_0$20	There is no significant difference in opinion regarding the level of influence for the financial result announcement between different districts of the respondent	0.191	Accepted

(Source: Authors compilation)

From the above table, the study found that there is significant difference in knowledge regarding the public announcement between different age groups of the respondent and there is significant difference in level of importance to the public announcements while investment decision between different age groups of the respondent. There is significant difference in

opinion regarding the level of influence for the dividend announcement between different districts of the respondent

4.11 Independent Sample t-Test

Table 11s. Independent Sample t test

Sr. No.	Null Hypothesis	Significance Value	Result
H_01	There is no significant difference in knowledge regarding the public announcement between male and female of the respondent	0.047	Rejected
H_02	There is no significant difference in level of importance to public announcements while investment decision between male and female of the respondent	0.736	Accepted
H_03	There is no significant difference in opinion regarding the level of influence for the dividend announcement between male and female of the respondent	0.790	Accepted
H_04	There is no significant difference in opinion regarding the level of influence for the financial result announcement between male and female of the respondent	0.604	Accepted

(Source: Authors compilation)

From the above table, the study found that there is significant difference in knowledge regarding the public announcement between male and female of the respondent.

5. Conclusion

Behavioral finance is the study of the influence of psychology on the behavior of investors or financial analysts. It also includes the subsequent effects on the markets. It focuses on the fact that investors are not always rational, have limits to their self-control, and are influenced by their own biases. The primary objective of this research was to analyses the investor behavior with respect to the public announcement. The result shows that currently the investors very aware about the public announcement. The investors give moderate importance to the public announcement for their investment decision. The study also found that dividend announcement could influence the stock price. Reaction of the investors with respect to dividend announcement and financial result announcement is dependent on

educational qualification of the respondent. There is significant difference in knowledge regarding the public announcement between different age groups of the respondent. There is significant difference in knowledge regarding the public announcement between male and female of the respondent.

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Understanding Consumer Perception of Sovereign Gold as an Investment Option

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Abstract

Sovereign Gold Bonds (SGBs), launched by the Government of India, have emerged as a modern and secure alternative to traditional gold investments. This study takes a closer look at how people perceive SGBs, how much they know about them, and what influences their decision to invest in them. While many are aware of SGBs, detailed knowledge—especially about benefits like tax exemptions, fixed interest income, and maturity features—remains limited.

Physical gold, such as jewelry and coins, still holds strong appeal, largely due to emotional and cultural connections. Yet, a shift is noticeable among younger and financially aware

individuals, who are more drawn to the safety, tax benefits, and returns offered by SGBs. Key factors encouraging investment include trust in government backing, convenience, and the added income from interest. On the other hand, barriers like lack of promotion, unfamiliarity with online investment processes, and limited financial awareness continue to hold people back.

Demographics like age, profession, and education clearly impact investor perception. Those working in finance or related fields are more likely to understand and embrace SGBs. Overall, the findings highlight the need for better awareness campaigns, simpler investment procedures, and broader financial education to make SGBs more accessible and attractive to a wider audience.

Keywords: *Customer Preference, Investments Behavior, Tax Benefit, Government Backed Securities*

Introduction

Gold has traditionally been viewed as a symbol of wealth and a reliable investment across generations. In countries like India, it holds immense cultural, emotional, and economic importance. Gold is not only cherished for its ornamental value but is also seen as a safeguard against economic uncertainties. Over time, the methods of investing in gold have diversified, moving beyond physical possession to more structured financial instruments. One such alternative is the Sovereign Gold Bond (SGB) scheme introduced by the Government of India, which presents a modern, secure, and interest-bearing avenue for gold investment.

Sovereign Gold Bonds are government-issued securities that represent a specific weight in gold. These bonds provide a unique opportunity for investors to gain from the appreciation in gold prices while also earning a fixed annual interest. Unlike physical gold, SGBs eliminate concerns related to purity, storage, theft, and making charges. Moreover, on maturity, the capital gains from SGBs are tax-exempt, making them an attractive proposition for long-term investors.

However, consumer perceptions toward SGBs are influenced by a variety of factors. Financial literacy, trust in government-backed instruments, prevailing market conditions, and the relative advantages of different gold investment options all shape investor behavior. While many view SGBs as a stable and tax-efficient alternative to physical gold, others may be deterred by the lack of immediate liquidity, fixed lock-in periods, and limited awareness of the product's benefits.

Investment decisions are also guided by individual risk tolerance, familiarity with financial instruments, and personal financial goals. For some, the emotional and traditional attachment to physical gold outweighs the financial benefits of SGBs. To broaden the reach and impact of such financial products, it is essential to understand consumer mindsets and address existing apprehensions.

This study aims to delve into consumer attitudes and perceptions regarding Sovereign Gold Bonds. It seeks to identify the key motivators and barriers influencing their investment choices. By examining patterns in consumer awareness and behavior, the research intends to offer meaningful insights that can help financial institutions and policymakers promote SGBs more effectively as a trusted and rewarding investment option.

Literature Review

Sudindra and Naidu (2019) conducted a study to assess whether Sovereign Gold Bonds (SGBs) offer advantages over other gold investment options. The research relied on secondary data and aimed to highlight the benefits of SGBs. The findings indicated that SGBs are a preferable choice due to their competitive purchase price, exemption from Tax Deducted at Source (TDS), and their acceptance as collateral for loans.

Shenoy & Ashwitha (2019) conducted a study in Belthangady Taluk (D.K) to assess investors' perceptions and satisfaction levels regarding the Sovereign Gold Bond (SGB) scheme. The research aimed to identify the factors influencing investment decisions in SGBs. With a sample size of 30 respondents, the findings revealed that 67% of investors were satisfied with their investments. Additionally, 66% preferred investing in paper form, while

34% opted for DEMAT. The study suggested that since the scheme is government-backed, it is a secure and suitable investment option.

Ninan (2018) explored the Sovereign Gold Bond Scheme as an alternative to physical gold investment in Kerala. The research, which followed an exploratory methodology based on primary data, highlighted a significant lack of awareness about SGBs, with 75.3% of respondents unaware of the scheme. Moreover, 90.7% of the participants had invested only in physical gold. The study concluded that SGBs could be a viable investment alternative, provided awareness is enhanced.

Satijani & Gidwani (2018) examined the Sovereign Gold Bond Scheme, comparing its performance with physical gold and Gold ETFs. This study, based on secondary research, analyzed the potential of SGBs as an alternative to purchasing physical gold. The findings suggested that policymakers should develop and implement strategies for gold investments. The research also indicated that gold loans were primarily utilized for managing household expenses and debt repayments.athore (2017) investigated investors' attitudes toward physical gold and SGBs, focusing on the factors influencing their investment choices. Using a quantitative research methodology and primary data collection, the study found that SGB investments do not incur transaction costs, making them more attractive to investors. The research recommended organizing awareness programs about SGBs and concluded that safety, purity, and liquidity were the primary factors influencing investors' decisions.

P. Parikh and A. Vaish (2013) highlighted in their study that gold maintains stable performance across different market conditions. They also emphasized that gold serves as an effective tool for risk diversification, as its value remains largely unaffected by fluctuations in other asset classes.Vanitha S. and Saravanakumar K. (2019) explored the future pricing trends of gold and examined its correlation with silver and crude oil. Their research also drew comparisons between gold investments and bank interest rates, ultimately concluding that gold remains a crucial investment choice

Nishad Nawaz and Sudindra Vr. (2013) analyzed the various gold investment avenues available to investors, including jewelry, gold ETFs, coins, bullion, and digital gold. Their

study aimed to evaluate the advantages and disadvantages of these options while also enhancing awareness about the diverse investment opportunities in gold C.A. Rashmi Chaudhary and Dr. Priti Bakhshi (2016) conducted a comparative analysis of the Gold Monetization Scheme and Sovereign Gold Bonds. Their findings suggested that, due to India's cultural and emotional attachment to gold, Sovereign Gold Bonds enjoy greater acceptance among investors compared to the monetization sccheme.

Amar G. Satijani, Dr. Jaspal Gidwani, and Avinash Sahu (2018) observed that public awareness regarding government-backed gold investment schemes—such as Gold Loans, the Gold Monetization Scheme, and Sovereign Gold Bonds—is relatively low. However, their study also revealed that investors are willing to consider these options if they receive adequate information.

Scope of the study

The scope of this study is to analyze consumer perception regarding investments in Sovereign Gold Bonds (SGBs). It focuses on understanding the level of awareness among consumers and the factors that influence their preference for SGBs over physical gold. The study also aims to examine how demographic variables such as age, income, and education affect investment decisions. Additionally, it explores consumer trust in government-backed schemes and evaluates the perceived advantages and limitations of investing in SGBs.

Research Questions

What is the level of awareness towards Sovereign Gold Bonds (SGBs) among investors in Ahmedabad city?

How do investors perceive and prefer between physical gold and Sovereign Gold Bonds

(SGBs)? What are the reasons why some investors do not invest in Sovereign Gold

Bonds (SGBs)?

What factors and reasons do investors consider while preferring Sovereign Gold Bond (SGB) schemes?

Objectives of the study

1. The purpose of the study is to know the awareness level towards SGB in Ahmedabad city.
2. To study the investor's perception through preference between physical gold and SGBs.
3. To study the reasons for non-investing in SGBs by investors.
4. To study the factors, reasons considered by investors on preference in SGBs schemes.

Data Analysis and Interpretation

Demographic Profile of the Respondents

Table 1 : Demographic profile of the respondents		
Demographics Detail	**Options**	**Percentage**
Age	a) Below 25	69
	b)25-35	35
	c)36-45	34
	d)46-55	7
	e) Above 55	8
Gender	a)Male	70
	b)Female	30
Occupation	a)Student	10
	b)Salaried Employee	46
	c)Business Owner	24
	d)Retired	9
	e)Other	11
Annual Income	Below 2,50,000	17
	₹2,50,000 - ₹5,00,000	19
	₹5,00,000 - ₹10,00,000	37
	₹10,00,000 - ₹20,00,000	16
	Above ₹20,00,000	12

The demographic profile of the respondents reveals a predominantly young population, with 69% under the age of 25 and a combined 138% in the 25–45 age group, indicating potential overlap or misreporting. Males constitute the majority at 70%, while females represent 30%, suggesting a gender imbalance. In terms of occupation, salaried employees (46%) and business owners (24%) form the core working population, while students (10%) and retirees (9%) show a mix of early and post-career perspectives. Income distribution indicates that a significant portion of respondents (37%) earn between ₹5,00,000 and ₹10,00,000 annually, pointing to a middle-income demographic. Only 12% earn above ₹20,00,000, reflecting a smaller high-income segment. This data provides valuable context for understanding consumer behavior, preferences, and socioeconomic influences relevant to the study, especially in relation to purchasing capacity and professional background. The sample leans toward a younger, working-class demographic with moderate income levels.

Primary reason for the Investment in SGB

Table 2 : Primary Reason for the Investment in SGB

Primary Reason for Investment	Options	Percentage
	Wealth preservation	15
	Portfolio diversification	27
	Hedge against inflation	41
	Cultural/Traditional reasons	17
	Other	16

The findings reveal that most people are investing with a clear and practical goal in mind—protecting their money from inflation, with 41% citing this as their primary reason. This shows a strong financial awareness among respondents, especially in today's uncertain economic climate. About 27% are focused on diversifying their portfolios, suggesting they understand the importance of spreading risk and not putting all their eggs in one basket. Interestingly, 17% invest due to cultural or traditional reasons, highlighting how family values or long-standing customs still play a role in financial decisions. Another 15% are focused on preserving their wealth, aiming to maintain what they already have rather than chasing high returns. The remaining 16% have other personal motivations—perhaps planning for education, retirement, or specific life goals. Overall, the data reflects a mix of

thoughtful planning, cultural influence, and real-world financial concerns guiding investment choices

Table 3 : Factor Influence for Investment		
Factor Influence for Investment	Interest income	16
	Tax benefits	26
	Government security	41
	Price appreciation of gold	19
	Other	16

The factors influencing investment decisions reflect a blend of rational analysis and personal priorities. Most respondents appear to be guided by practical considerations such as returns on investment, market stability, and inflation protection. This suggests a financially aware group that evaluates investments based on risk and reward. At the same time, factors like trust in financial institutions, past experiences, and social or cultural influences also play a role, indicating that investment decisions are not purely numbers-driven but also shaped by emotion and community norms. For some, expert advice or peer recommendations act as significant triggers, showing how interpersonal trust and financial literacy affect behavior. Overall, the decision-making process seems to be influenced by both external market conditions and internal motivators like long-term security, family traditions, and personal financial goals. This underscores the importance of addressing both rational and emotional dimensions when analyzing investor behavior.

Chi Square

Null Hypothesis (H_0): There is no significant association between a respondent's age group and their awareness of Sovereign Gold Bonds.

Alternative Hypothesis (H_1): There is a significant association between a respondent's age group and their awareness of Sovereign Gold Bonds.

Chi Square

Table 4 : Chi Square			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	15.073[a]	4	0.005
Likelihood Ratio	15.535	4	0.004
Linear-by Linear Association	3.074	1	0.08
N of Valid Cases	202		

The Chi-square test reveals a meaningful link between age group and awareness of Sovereign Gold Bonds (SGBs), with a p-value of 0.005. This indicates that people's understanding or familiarity with SGBs tends to vary across different age groups. For instance, respondents in the 36–45 age bracket were noticeably more aware of SGBs compared to their younger counterparts. Since the p-value is below the standard threshold of 0.05, we can confidently reject the null hypothesis and conclude that age does play a significant role in influencing awareness levels. In simple terms, as people grow older—particularly into their middle years—they seem more likely to be informed about investment options like SGBs.

Null Hypothesis (H_0): There is no significant association between a respondent's occupation and whether they have invested in Sovereign Gold Bonds.

Alternative Hypothesis (H_1): There is a significant association between a respondent's occupation and whether they have invested in Sovereign Gold Bonds.

Table 5 : Chi-Square Test			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	34.712[a]	4	0
Likelihood Ratio	33.781	4	0

Linear-by-Linear Association	1.647	1	0.199
N of Valid Cases	202		
a. 0 cells (_%) have expected count less than 5. The minimum expected count is 5.88.			

The test shows a clear and significant connection between a person's occupation and their likelihood of investing in Sovereign Gold Bonds (SGBs), with a p-value of 0.000. This means the type of work someone does plays an important role in shaping their investment decisions. Salaried employees and business owners are notably more likely to have invested in SGBs, possibly due to having more disposable income or financial awareness. In contrast, students and retirees are less likely to invest, which may be due to limited earnings or different financial priorities. Because the p-value is well below the 0.05 threshold, we reject the null hypothesis and accept that occupation does have a meaningful impact on investment behavior related to SGBs. Simply put, people's work lives influence how and whether they choose to invest.

Null Hypothesis (H0): People with different occupations are equally likely to invest in SGBs in the future.

Alternative Hypothesis (H1): Willingness to invest in SGBs in the future varies by occupation.

ANOVA					
Occupation					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	24.314	2	12.157	11.683	0
Within Groups	207.077	199	1.041		
Total	231.391	201			

The results indicate a strong and statistically significant relationship between a person's occupation and their likelihood of investing in Sovereign Gold Bonds (SGBs), as shown by a p-value of 0.000. This suggests that one's professional background plays a key role in shaping investment behavior. Salaried employees and business owners are more

inclined to invest in SGBs, likely due to greater financial stability or awareness. On the other hand, students and retirees tend to invest less, possibly because of limited income or different financial goals. Since the p-value is significantly below the 0.05 threshold, we reject the null hypothesis and confirm that occupation has a significant influence on investment decisions related to SGBs. In essence, a person's work status directly affects how likely they are to engage in such investment opportunities

Limitation of the Study

This study has a few limitations that need to be acknowledged. Since it is focused only on investors in Ahmedabad city, the findings may not reflect the views of people in other regions. The study is also based on a limited number of respondents, so the results may not capture the opinions of the wider investor community. Another limitation is that some participants may not have shared their true investment behavior or may have limited knowledge about Sovereign Gold Bonds, which could affect the responses. In addition, the research was carried out in a specific period of time, and investor awareness or perception might change in the future due to market conditions or government policies. The study mainly looks at awareness, perception, and reasons for investment or non-investment in SGBs, and does not go into detail about larger economic factors like global gold prices or taxation rules.

Findings

The results of the study offer meaningful insights into how different people think about and approach investments in Sovereign Gold Bonds (SGBs). Most of the respondents are quite young—nearly 70% are under the age of 25—and the majority are male. Salaried employees and business owners make up a large part of the group, suggesting that most participants are actively earning and likely to be more financially involved. Income levels mostly fall into the middle-income bracket, with many earning between ₹5,00,000 and ₹10,00,000 per year. When asked why they invest in SGBs, the top reason was to guard against inflation, chosen by 41% of participants. This shows a strong awareness of economic risks and a desire to protect the value of money over time. Others mentioned portfolio diversification (27%) and cultural or traditional reasons (17%), indicating a mix of strategic thinking and personal or

family values influencing their choices.

In terms of what actually influences their investment decisions, government backing was the most reassuring factor (41%), followed by tax benefits and the potential for gold prices to rise. Clearly, people are drawn to safety, returns, and long-term stability when it comes to investing.

Importantly, the data shows that both age and occupation significantly affect how much people know about SGBs—and whether they invest in them. Middle-aged respondents (especially those between 36 and 45) were more aware of SGBs compared to younger age groups. Similarly, salaried professionals and business owners were far more likely to have invested in SGBs than students or retirees. This suggests that income stability and financial maturity play a big role in investment behavior.

Finally, when asked about their interest in investing in SGBs in the future, responses again varied based on occupation. The ANOVA test confirmed this difference to be statistically significant, pointing out that a person's profession continues to shape their financial outlook and willingness to invest going forward.

Overall, the findings highlight that investment decisions are influenced by a mix of age, job status, income, personal goals, and trust in financial instruments—painting a well-rounded picture of the modern investor’s mindset.

Conclusion

This study gave valuable insight into how people in Ahmedabad view Sovereign Gold Bonds (SGBs). While many are aware of SGBs, only a smaller portion really understands the full range of benefits they offer—like tax advantages, safety, and earning interest. Traditional gold still holds strong popularity, but it’s encouraging to see more young and financially savvy individuals becoming interested in SGBs. They appreciate that these bonds are government-backed, secure, and don’t require any physical storage.

At the same time, the research highlights some hurdles. Many people hesitate to invest in SGBs because they don't have enough clear information, and the buying process seems confusing. Promotion and awareness around SGBs are still lacking, which keeps many potential investors on the sidelines.

The good news is that with better education and simpler communication, more people are likely to choose SGBs over physical gold. As financial literacy grows—especially among younger generations— the shift toward safer, smarter investments like Sovereign Gold Bonds will probably continue to rise. Overall, SGBs have great potential to become a go-to investment, as long as people understand their benefits and find it easy to invest.

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An analysis of the effectiveness and reach of financial inclusion strategies in the Vadodara district

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Abstract

This study looks at the scope and efficacy of financial inclusion initiatives in the Vadodara area, with a particular emphasis on important programs like the Banking Correspondent (BC) model, Pradhan Mantri Jan Dhan Yojana (PMJDY), Direct Benefit Transfer (DBT), and UPI-based digital payments. Surveys were used to gather primary data, while secondary data from government and RBI sources bolstered the analysis. Descriptive statistics and chi-square tests were among the statistical tools used in SPSS to evaluate awareness, usage, and access levels among various socioeconomic groups. Although there have been notable advancements in financial access, the data also show gaps in usage, digital literacy, and scheme awareness, especially among low-income and rural communities. For inclusive financial growth, the

report suggests strengthening financial education and advancing digital infrastructure.

Keywords: *Financial inclusion, Advancement of Digital infrastructure, Government Schemes, Digital Literacy, UPI.*

Introduction:

In the twenty-first century, financial inclusion has become essential to equitable and sustainable economic growth. It is the process of guaranteeing that all people and businesses, especially those in disadvantaged or vulnerable segments of society, have access to suitable, reasonably priced, and timely financial goods and services. In order to promote economic empowerment, lessen poverty, and advance social justice, financial inclusion aims to empower people to actively engage in the formal financial system rather than just giving them access to bank accounts.

Financial exclusion has long been a major socio-economic problem in developing nations like India, where a sizable section of the population lives in rural or semi-urban areas and works in the unorganized sector. In order to enhance financial access and literacy, the Indian government, the Reserve Bank of India (RBI), and other stakeholders have implemented a number of significant projects during the last 20 years. One of the most well-known of them is the Pradhan Mantri Jan Dhan Yojana (PMJDY), which was launched in 2014 with the goal of bringing all households into the banking system by offering insurance, RuPay debit cards, and zero-balance savings accounts.

The reach of formal financial institutions has been greatly expanded by a number of supplementary initiatives in addition to PMJDY, including Direct Benefit Transfers (DBT), the Aadhaar-enabled Payment System (AePS), digital wallets, mobile banking, Business Correspondent (BC) models, and financial literacy campaigns. The financial inclusion movement has been further pushed by the increased use of digital technology and mobile phones, especially during the COVID-19 epidemic, which highlighted the significance of digital access to financial services.

Nevertheless, difficulties still exist in spite of these developments. Meaningful financial inclusion is not ensured by simply opening a bank account. Numerous Jan Dhan accounts are inactive and inert, according to studies. The complete implementation of inclusive financial

access is nevertheless hampered by structural obstacles such low financial literacy, inadequate digital connectivity, a lack of documentation, gender inequality, and mistrust of formal institutions. As a result, evaluating these programs' efficacy in practical settings is essential to comprehending their true effects on recipients.

Gujarat's Vadodara district offers a special case for this kind of evaluation. Vadodara, one of the state's fastest-growing regions, is home to a mixed population of urban, semi-urban, and rural residents. It is a microcosm of India's larger socioeconomic environment because it has farming settlements, industrial zones, educational institutions, and tribal territories. Financial inclusion initiatives have been widely implemented in the district by government agencies, cooperative societies, public and private banks, and self-help groups (SHGs).

The goal of this study is to conduct a thorough examination of the Vadodara district's financial inclusion ecosystem. It seeks to gauge public awareness of various financial inclusion programs, evaluate the accessibility and utilization of financial services, pinpoint socioeconomic factors that influence financial participation, gauge the perceived success of institutional initiatives, and investigate the obstacles that still stand in the way of access.

This project will advance knowledge of the effectiveness of financial inclusion measures at the local level by fusing statistical analysis with empirical data. The information gathered can help community organizations, financial institutions, and legislators expand the availability and influence of financial services in Vadodara and other Indian areas.

Problem statement:

Many residents of Vadodara district are still unaware of or unable to fully access and utilize the financial inclusion programs that have been introduced in India. According to the survey, there are notable differences in awareness and usage by gender, place of residence, and educational attainment. This discrepancy between accessibility and true inclusion emphasizes the necessity of assessing the efficacy and scope of existing financial methods in order to guarantee fair access for all societal segments.

Objectives:

1. To determine the Vadodara district's citizens' degree of knowledge on financial inclusion initiatives.
2. To assess the use and availability of financial and banking services.
3. To examine how socioeconomic variables, affect financial participation.
4. To make recommendations for enhancing Vadodara's financial inclusion's efficacy and reach.

Hypothesis:

- **(Awareness vs. Education)**

H0: Respondents' knowledge of financial inclusion programs is not significantly correlated with their educational attainment.
H1: The degree of education of a respondent and their knowledge of financial inclusion programs are significantly correlated.

- **(Service Use vs. Residential Area)**

H0: The use of banking and financial services is not significantly correlated with residential area (rural, semi-urban, or urban) among respondents.

H1: The use of banking and financial services is significantly correlated with the respondent's residential area.

- **(Gender vs. Financial Participation)**

H0: Financial participation is unaffected by gender. H1: Financial participation is influenced by gender.

Review of Literature

Financial inclusion has become an important area of discussion across the globe, especially in developing economies like India, as it is considered a key driver of economic growth and social equity. A look at previous studies helps us understand how this concept has evolved over time, the progress made, and the challenges that still persist.

The Rangarajan Committee (2008) provided one of the most widely accepted definitions of financial inclusion. It described it as the process of ensuring access to appropriate financial services and timely credit for disadvantaged sections of society at affordable costs. The committee also highlighted that achieving true financial inclusion is not just about opening bank accounts; it requires innovation, the use of technology, and active outreach, especially by public sector institutions.

Building on this perspective, Sarma (2008) developed a multidimensional index to measure financial inclusion across regions. This index considered factors such as the availability of banking services, penetration of banking facilities, and their actual usage. The study revealed significant regional disparities, which suggested that physical access to banking infrastructure alone cannot ensure inclusive financial participation.

The Global Findex Database (Demirgüç-Kunt et al., 2017) presented a global picture and pointed out an interesting trend in India. While there was a sharp rise in bank account ownership, especially after the launch of government schemes like Pradhan Mantri Jan Dhan Yojana (PMJDY), many accounts were inactive or dormant. This finding stressed that financial inclusion should not be measured by the number of accounts opened but by their regular use and the depth of financial engagement.

Mehrotra and Yetman (2015) highlighted the role of digital financial services in advancing inclusion. They argued that mobile banking, online platforms, and other technology-based solutions, combined with strong financial literacy initiatives, could significantly improve last-mile connectivity and ensure people actually use the services available to them.

A more region-specific study by Kumar and Mishra (2019) focused on PMJDY's impact in Bihar. They found that while the scheme helped in expanding access, usage was limited due to low levels of financial literacy and a lack of technological awareness. This underlined the fact that improving infrastructure and policies must go hand in hand with changing behavior and building financial knowledge.

The role of community-driven approaches came out strongly in the work of Shah and Patel (2022), who studied financial inclusion in rural Gujarat. They found that Self-Help Groups (SHGs) and cooperative banks were instrumental in reaching out to underserved populations.

Their findings suggest that leveraging local networks and trust-based models can be highly effective in rural areas.

Finally, Singh et al. (2023) looked at what drives people in semi-urban and rural areas to adopt financial products. Their study concluded that factors such as trust, simplicity of products, and quality of customer service play a major role in encouraging adoption. This shows that creating user-friendly products and building strong relationships with customers are just as important as policy initiatives.

Research Gap:

- Limited District-Level Micro Analysis: Although there are a number of studies on financial inclusion at the national and state levels, there aren't many detailed district-level analyses that concentrate on urban, semi-urban, and rural inequities, particularly in Gujarat's Vadodara district.
- Inadequate Integration of Socioeconomic Variables: While many earlier research concentrates on awareness or access independently, very few examine the impact of variables such as income levels, gender, occupation, and education on financial service usage and awareness.
- Effectiveness Assessment of Particular Plans Is Limited: Despite the extensive documentation of programs such as PMJDY and PMMY, little is known about how residents, particularly at the grassroots level, feel about their efficacy and level of satisfaction with their execution.
- Local Barriers Are Understudied: The body of existing literature enumerates general obstacles to financial inclusion, such as illiteracy and remoteness.

Research Methodology:

Research Design:

The research design used in this study is both descriptive and analytical. It investigates the efficacy and scope of financial inclusion initiatives in Vadodara using both quantitative and qualitative methodologies.

Data Collection:

- A structured questionnaire was used to gather primary data from a variety of urban, semi-urban, and rural locations in the Vadodara district. The questionnaire was distributed online.
- Stratified random sampling was used to choose 150 respondents for the sample.
- Dependent variables include perceived efficacy, contentment, and financial services usage.
- Age, gender, education, income, occupation, and place of residence are examples of independent variables.
- Part A: The survey comprised both multiple-choice and closed-ended questions that were divided into: Demographic information (Age, Gender, Education, Occupation, Income, and Area) is covered in Part A.
- Part B: Access and Awareness (such as an understanding of PMJDY, PMMY and bank usage patterns)
- Part C: Barriers and Effectiveness (Suggestions, Likert scale assessments, challenges, and satisfaction)

Statistical Tools Used:

- In order to facilitate statistical analysis, the demographic and category responses were numerically coded in Excel. For example, Gender: Male=1, Female=2, Other=3; Awareness: Yes=2, Somewhat=1, No=0Level of Education: Illiterate = 1 to Postgraduate = 6. In banking, yes=1 and no=0.
- Cross tabulation: To investigate correlations between two variables, such as: Education versus Awareness versus Awareness Area (Rural/Urban) versus Gender versus Financial Service Use.
- The χ^2, or Chi-Square Test of Independence, Categorical variable connections are tested using this method.

Scope of the study:

- Geographic Coverage: To offer a comparative regional perspective, the study covers urban, semi-urban, and rural areas in addition to the Vadodara district of Gujarat.

- Demographic Diversity: To provide a comprehensive picture of the penetration of financial inclusion, the survey includes a broad range of respondents based on age, gender, education, occupation, and income.
- Focus Areas: Knowledge of important financial inclusion programs (PMJDY, PMMY, and PM- SVANidhi) ‴ financial services accessibility and utilization (bank account, digital tools, credit). Perception of the efficacy of various initiatives Difficulties encountered in obtaining financial services▪ Ideas for enhancing outreach and inclusion policies.
- Policy Implications: The results can assist local banks, cooperative societies, financial institutions, and legislators in creating more focused financial literacy initiatives and enhancing customer service delivery.

Data Analysis and Interpretation

- To determine the Vadodara district's citizens' degree of knowledge on financial inclusion initiatives.

Education Level	No	Yes	Somewhat
Secondary	8.58	1.15	2.24
High Secondary	3.45	0	4.4
Graduate	0.1	0.12	0.91
Post Graduate	0.49	0.01	0.35

- Chi-Square value (χ^2): 21.81
- Degrees of Freedom (df): 6
- Significance Level (α): 0.05
- P-value: 0.0013

We reject the null hypothesis (H_{01}) because the p-value (0.0013) is smaller than the significance level (0.05).

This suggests that respondents' awareness of financial inclusion activities and their educational attainment are statistically correlated.

Simply said, a person's awareness of financial inclusion programs such as PMJDY, PMMY is greatly influenced by their educational attainment.

The information gathered from 150 participants was divided into groups according to their educational background and degree of familiarity with financial inclusion programs. The levels of awareness were categorized as follows:

"No" (Unaware), "Yes" (completely conscious), and "Somewhat" (Aware to some extent). Since no responders were listed under "Illiterate" or "Primary," the exam only included responses from people with secondary education and above.

- To assess the use and availability of financial and banking services.

Area	Yes (E)	No (E)	Somewhat (E)
Urban	69.7	30.34	22.96
Semi-Urban	7.93	3.45	2.62
Rural	7.37	3.21	2.42

Degrees of

Freedom (df) = 4

$\chi^2 = 25.56$

P-value ≈ 0.00004

The p-value is significantly lower than 0.05, at 0.00004. Therefore, the null hypothesis (H_0) is rejected. This indicates that knowledge of financial schemes and residential area are statistically significantly correlated.

- To Examine Socioeconomic Variables, Affect Financial Participation.

Gender vs. Financial Participation

Gender	Category	O	E	$(O-E)^2 / E$
Male	Yes	70	69.33	$(0.67)^2 / 69.33 = 0.0065$
Male	No	10	10.67	$(-0.67)^2 / 10.67 = 0.0421$
Female	Yes	61	60.667	$(1.07)^2 / 60.667 = 0.0188$
Female	No	9	9.33	$(-1.07)^2 / 9.33 = 0.1227$
Other	Yes	0		
Other	No	0		

There is little difference in the high utilization rates among males and females (87.5% and 88.2%, respectively).

The "Other" category, where usage is 0%, has a significant impact on the statistical significance. The chi-square outcome is greatly influenced by this exaggerated value.

It shows that those who identify as "Other" could not have as much access to financial services or might be underrepresented.

Findings

- Respondents' awareness of financial inclusion programs and their educational attainment are statistically significantly correlated.
- The awareness levels of respondents with graduate and postgraduate degrees were noticeably greater. For instance:
- 57.8% of postgraduate students and 60% of graduates said "Yes" (completely

informed).

- Only 33.3% of those with only a secondary education demonstrated complete awareness, which is significantly lower.
- Respondents with doctoral degrees and higher secondary education were more likely to have partial awareness ("Somewhat").
- Those with only a secondary education or less were more likely to answer "No" (not aware), indicating a glaring lack of awareness or outreach.
- Financial participation is statistically significantly influenced by gender.
- The financial inclusion of the "Other" gender category is very lacking.

Conclusion:

- The findings imply that awareness of financial inclusion initiatives is significantly influenced by educational attainment.
- Campaigns for financial literacy and outreach initiatives may need to focus on people with less education in order to increase their knowledge of and use of the financial services that are available.
- It draws attention to the necessity of inclusive, language-accessible, and simpler communication techniques designed for those with less formal education or low literacy.
- Financial plans are more accessible and well-known to urban respondents. Moderate awareness is seen in semi-urban locations, with a concentration in the "somewhat" group.
- Overall awareness is lower among respondents in rural areas, with none indicating "somewhat" awareness.
- People's use of financial services in Vadodara is not substantially influenced by their gender.
- It's possible that efforts to promote financial inclusion are fairly reaching both sexes.

Recommendations/Suggestions:

- Financial education initiatives in secondary schools and community programs should be bolstered by authorities and financial firms.

- To close the awareness gap, use village-level efforts, local influencers, and vernacular media.
- During neighbourhood gatherings and community meetings, provide hands-on examples of banking services and the advantages of schemes.
- Bolster the digital banking infrastructure in rural regions (better mobile and internet connection).
- Encourage the use of UPI, Net Banking, and other digital literacy through government awareness initiatives.
- Boost efforts for financial literacy and services that are inclusive of all genders.
- Engaging transgender and non-binary people in the financial system requires extra outreach and trust-building.
- To improve the design of inclusive financial services, make sure that data is collected with gender disaggregation.
- In villages that are underserved, increase the number of banking correspondents. Use government camps, neighborhood kiosks, and mobile vans to increase financial services.
- In rural and semi-urban communities, targeted financial literacy and awareness initiatives are required.
- In these areas, local camps and mobile banking awareness campaigns ought to be organized by the government and financial institutions.

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Questionnaire:

Research Paper

"An analysis of the effectiveness and reach of financial inclusion strategies in the Vadodara district".

Part A: Demographic Details

Age:

Multiple choice

- Below 18
- 18-25
- 26-40
- 41-60
- Above 60
- Add option or Add "Other"

Required

Gender: *

- Male
- Female
- Other

Education: *

- Illiterate
- Primary
- Secondary
- Higher Secondary
- Graduate
- Postgraduate

Occupation: *

- Farmer
- Self-Employed
- Salaried
- Daily wage
- Unemployed
- Student

Monthly Income: *

- < ₹5,000
- ₹5,001–₹10,000
- ₹10,001–₹20,000
- ₹20,001–₹40,000
- Above ₹40,000

Area of Residence: *

- Urban
- Semi-Urban
- Rural

Part B: Awareness & Access

Are you aware of financial inclusion schemes like PMJDY, PMMY, PM-SVANidhi? *

- Yes
- No
- Somewhat

Do you have a bank account? *

- Yes
- No

Type of bank used: *

- [ ] Public Sector
- [ ] Private Bank
- [ ] Cooperative Bank
- [ ] Post Office
- [ ] Payments Bank

How frequently do you use your bank account? *

- ( ) Regularly
- ( ) Occasionally
- ( ) Rarely
- ( ) Never

What financial services do you use? (Tick all that apply) *

- [ ] Savings Account
- [ ] Loan
- [ ] Insurance
- [ ] ATM
- [ ] UPI
- [ ] Net Banking
- [ ] Fixed Deposit
- [ ] Credit Card
- [ ] Other...

Was your account opened under any government scheme? *

- ( ) Yes
- ( ) No
- ( ) Don't Know

Part C: Effectiveness and Barriers *

Rate the following on effectiveness of financial inclusion strategies (1 = Very Poor to 5 = Excellent):

PM Jan Dhan Yojana

1 2 3 4 5

PM Mudra Yojana *

1 2 3 4 5

Mobile Banking/UPI *

1 2 3 4 5

Banking Correspondents *

1 2 3 4 5

What are the barriers you face in accessing financial services? *

- [ ] Distance
- [ ] Lack of documents
- [ ] Illiteracy
- [ ] Technology issues
- [ ] Lack of awareness
- [ ] High service charges

Are you satisfied with the services provided by your bank? *

- ( ) Highly satisfied
- ( ) Satisfied
- ( ) Neutral
- ( ) Dissatisfied

Suggestions for improvement in financial inclusion

Short-answer text

India's Digital Financial Transactions Revolution: Opportunities, Challenges, and Future Prospects

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Abstract

India’s financial system is being run by digital technology. Large-scale reforms, such as notation, Covid- 19 pandemic, digital India initiatives, and acceleration of contact-free services, have also become a pillar of economic development, including digital financial transactions. Platforms such as the Unified Payments Interface (UPI), Aadhaar-enabled Payment Systems (AEPS) and mobile wallets, blockchain, digital rupees have increased the speed, accessibility and transparency of the transaction. Artificial Intelligence (AI) improves digital finance by facilitating data-based decisions, personal services and real-time fraud detection. This study shows enormous prospects for the development of digital finance environment, infrastructure and development route, financial inclusion, MSME assistance and governance transparency. However, significant barriers to progress include cyber security risks, data privacy and digital illiteracy. The future possibilities identified in this study include blockchain applications, digital currencies (CBDCs), AI-operated platforms,

and tools for removing digital division. Through India's digital financial ecosystem, technical innovation, strategic policy interventions and public-private collaborations can help to realize the model of all similar, secure and sustainable development. These findings show how important it is to have strong cyber security, trust-building strategies and essential infrastructure to fully implement this digital revolution.

Keywords: *Digital Financial Transaction, Cashless Economy, Digital Divide, Fintech in India, Future of Digital Finance*

Introduction

In the last decade, the rapid adoption of digital financial transactions in India has changed its financial position. Major national and global events—such as the 2016 demonetization, the COVID-19 epidemic, and rapid fintech innovation—have worked as a catalyst for this change (RBI, 2025; Mehta and Kumar, 2023). This development has transitioned into agile, efficient, and technology-based payment systems from cash-based models, providing customer and professional behaviour uniformly. Government leadership, such as Prime Minister Jan Dhan Yojana (PMJDY), Aadhaar-based identification, and Bharat Net infrastructure, has provided a strong foundation for financial inclusion, which expands the deprived and remote population (Finance Ministry, 2024). The widespread adoption of digital platforms, including the Unified Payments Interface (UPI), Aadhaar-enabled Payment System (AEPS), mobile wallets, and Internet banking, has become more democratic (NPCI, 2024).

The integration of Artificial Intelligence (AI) in digital finance makes a significant jump in service distribution and risk management. AI-operated equipment now enables real-time fraud search, personal financial services, prediction credit scoring, and intelligent customer support by chatbots and virtual assistants (KPMG, 2023). This synergy between AI and digital finance has increased security, functional efficiency, and user experience, which promotes more incorporated and sustainable financial ecosystems. India's leadership is more and more known globally in digital payments. For example, UPI processes more than 13 billion transactions (NPCI, 2024) and is expanding internationally through partnerships with countries such as Singapore, the UAE, Bhutan, and France (RBI, 2025). This growth has been supported by the regulatory institutions, especially the Reserve Bank of India (RBI) and the National Payments Corporation of India (NPCI), a novelty sandbox, security structure,

and indigenous systems such as Rupay and Bharat Billpay (RBI, 2025; NPCI, 2024). Together, technological innovation, active regulation, and public-private cooperation are leading India to a cash-light, digitally powerful, and competitive financial future globally.

Growth and Evolution of Digital Financial Transactions in India:

The development of digital financial transactions in India is taking shape with technological advancement, policy improvement and growing acceptance by consumers. The journey began with the initial electronic systems such as electronic fund transfer (EFT) in the 1990s and the start of the National Electronic Fund Transfer (NEFT) in 2005, enabling inter-bank transfer by Batch Settlement (Reserve Bank [RBI], 2023).

A major milestone was the launch of the Immediate Payment Service (IMPS) in 2010, which allowed 24×7 instant money transfers using multiple channels such as mobile banking and ATMs (National Payments Corporation of India [NPCI], 2024). In 2011, the Aadhaar-enabled Payment System (AEPS) was introduced to provide biometric-based banking services, improving financial inclusion, especially in rural areas (RBI, 2023).

The biggest change was with the introduction of the Unified Payments Interface (UPI) in 2016. Its growth through the government's notary policy and the Digital India Program became accelerated. UPI transactions increased from 92 million in 2017-18 to more than 131 billion in 2023-24, showing more than 100% compound annual growth rate (CAGR) (Finance Ministry, 2024). By 2024, UPI had more than 83% of all retail digital transactions, leaving behind old systems such as NEFT, IMPS and card payments (business standard, 2025).

India’s dominance in real -time payment is now globally – in 2024, all of these transactions worldwide account for 48.5% (ACI Worldwide, 2025). Auxiliary infrastructure has also increased rapidly: Point- of-cell (POS) terminals increased by 24.7% in 2024, and in the same year UPI QR code increased by 91.5% (Financial Express, 2025). This development shows how India has developed in a sophisticated, high-volume and global recognized system of basic digital payment facilities.

Growth in Digital Financial Transactions in India (FY 2020–21 to FY 2024–25):

Financial year	Volume of digital transactions (in crores)	Value of digital transactions (In ₹ Lakh crores)	Source
2019 -20	3510	1180	RBI Annual Report (2020)
2020 -21	4380	1414	RBI Annual Report (2021)
2021 -22	7200	1744	RBI Annual Report (2022)
2022 -23	11393	2086	RBI Annual Report (2023)
2023 -24	16443	2428	RBI Annual Report (2024)

(Source: RBI Annual Report)

This table has shown continuous growth in digital payment transactions in India in the last five years. Volume increased by about 3510 crores in 2019-20 to 16443 crores in 2023-24. There is also a steady increase in the value of the transaction, showing consumer confidence and adoption increase. This growth is inspired by the main platform such as UPI, mobile wallets and card payments.

Literature Review

Growth of Digital Financial Services

Kandpal and Mehrotra (2019) emphasize that fintech and digital financial services have reduced transaction costs and expanded banking access, especially through platforms like UPI and mobile wallets. Similarly, Bansal (2024) emphasizes the role of government-led initiatives like Digital India in encouraging adoption, citing improved convenience and efficiency. However, Parvin and Panakaje (2022) give a more cautious view, noted that despite the quantitative growth, rural adoption is limited by less awareness and structural deficit. This difference reflects the distance between the volume matrix and the actual inclusive entrance.

Financial Inclusion and Equity

Goldfinch (2024) and Demirguc-Kunt et al. (2018) provides strong evidence that the digital financial platform can significantly expand the access to affordable financial services for the traditionally excluded population, especially women, low -income people and subtle

entrepreneurs. By eliminating geographical and cost-related barriers, this platform provides users more control over their financial decisions. However, Sharma et al. (2023) and Nazar and Kareem (2024) challenge the assumption that improved access automatically translates into genuine inclusion. They argue that factors such as low digital literacy, mistrust in technology, and reliance on intermediaries often limit sustained and independent use of these platforms. This tension highlights the gap between formal access to services and meaningful, empowered participation in the digital economy.

Technological Innovation and Risks

Prasad (2021) frames the ongoing fintech revolution as a transformative process capable of reshaping global currency systems and democratizing financial access. Narula and Sah (2025) further emphasize how India's fintech ecosystem has evolved to integrate AI-driven solutions, blockchain applications, and scalable payment infrastructures. Yanagawa and Yamaoka (2019) extend this optimism to the realm of central bank digital currencies (CBDCs), suggesting that public-sector-backed digital money could combine the efficiency of private innovations with the security of sovereign guarantees. In contrast, Murinde et al. (2022) caution that the rapid pace of technological adoption introduces systemic vulnerabilities, including cybersecurity breaches, algorithmic bias, and regulatory blind spots. They warn that over-reliance on untested digital frameworks may increase financial instability during market shocks. These conflicting perspectives expose a central debate in the literature — whether fintech-driven innovation inherently strengthens financial systems or creates new fragilities that require vigilant oversight.

Future Prospects and Unresolved Challenges

Rachmad (2025) and Malali (2025) imagine significant opportunities in emerging technology such as AI, Blockchain and CBDC, indicating that this equipment can streamline operations, reduce costs, and further extend access to financial services. He believes that the integration of such innovations in mainstream finance could rank India as a leader in global digital finance. However, Theraiyan (2024) and Rajak (2023) stress that without addressing structural inequalities — including poor digital infrastructure in rural areas, language barriers, and the exclusion of elderly or technologically disadvantaged populations — future advancements may deepen existing divides. Their position reflects a broader scholarly scepticism over technological determinism, questioning whether innovation alone can

deliver equitable outcomes without parallel social and economic reforms.

Objectives of The Study

- To study the evolution and growth of digital financial transactions in India.
- To identify the key opportunities created by the digital finance ecosystem.
- To identify the challenges hindering the adoption of digital financial services.
- To analyze future prospects for digital financial transactions.

RESEARCH METHODOLOGY

This study adopts descriptive and analytical research design to explore digital financial transactions, challenges and future prospects in India. This research depends entirely on the secondary data due to the availability of widespread official datasets, industry reports and peer-migrated educational literature, which ensures the accuracy, reliability and extensive of findings.

Purpose of Methodology:

The objectives of this method are to systematically collect, review, and analyze reliable secondary information to find patterns in India's digital financial ecosystem, find out how much challenges and evaluate future growth prospects.

Data sources:

Secondary data was obtained from multiple reliable and authorized sources, including the following:

Government and Regulatory Publications: Reserve Bank of India (RBI) Annual Reports, National Payments Corporation of India (NPCI) Transaction Dashboards, Telecom Regulatory Authority of India (TRAI) Statistics, Ministry of Electronics and Information Technology Update (MeitY) Digital Economy.

International Database: World Bank Global Findex Database, IMF Financial Access Survey, UNCTAD Digital Economy Statistics.

Educational Literature: Peer-reviewed of Research Articles published in Scopes- and Web

of Science- Indexed Journals, Conference Proceedings and Research White Papers.

Industry reports and portals: Digital India platform, India Billpay statistics, UPI performance reports and Fintech sector analysis reports.

OPPORTUNITIES IN DIGITAL FINANCIAL TRANSACTIONS

Economic & Financial Inclusion Opportunities

- **Financial Inclusion for the Unbanked:** The digital platform eliminates the gap between traditional banking systems and deprived population in rural and remote areas. Using mobile banking, Aadhaar-linked services and simple wallet applications, people with no bank branch nearby can also participate in a formal financial ecosystem.
- **Boost to Small Businesses & MSMEs:** Digital payment tools empower micro, small and medium industries (MSMEs) by enabling immediate payment, recordkeeping and access to digital credit. E-commerce integration also helps them reach widespread markets and improve financial transparency.
- **Expansion of Credit Access via Digital Footprints:** With AI-based credit evaluation, the digital platform uses transaction data to provide users offer loans without formal credit history. This makes financial access democracy and brings informal workers into a lending system.
- **Poverty Reduction Through Direct Benefit Transfers (DBTs):** DBTs allow governments Send directly to the Subsidies, pension and welfare schemes to the beneficiaries account, eliminate the intermediaries, reduce corruption and provide timely assistance to the needy.

Efficiency, Growth & Innovation Opportunities

- **Faster and Real-Time Transactions:** Services such as UPI, IMPS, NEFT and RTGS ensure immediate transfer of funds, improving business efficiency and reducing dependence on cash. This speed is important for emergency services, medical payments and rapid commerce.
- **Promotion of a Cashless Economy:** Digital payment helps reduce cash circulation,

reduce black money, and formalize the economy. The cashless system supports more responsibility, facilitates tax collection and reduces working costs for banks and government.

- **Innovation in Financial Services:** Fintech innovations such as Buy-No-Pay-Later (BNPL), Micro-Investing Apps, Peer-to-peer Landing and Digital Insurance are creating new ways to meet customers' needs, as well as increasing financial literacy and accessibility.
- **Wider Market Access for Sellers:** Small retailers, craftsmen and domestic businesses can now receive and sell online payments on platforms like Amazon, Flipkart and Social Commerce Apps. This leads to economic empowerment and local-to-global market.

Transparency, Governance & Policy Opportunities

- **Reduction in Corruption and Leakages:** Digital transactions reduce manual processes and eliminate mediators, reduce corruption opportunities in government programs, purchases and service distribution.
- **Improved Record-Keeping & Analytics:** Digital payment history offers data for both individuals and enterprises for budget, auditing and financial planning. Lenders and regulators can use this data for risk evaluation and compliance monitoring.
- **Support for ESG and Green Finance:** Digital platform facilitates investment in green bonds, clean energy projects and other durability-associated enterprises, which are financial alignment with environmental and social goals.
- **Better Monetary Policy Transmission:** With better data from digital transactions, RBI and financial institutions can track money flow in real time, thereby enabling more response and accurate monetary policies to control inflation, manage liquidity and stabilize the economy.

Technology & Future-Readiness Opportunities

- **Integration with Artificial Intelligence & Machine Learning:** AI and ML can analyze the user's behaviour to provide customized financial services, find

inconsistencies in transactions and improve the decision. They also reduce operational costs through automation.

- **Support for Digital Rupee (CBDC) Rollout:** India's central bank is introducing digital rupees, offering government- backed, programmable and traceable currency. This will redefine financial exchange models, reduce printing costs and increase transparency.
- **Interoperability Across Platforms:** Allows seamless transactions in interoperability banks, wallets and financial applications - ensure facilities, reduce friction and increase user confidence. It supports digital inclusion in regions and platforms.
- **Job Creation in Fintech & Digital Infrastructure:** Surge in digital finance have demanded roles in application development, cyber security, customer support, AI/ml and data analytics. It also opens entrepreneurship opportunities through a digital platform.

Challenges in Digital Financial Transactions

- **Cybersecurity Threats:** Cybercrime incidents have also increased significantly with the rapid growth of digital financial transactions. In the financial year 2024-25, 13,516 cases of card and internet fraud were registered in India, which was 56% of all banking fraud, of which a total loss of ₹ 520 crore was lost-less than ₹ 1,457 crore in 2023-24 (Reserve Bank of India [RBI], 2025). The main attack methods include phishing, malware infiltration, SIM-swap plans and identification theft. A national survey by HelpAge India (2025) found that 38% of senior citizens faced online scandals in the past year, which showed consistent defects in digital literacy, especially in rural and semi-urban areas. Poor authentication methods, unsafe devices and delayed fraud search methods increase financial risks for both end users and financial institutions.
- **Poor Digital Infrastructure in Rural Areas:** Despite India's rapid progress in poor digital infrastructure digital payments in rural areas, rural connectivity is a major barrier. According to the Telecom Regulatory Authority of India (TRAI, 2024), the use of rural internet is only 37%, while in urban areas the proportion is 69%. Poor broadband access and frequent network outage, especially in Bihar, Jharkhand, and

remote areas of the northeast, hinders easy transactions.

- **Inadequate Banking Services in Remote Areas:** Despite the financial inclusion drives, physical banking facilities are limited in rural and tribal areas, with an average of 14.6 branches per 100,000 adults. Many people rely on business correspondents and micro-ATMs, suffering from cash lack and technical failures (RBI, 2024).
- **Exclusion of Elderly and Technologically Disadvantaged:** Digital payments are only 8% in people aged 60+, which reflects generation and technical barriers. Older citizens often avoid online transactions due to complexity and selection of cash (RBI, 2023). Most of India's older population has difficulty using mobile banking applications, e-wallets and other digital platforms. Similarly, people with limited education or have no technology experience cannot benefit from digital finance. This exclusion creates dependence on others, which increases their weakness of absorption or financial misconduct. Unless the platform is designed to make user-friendly, these groups will stay away the benefits of financial digitization.
- **Trust Deficit in Technology:** Cyber security concerns are a hindrance to the adoption of digital payment. In 2023, 1.39 million cyber incidents were reported in India, including phishing and payment fraud (CERT-In, 2024). In the financial year 2024-25, the loss of fraud reached ₹ 36,316 crore (RBI, 2025). Such risks reduce the user's confidence, which makes strong security measures, transparency and effective grievance redressal critical for trust building.
- **Lack of Awareness About Services and Benefits:** Despite the rapid expansion of digital finance, 42% of rural Indians are unaware of the main services such as Direct Benefit Transfer (DBT), Aadhaar-Enable Payment System (AEPS), or Micro-insurance scheme (MeitY, 2024). With only 27% financial literacy (NCFE, 2023) at the national level, limited awareness prevents users from maximizing benefits, emphasizing targeted local-language campaigns and community access.

Future Prospects of Digital Financial Transactions

- **Integration with Artificial Intelligence:** Artificial Intelligence is expected to redefine digital financial systems by making it smarter, safer and more adaptable. Through real-time fraud detection, forecast analysis, biometric authentication and

intelligent consumer assistance, AI will personalize user experiences and improve risk management. Chatbots and virtual assistants will increase service distribution, while AI-operated credit scoring models will provide credit solutions to the deprived population. These capabilities will significantly improve performance efficiency and customer satisfaction.

- **Blockchain and Smart Contracts:** Blockchain technology will introduce a new level of transparency and security in digital transactions. With its decentralized nature, data can be tampering and fraud minimize. Smart contracts will allow self-executive agreements that will automatically trigger payment when the predetermined conditions are met-eliminate mediators, reduce legal disputes and ensure fast, cost-effective transactions. This technology is especially promising for insurance claims, loan distribution and trade across the border.
- **Digital Rupee (CBDC):** Digital Rupees, Central Bank of India, Digital Currency (CBDC), is ready to change the payment landscape by providing a sovereign digital alternative to physical currency. Supported by the Reserve Bank of India (RBI), CBDC will allow safe, efficient and tracing transactions when reducing currency management costs. It will also support offline payments, reduce dependence on cash and enable more involved partnerships in the formal economy - especially for those with limited access to banking.
- **Expansion of Fintech Ecosystem:** India’s expansion Fintech industry will pave the way for innovations in investment, credit, insurance and payment. This will accelerate economic expansion, increase financial accessibility for the disadvantaged people, and create new opportunities for digital-first financial services and enterprises.
- **Green and Sustainable Finance:** The digital platform will lead the environmentally friendly financial sector through digital transactions, green bonds, durability and potential investments. It will support India’s green digital economy and align financial operations with environmental goals.
- **Global Expansion of Indian Platforms:** India's digital payment infrastructure, especially UPI and Rupay, who are gaining recognition internationally. With strategic partnerships in countries like Singapore, UAE, France and Nepal, the Indian platform is

ready to be the key players in global digital payments. This will streamline to remittances, promote commerce across the border and increase India's influence in global FinTech governance. It will also provide a model for low-cost, high-volume digital payment systems worldwide.

- **Voice and Regional Language Payments:** To promote financial inclusion in all demographic communities, the future digital platform will support voice-based commands and local language interface. This will help the semi- literate, older and rural users confidently financial transactions. Voice-enabled banking, AI chatbots in regional languages and interactive voice response (IVR) systems will bridge the barriers of language and literacy, bringing millions of new users to the digital economy.
- **Strengthened Cybersecurity and Data Protection:** Strengthening cyber security and data security as digital transactions expand, it will be necessary to ensure strong cyber security and user data protection. Future systems will implement AI-based threat search, end-to-end encryption, zero-trust security models and strict data governance policies. Regulatory organizations are also expected to introduce advanced structures such as India's proposed Digital Personal Data Protection Act to ensure the moral and legal management of financial data.

Limitation of the study

This study depends only on the secondary data obtained from the Reserve Bank of India (RBI), the National Payments Corporation of India (NPCI), academic research papers, and the relevant government publications. While these sources are generally reliable, there is a possibility of instinctive prejudice due to factors such as selective reporting, consolidation of statistics and potential delays in data proliferation. Absence of primary data collection – such as structural surveys, interviews or case studies – limits the ability to get a subtle, ground -level view on user behaviour and adoption patterns. In addition, given the rapid pace of innovation in the digital finance ecosystem of India, some of the trends and figures presented here may vary in a short -time frame. In addition, this analysis does not account for non-recorded or informal digital transactions, which can result in less estimates of the actual volume and scope of activity in the field.

Suggestions

- **Increasing cyber security measures:** Adoption of advanced fraud search equipment, end-to- end encryption and regular security audits to reduce risks such as hacking, phishing and identification theft.
- **Encourage digital literacy:** Apply digital skill training programs nationwide, especially in rural and semi-urban areas, to ensure safe and effective use of a digital payment platform.
- **Bridge the Digital Divide:** Extend high-speed internet coverage, improve network infrastructure, and make data services more affordable to enable the same access to digital transactions.
- **Strengthen the public-private partnership:** Easy cooperation between banks, fintech companies and government agencies to design a safe, user-friendly and inclusive payment solutions.
- **Adopt Emerging Technologies:** Embrace emerging technologies: use blockchain for secure record-keeping, AI to enhance customer service, and CBDC for safer, more efficient transactions.
- **Build Public Trust:** Establish efficient grievance redressal systems, customer help desks and awareness campaigns to increase trust in digital financial services.

Conclusions

This study concludes that India's digital financial ecosystem has changed significantly, powered by technological innovation, progressive policy measures, and rapid adoption of FinTech solutions. Platforms such as UPI, AEPS, mobile banking, internet banking, and mobile wallets have increased accessibility, functional efficiency, and transparency, which has made a widespread partnership with the formal economy. This development has strengthened financial inclusion, supported small businesses, and facilitated economic modernization. However, continuous issues such as cyber security risks, gaps in rural structure, low digital literacy, and concerns about data privacy continue to limit equal adoption in all demonstrations. Addressing these challenges requires an integrated approach

to an advanced security protocol, targeted awareness programs, and structural expansion in the lacking areas. Looking forward, the integration of emerging technologies such as artificial intelligence, blockchain, and central bank digital currencies provides opportunities to improve the elasticity, inclusion, and efficiency of the financial system. Depending on the collaborative efforts between the sustainable policy makers, financial institutions, technology providers, and civil society, it can be ensured that the benefits of digital finance are safe, accessible, and similar to all citizens.

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Green Supply Chain Finance and ESG Integration in India: A Mixed- Methods SEM Approach

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Abstract

India's transition to a low-carbon economy hinges on how quickly its supply-chain-intensive industries can unlock "green" liquidity and embed Environmental, Social, and Governance (ESG) discipline across tiered networks of suppliers and distributors. Drawing on the Triple Bottom Line (TBL) framework, this study employs an explanatory-sequential mixed-methods design. A survey of 382 senior managers from manufacturing, FMCG, textile, and automotive firms is analysed with covariance-based Structural Equation Modelling (SEM), followed by 24 semi-structured interviews to elucidate causal pathways. Results show that Green Supply Chain Financing (GSCF) instruments (e.g., green-labelled invoices, preferential credit, sovereign green bonds) have a significant positive impact on ESG Integration ($\beta = 0.63$, $p < 0.001$), which in turn drives Sustainability Performance ($\beta = 0.56$, $p < 0.001$). ESG

partially mediates the GSCF–performance link (VAF = 47 %), while policy pressure and supply-chain collaboration moderate key paths. Qualitative insights reveal five adoption archetypes—from "compliance allocators" to "strategic reconciliators"—highlighting contextual forces such as SEBI's BRSR Core standards and India's USD 55.9 bn sustainable-debt boom. The study contributes a validated measurement model, extends TBL to emerging-market finance, and offers managers a stepwise roadmap for scaling GSCF without green-washing.

Keywords: *Green supply-chain finance, ESG, mixed methods, structural equation modelling, India, Triple Bottom Line.*

1. Introduction

Recently, the intersection of environmental responsibility, financial innovation, and supply chain management has emerged as a crucial focal point for achieving sustainable development (Raman et al., 2023; Alamoush et al., 2021). The development of Green Supply Chain Finance (GSCF) is a good start on the road to making sustainability financing as popular as other forms of Islamic financing are today (Liu et al., 2023; Khan et al., 2023). By using GSCF, businesses have the chance to infuse their value chains with environmentally and socially responsible practices, which can help pave the way to more sustainable societies and economies (Guo et al., 2022; Chen et al., 2023). GSCF links access to capital to environmental, social, and governance (ESG) performance metrics (Zhou et al., 2022; He et al., 2024). This makes it possible for both buyers and suppliers to align their financial decisions with sustainability objectives.

Integrating this is especially timely and critical in the Indian context. India, as one of the fastest-growing economies, is under ever-increasing pressure to not only reduce—but also to demonstrably show that it is reducing—for the sake of both an appeased public and international investors, its environmental footprint, while at the same time, supporting a largely industrial growth phase and an agenda of so-called inclusive development. Country's economic output and the environmental burden both significantly arise from supply chains in sectors like manufacturing, textiles, automotive, and fast-moving consumer goods (FMCG) (Zhang & Dilanchiev, 2022; Chauhan et al., 2022). As worldwide stakeholders call for supply networks that are cleaner and more transparent, Indian companies are under pressure to examine not just

what they do but also how they do it, especially when it comes to financing, evaluating, and incentivizing sustainability at every level of their supply chains.

Even though GSCF's potential is clear, there exists a high number of alerts threshold certification brings with it a rising prominence and trust from stakeholder groups, Indian banks remain unintegrated. They remain disconnected from this high-trust territory because company law in India mandates a very low threshold for consolidated accounts to be presented. This, combined with the fact that many CSR activities are not accounted for in consolidated accounts, represents a gaping chasm in trust (Primec & Belak, 2022; Belas et al., 2022).

The conventional supply chain finance system frequently neglects sustainability requirements (Lai et al., 2025; Kabir et al., 2021). It emphasizes cost and efficiency far too much and doesn't consider factors in the financing decisions that might bias in favor of environmental or social sustainability. On the other hand, obtaining financial support for sustainability initiatives may be difficult because of the absence of aligned and measurable risk-return expectations (Zhao et al.,2022; Ediagbonya & Tioluwani, 2022). The challenge is to create systems that reward performance on ESG (environmental, social, and governance) factors with real, quantifiable, and financially beneficial results in the case of supply chains that are varied, complex, and multilayered.

This research tackles this challenge by investigating the connection between green supply chain finance, ESG integration, and sustainability performance in businesses in India. It seeks to unravel the kinds of relationships that exist between financial mechanisms that may serve as catalysts for ESG adoption and

top-tier organizational performance. Using a mixed-methods approach, the investigation combines empirical data analysis with expert insights. The result is a meritorious work that provides a comprehensive view of the financial and strategic implications of adopting GSCF.

We aim to help financial institutions, policymakers, corporate decision-makers, and supply chain partners move toward deeper integration of sustainability into their financial and operational frameworks. While India moves toward a low-carbon, inclusive economy, it is essential to understand the mutually reinforcing roles that finance and ESG play. Their interaction is not just relevant; it is necessary and, in fact, fundamental for something we all

want: a long-term, resilient, and inclusive society and economy.

1.1 Research questions

1. **RQ1:** How does GSCF influence ESG integration in Indian supply chains?
2. **RQ2:** Does ESG integration mediate the relationship between GSCF and sustainability performance?
3. **RQ3:** What contextual factors strengthen or weaken these relationships?

2. Literature Review

The shifting arrangement of business practices targeting sustainability has prompted the need for mechanisms like Green Supply Chain Finance (GSCF). Deploying GSCF, a relatively new development, appears to have considerable potential for steering companies in an environment-friendly direction. In basic terms, GSCF represents the marrying of traditional supply chain finance with sustainability principles, where financing decisions are influenced not only by the creditworthiness of suppliers but also by their environmental, social, and governance (ESG) performance (Liu et al., 2023; Malay et al., 2024). This model allows large businesses to harness their financial power to drive sustainability among partners, both upstream and downstream. This is particularly true in developing economies such as India, where the SME sector occupies a pivotal space in the economy.

Green supply chain finance is more than a funding strategy; it is a value creation tool that aligns cash flow management with sustainable procurement goals (Lai et al., 2025; Fahim & Mahadi, 2022). Financial instruments such as green factoring, reverse factoring, dynamic discounting, and sustainability-linked loans are now being tailored to reflect ESG benchmarks. These mechanisms reward suppliers with better credit conditions or lower interest rates if they meet certain ESG targets. GSCF thus not only enhances liquidity but also elicits a change in manner from suppliers across the whole supply chain. It nudges them toward greater transparency, traceability, and sourcing responsibility.

Concurrently, ESG integration is becoming a global business issue (Lliescu & Voicu, 2021; Hu et al., 2022). ESG stands for environmental, social, and governance factors (Suresh et al.,

2024; Maybee et al., 2023). These are systematically incorporated into business decision-making, operations, and disclosures. Companies that embrace the E, S, and G are presumably doing a better job of positioning themselves to manage long-term risks (Larcker et al., 2022; Yildiz et al., 2024). They're presumably attracting sustainable investments with this enhanced risk profile. They're presumably building and maintaining better stakeholder trust because they're walking the talk of sustainable capitalism. In supply chains, the integration of ESG shows up in emission reduction, fair labor practices, waste minimization, and, importantly, supply chain transparency. And it all comes down to one thing: managing risk.

In India, the integration of ESG is moving forward, thanks to regulatory insistence, investor interest, and global trade linkages. Large Indian corporations know they can no longer ignore the need to not only assess their own ESG performance but also that of their suppliers—this being part and parcel of a more sustainable, less risky, and therefore more sensibly managed business ecosystem. The intricate nature of multi-tier supply chains, the absence of standardized ESG metrics, and the restricted availability of green financing tools frequently obstruct thorough ESG integration at the supplier level.

The theoretical foundation behind GSCF and the integration of ESG is found in frameworks like the Triple Bottom Line (TBL). TBL theory posits that the interdependencies of people, planet, and profit are what truly govern the long-term success of businesses (Srivastava et al., 2022; Molina & Rajagopal, 2023). From a strategic standpoint, GSCF is a mechanism for translating sustainability from a somewhat esoteric principle into a set of practices that are both financially measurable and operationally viable. When firms link financial incentives to ESG performance, they are effectively converting qualitative sustainability goals into something that looks and acts much more like a typical business outcome: a set of mostly quantitative results.

Even though this domain is receiving heightened interest, current research often considers green finance and ESG as parallel, if not totally isolated, constructs. It pays far too little attention to understanding their interaction—how green finance can help achieve ESG objectives and how achieving ESG objectives may require green finance, in the dynamic context of supply chains (Gao et al., 2024; Baid & Jayaraman, 2022). Very few studies have taken an empirical approach to this issue. In addition, the emerging market context, including policy, infrastructure, and market readiness, varies widely throughout the nation of India and remains underexplored.

This study attempts to fill these gaps by looking at how GSCF and ESG interact and influence sustainability performance, especially in the Indian supply chain ecosystem. The research aims to provide both evidence from empirical studies and practical insights. It proceeds from a robust theoretical framework into the growing body of literature on responsible supply chain management and sustainable finance.

3. Research Objectives & Hypotheses

This research primarily aims to investigate the link between Green Supply Chain Finance (GSCF) and Environmental, Social, and Governance (ESG) integration. It then evaluates how these factors combine to impact sustainability performance in Indian supply chains. The national and global focus on sustainable development makes it increasingly necessary to comprehend how we can use finance to foster responsible and transparent business practices across the increasingly complex networks of suppliers in this country. Understanding this set of issues is particularly pressing in India, a country that is both a major player in the world economy and home to a substantial portion of the world's poor.

This study intends to scrutinize whether GSCF mechanisms like preferential financing, green bonds, and sustainability-linked credits serve as efficacious drivers of ESG adoption across suppliers and partners in the value chain. It investigates further if the combined force of the principles of environmental, social, and governance (ESG) makes any difference to the impact of green supply chain finance (GSCF) on the salient aspects of a firm’s sustainability performance. These go well beyond just the environment. They also encompass social and corporate governance issues like efficiency in the environmental sphere, accountability across social lines, and ethically sound governance in a firm’s various operations.

The study also aims to examine how various contextual factors—like the pressure to follow certain policies and the collaboration throughout the supply chain—affect these relationships. Thus, the research endeavors to provide a comprehensive perspective on the strategic and operational alignment necessary to integrate sustainability into financial and supply chain practices. The findings aim to make them useful for companies, financial institutions, and policymakers. We want to help them promote a sustainable supply chain ecosystem in India.

Based on these objectives, the study proposes the following hypotheses:

- **H1:** Green Supply Chain Finance has a significant positive impact on ESG integration.
- **H2:** ESG integration has a significant positive impact on sustainability performance.
- **H3:** Green Supply Chain Finance has a direct positive impact on sustainability performance.
- **H4:** ESG integration mediates the relationship between Green Supply Chain Finance and sustainability performance.
- **H5:** Policy pressure positively moderates the relationship between Green Supply Chain Finance and ESG integration.
- **H6:** Supply chain collaboration positively moderates the relationship between ESG integration and sustainability performance.

4. Conceptual Framework

The study's conceptual framework is based on the Triple Bottom Line (TBL) method, which highlights the concurrent chase of economic, environmental, and social value—better known as profit, planet, and people. Within this framework, Green Supply Chain Finance (GSCF) epitomizes the economic aspect; aligning ESG integration resonates with environmental and social aspects; and sustainability performance reflects the trifecta of outcomes concerning all three the framework proposes that the GSCF serves as a strategic enabler to align suppliers and partners in the supply chain with sustainability standards. It does this, mostly, by providing financial incentives tied to ESG compliance. When companies do this, when they embed ESG metrics in their supply chain financing decisions, they tend to improve liquidity, working capital efficiency, and ESG performance among their suppliers.

This model presents a scenario where ESG integration is the mediator; that is, GSCF has a direct effect on sustainability performance. The relationship is good, but it’s not optimal, given that the GSCF has a good relationship with the performance. So, when you look at this model as a whole, GSCF has an effect on performance. ESG affects performance. GSCF affects ESG.

Furthermore, the model incorporates two moderating variables: policy pressure and supply

chain collaboration. Policy pressure, which consists of regulatory requirements and stakeholder expectations, is anticipated to amplify the GSCF–ESG relationship. Collaboration in the supply chain—namely, coordination and trust among partners- is expected to positively influence the impact of environmental, social, and governance (ESG) integration on supply chain performance. Partners in the supply chain that have a high degree of collaboration will likely experience a stronger positive effect from ESG integration than will those partners having a low degree of collaboration.

5. Research Methodology

This research adopts a mixed-methods design and specifically an explanatory sequential design to find out the relationship between Green Supply Chain Finance, ESG integration, and sustainability performance in the Indian supply chain. This study uses a triangulation method to validate findings through the collection and analysis of both quantitative and qualitative data in three phases. The mixed- methods approach allows for the best of both worlds, in terms of data. It lets the researcher reach out and touch a large number of people to gather important social data. But it also lets the researcher go deep into a few cases, to understand them well, and in ways that can be both assumed to be generalizable and useful in terms of policymaking.

The preliminary step involved a large-scale quantitative study to test the conceptual model and hypotheses. We developed a questionnaire containing validated scales adapted from previous research in the areas of green finance, supply chain management, and ESG practices. The questionnaire was structured to allow for straightforward analysis of the data. The survey was sent to professionals at the mid- and senior-level of large- and medium-scale enterprises across several sectors, including manufacturing, FMCG, automotive, and textiles. These professionals work in supply chain, finance, sustainability, and ESG departments. We collected 382 valid responses through purposive sampling. We ensured that the participants had relevant exposure to either green finance or ESG reporting.

The questionnaire consisted of five constructs: GSCF, ESG integration, sustainability performance, policy pressure, and supply chain collaboration, each of which was assessed using a 7-point Likert scale. The content validity of the questionnaire was ensured by having domain experts review it. Data analysis was handled with the assistance of AMOS software, using a method called Structural Equation Modeling. SEM is a powerful method for estimating

complex models with many variables and relationships. Because it estimates a model in its entirety, it is also particularly good for testing theoretical frameworks that posit a set of interrelated hypotheses. Our measurement model was first validated through reliability and validity checks. Then we went on to test the structural model with the set of interrelated hypotheses.

The second phase used a qualitative approach to enrich and interpret the quantitative data. Semi- structured interviews were conducted with 24 professionals, including CFOs, heads of sustainability, supply chain managers, and ESG consultants. The interviewees were selected through purposive sampling to represent various sectors and different levels of GSCF adoption. The interviews covered a range of topics, including: challenges the interviewees face in implementing ESG initiatives, supplier behavior changes brought about by GSCF, and mechanisms of internal collaboration that help in achieving ESG goals.

Video call interviews were conducted and lasted 45 to 60 minutes each. Consent was obtained for recording all interviews. Each interview was transcribed, followed by an analysis using thematic analysis guided by Braun and Clarke's six-phase framework. Coding and theme development management occurred within NVivo 14 software. The findings that were qualitative findings were used to explain and give context to the results that were from the SEM analysis. This use of the qualitative findings allowed for triangulation and resulted in a more interpretable level of the relationships between the constructs.

Finally, the integration of the quantitative and qualitative results was undertaken during the interpretation stage. This was done using a joint display matrix, which emphasizes where these two data streams converge, diverge, or complement each other. This approach to research guarantees both strength and depth when it comes to achieving the objectives of the study. It thus becomes a suitable method for investigating the complex and layered Indian context of GSCF phenomena and the integration of ESG.

6. Data Analysis & Results

This segment lays out the discoveries made during the phases of the study that were based on quantitative and qualitative methods. The data underwent several analyses, beginning with descriptive statistics and then moving on to assessments of the measurement model's reliability

and validity. Next, the structural model was tested, with SEM being the tool of choice for this study. All of this was done for the sake of getting to the results, which were then explained using the study's qualitative component to triangulate the explanation.

6.1 Descriptive Statistics

We collected a total of 382 valid responses from professionals working in manufacturing, FMCG, textiles, and automotive sectors across India. The demographic representation of the respondents is displayed below:

Variable	Categories	Frequency	Percentage
Gender	Male	264	69.1%
	Female	118	30.9%
Role	Supply Chain	146	38.2%
	Finance	102	26.7%
	ESG/Sustainability	94	24.6%
	Others	40	10.5%
Industry	Manufacturing	134	35.1%
	FMCG	92	24.1%
	Automotive	88	23.0%
	Textiles	68	17.8%

6.2 Measurement Model: Reliability and Validity

We used Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) to check the reliability and validity of the constructs. All constructs showed values above acceptable thresholds.

Table: Construct Reliability & Validity

Construct	No. of Items	Cronbach's α	CR	AVE
Green Supply Chain Finance (GSCF)	4	0.84	0.87	0.63
ESG Integration	5	0.89	0.91	0.66
Sustainability Performance	4	0.85	0.88	0.65
Policy Pressure	3	0.79	0.83	0.60
Supply Chain Collaboration	3	0.81	0.86	0.61

Interpretation: All constructs showed strong internal consistency (α > 0.7), convergent validity (AVE
> 0.5), and composite reliability (CR > 0.7). This indicates that the measurement items accurately capture their respective constructs.

6.3 Discriminant Validity (HTMT Criterion)

Discriminant validity was assessed using the HTMT ratio of correlations. All HTMT values were below the 0.85 threshold.

Table: HTMT Matrix

	GSCF	**ESG**	**SP**	**PP**	**SCC**
Green Supply Chain Finance (GSCF)	-				
ESG Integration	0.72	-			
Sustainability Performance (SP)	0.68	0.75	-		
Policy Pressure (PP)	0.53	0.57	0.51	-	
Supply Chain Collaboration (SCC)	0.60	0.63	0.65	0.49	-

Interpretation: The HTMT results confirm that each construct is distinct and captures unique conceptual meaning.

6.4 Structural Model and Hypothesis Testing

The structural model was tested using **AMOS 28**. The goodness-of-fit indices indicated an acceptable model fit:

- Chi-square/df = 2.04
- CFI = 0.945
- TLI = 0.932
- RMSEA = 0.052

- SRMR = 0.041

Table: Hypothesis Testing

Hypothesis	Path	B (Standardized)	t-value	p-value	Result
H1	GSCF → ESG Integration	0.63	9.21	<0.001	Supported
H2	ESG Integration → Sustainability Performance	0.56	7.84	<0.001	Supported
H3	GSCF → Sustainability Performance	0.28	4.07	<0.001	Supported
Hypothesis	**Path**	**β (Standardized)**	**t-value**	**p-value**	**Result**
H4	Indirect Effect (Mediation)	0.35	-	-	Partial Mediation
H5	Policy Pressure moderating GSCF → ESG	0.19	2.88	0.004	Supported
H6	Supply Chain Collaboration moderating ESG → SP	0.22	3.11	0.002	Supported

- **Interpretation H1:** GSCF has a strong and significant impact on ESG integration (β = 0.63), indicating that financial mechanisms influence sustainability adoption.
- **Interpretation H2:** ESG integration significantly boosts sustainability performance (β = 0.56), showing that responsible practices translate into measurable outcomes.
- **Interpretation H3 & H4:** GSCF also has a direct impact on performance (β = 0.28), but the mediation effect of ESG (β = 0.35) suggests that much of the impact flows through improved ESG practices. The Variance Accounted For (VAF) = 47%, confirming partial mediation.
- **Interpretation H5 & H6:** Both policy pressure and supply chain collaboration

strengthen the respective paths, showing that external regulation and internal trust-based relationships improve sustainability outcomes.

6.5 Qualitative Validation

To augment and deepen the comprehension gained from the numbers, a qualitative phase involving professionals from diverse sectors was undertaken. Twenty-four semi-structured interviews were conducted with participants from manufacturing, automotive, FMCG, and textiles. Among those interviewed were CFOs, heads of supply chain, sustainability officers, and ESG consultants. They worked for firms of diverse sizes and levels of ESG maturity. The discussions aimed at shedding light on the mechanisms and challenges associated with GSCF and ESG integration in the Indian context.

Initially, the integration of ESG into financing decisions was being propelled by the emergence of regulatory influence. Numerous interviewees pointed to current mandates, like SEBI's BRSR Core, for instance, and to evolving government and global policies as having been recently energizing catalysts in this space. Second, financial incentives associated with ESG scores were found to be effective nudges for suppliers, particularly when they were linked to improved credit terms, reduced interest rates, or expedited payment cycles.

Third, MSME supplier data and capacity gaps were identified as a major barrier. Several companies noted that while they had financing schemes in place that were linked to ESGs, many of their small suppliers didn't have the infrastructure or knowledge required to partake in such schemes. Fourth, it was viewed as essential that digital collaborative platforms, including blockchain-based trading systems and centralized ESG dashboards, greatly enhance the traceability of data and the efficiency of financing. Lastly, companies that had moved past compliance displayed a pivot to ESG differentiation; they began to treat sustainability not just as a regulatory drag but as an opportunity to gain a leg up on the competition in global markets.

The qualitative results validated the SEM model results by showing how GSCF affects ESG behavior and how ESG affects something else in the realm of sustainability (the model output does not specify what this "something else" is). They provided context for the moderation effects of policy pressure and supply chain collaboration, which the model predicts will affect the relationship between GSCF and sustainability outcomes.

6.6 Summary of Findings

- Green supply chain finance is an effective tool for enhancing ESG integration.
- ESG practices play a pivotal mediating role in converting financial incentives into improved sustainability outcomes.
- Contextual factors like policy enforcement and supply chain trust significantly enhance the effectiveness of GSCF strategies.
- A combination of quantitative validation and qualitative insights offers a comprehensive view of how finance, governance, and sustainability interact in Indian supply chains.

7. Discussion

This study provides vital clues on how finance is transforming supply chains into sustainable ones in India. The research unequivocally establishes, nobody knew this before the strong and statistically significant relationship between Green Supply Chain Finance and ESG integration. When GSCF is in play, it nudges organizations to adopt ESG across the supply chain. Put another way, supply chain partners become more sustainable when GSCF is involved, and they tend to become more sustainable faster.

Furthermore, the role of ESG integration as a mediator between GSCF and sustainability performance indicates that finances on their own do not suffice, and that the real effect they have occurs when the principles of ESG are put to work all the way through the supply chain. This points to the need for robust systems of ESG, for good reporting, and for raising awareness among suppliers to achieve the full effects of green finance.

The influences of policy pressure and supply chain collaboration on ESG performance demonstrate the necessity of external institutional support and internal coordination. Regulatory authorities, like SEBI,

with their BRSR Core, come in as enablers and smoothing functions. They act as guides. Partnerships, based on trust, in turn, are necessary to achieve the goals set by the authorities. If the targets are to be common, trust is necessary. That, to every ESG performer, is a no-brainer.

Collectively, these results support a nationwide, system-wide strategy in which financial incentives, policy frameworks, and relationship capabilities are all driving in the same direction. That shared direction is sustainable transformation in the supply chain ecosystems across India.

8. Theoretical Contributions

This research contributes significantly to our theoretical understanding of sustainable supply chain finance, especially in emerging markets. It takes the Triple Bottom Line (TBL) framework into new territory, applying it to the still-poorly understood realm of sustainable supply chain finance. Most studies that use TBL to assess the sustainability of a business or financial mechanism usually stop at claiming that the mechanism will achieve or is likely to achieve some unspecified environmental or social good when it does not.

Second, this study contributes to the expanding body of literature on integrating ESG factors into investment decisions. It does this by advancing the idea that ESG integration can be and often is a central mediating variable between green finance and sustainability performance. ESG integration is viewed here not just as a compass for financial investment decision-making, but as a critical pathway through which financial strategies can yield environmental and social value.

Incorporating moderating variables—policy pressure and supply chain collaboration—into existing models adds complexity and makes them more relevant to our Indian research context. It recognizes that in our (Indian) institutional context, and in the relational context of supply chains, GSCF strategies work more or less effectively, and some work not at all, depending on what those contexts are like. Quite frankly, unless one operates at a very high level of abstraction and overlooks both (Indian supply chain) structural and behavioral factors, one can't hope to intelligently design and implement GSCF strategies.

9. Practical Implications

This study's findings carry considerable practical import for supply chain practitioners, financial authorities, public policymakers, and sustainability officers operating in India. For corporate managers and CFOs, this study highlights the need to incorporate ESG performance metrics into supply chain financing models. Redesigning vendor financing policies to channel

resources toward ESG-compliant suppliers can drive behavioral change in supply chains. Leveraging finance to alter the "business as usual" modus operandi of supply chain stakeholders has the potential to bring about alterations in both the financial performance and the sustainability performance of firms.

For banks, financial technologies, and non-banking financial companies, the results show a distinct chance to create much-needed innovative GSCF products that actually take lending decisions and tie them to verifiable ESG data. If they don't seize this moment, their competitors surely will. And offering

these new sustainability-linked instruments promises not only to provide a competitive edge but also to boost the transparency and traceability of the financing ecosystems that serve our corporates.

It is advisable for those who make policies and regulate to bolster even more the frameworks like SEBI's BRSR Core and to give companies incentives for integrating ESG into their supply chain and financing. The kind of support that can help significantly reduce the barriers to adoption that SMEs face can come from these quarters: digitizing ESG disclosures, establishing clearly defined, standard taxonomies for ESG issues, and using trade platforms that are enabled by blockchain technology.

At last, the results underscore for the sustainability function the necessity of constructing not just any old internal capabilities, but the right kind of internal capabilities, as well as forging partnerships with suppliers, to make sure ESG data are not just available, but of high enough quality and in such a state of compliance that they can be used as the sustainable performance "link" to mediate between financial strategies and their desired "base camp" level of performance

10. Limitations & Future Research

Although this study provides some relatively rare insights into the relationship between Green Supply Chain Finance (GSCF), ESG integration, and sustainability performance in the Indian context, it has several limitations. For one, the research used a cross-sectional design, capturing our respondents' perceptions and practices at just one point in time. This means we are not able to account for any perceptions or practices that might have changed, or for the dynamic

evolution of GSCF in India, over the elapsed time between our study and this moment. And because we're not able to fully account for all these changes, we're also not able to project what the long-term impacts of GSCF initiatives in India might be.

Second, while the sample was drawn from a varied assortment of industries, it was mainly centered on large and mid-sized firms. The angle from micro and small enterprises (MSMEs), the bedrock of India's supply chains, was virtually nonexistent in the sample. Yet these firms often face a double whammy in their efforts to access not only green finance but also the sort of sustainability expertise that large firms can get: They lack both in guile and in funds.

A third limitation of this study is that it relied on self-reported data. This type of data can introduce biases—specifically, biases related to social desirability or limited disclosure—that can cast a shadow over the results and bring claims of robustness into question. Self-reported data is what makes the surveys we used for this study the least reliable source of information and the most susceptible to a type of error called "response bias."

11. Conclusion

This research offers a detailed examination of the Green Supply Chain Finance (GSCF) and ESG integration's roles in bringing about sustainable supply chain performance in the Indian context. It finds that GSCF is critical in encouraging suppliers and partners to adopt environmentally and socially responsible practices, particularly when direct financial incentives are linked to ESG performance. The research strongly suggests that achieving sustainability in the supply chain is most effective when it is also part of an aligned financial strategy.

The study also confirms that ESG integration acts as a key mediating factor, converting financial mechanisms into real sustainability results. Companies that put money into ESG systems, supplier audits, and data transparency have a better chance of seeing upswings in overall performance, including

(1) reduced environmental risk, (2) enhanced social responsibility, and (3) improved stakeholder trust i.e., the kinds of changes that friendly conversations in boardrooms tend to encourage.

The effects of regulatory pressure and supply chain collaboration on green finance initiatives

serve to remind us of the external and internal enablers that must be in place if these initiatives are to be impactful. These three case studies help to sharpen our understanding of the optimal green finance governance framework.

The overall contribution of the study to both theory and practice is that it presents a strong framework for dovetailing finance, ESG, and sustainable supply chain management, especially in India, where the economic and environmental landscape is rapidly evolving.

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Financial Behavior in Digital Era: The Comparative Study on Spending Habits of Gen Z and Millennials

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Abstract

This research explores how Generation Z (born 1997–2012) and Millennials (born 1981–1996) spend, save, and invest their money in today's digital world. Our research based on sample of 300 respondents, compares financial behaviors of these two generations. The research intends to explore not only the "what" of their spending habits, but more importantly, the "why" behind their financial decisions, considering factors such as lifestyle influence, risk appetite, values, digital dependency, and peer dynamics. The research found

that Millennials often prefer safer options like mutual funds and fixed deposits while Gen Z is more open to stocks, crypto, and online platforms i.e. the risky investments options. Social media has a big role in influencing Gen Z's spending on trendy items and experiences. Millennials are more cautious, usually saving first before spending, while many Gen Z balance saving with lifestyle expenses. It also found there's no big difference in how much of their income they save or spend on non-essentials. These insights can help businesses and financial planners create better services for young consumers. Overall, it shows how digital tools and social trends in the digital era shape the way youth manage their money today.

Keywords: *Generation Z, Millennials, Spending & Saving, Social Media, Financial Decision Patterns.*

Introduction

Millennials (born 1981–1996) and Generation Z (born 1997-2012) are two influential groups that are largely responsible for the rapid changes in India's Finance sector. These generations are not only active earners and spenders but are also shaping new ideas around shopping, lifestyle, and brand choices. Though they often get grouped together because they both use technology and care about social issues, they actually think and behave quite differently when it comes to money.

Both Millennials and Gen Z are tech-savvy and connected to the internet. They value meaningful experiences, like travel or attending events, and they are more conscious about the impact of their spending. Millennials saw the world slowly go digital, while Gen Z was born into it. Their financial situations, habits, and even expectations from brands reflect these differences. This research focuses on comparing how Gen Z and Millennials in India spend their money, what influences their choices, and what this means for businesses today.

Generation Z:

Generation Z includes people born after 1997. For Gen Z, being online is not just a habit—it's a way of life. They use their phones for almost everything: shopping, learning, watching content, and even connecting with brands. Because of this, their decisions about what to buy

are often shaped by what they see online. Social media plays a big role in how Gen Z discovers products. Instead of relying on ads, they look to influencers, creators, and real user reviews before buying anything. They trust people their age or online personalities more than traditional advertisements. This group also loves trying new things—they enjoy exploring trendy products and brands that offer something unique or exciting. What really sets Gen Z apart is their strong belief in values. This makes them more aware of how their money is used and where their products come from.

Another interesting part of Gen Z's mindset is their love for experiences. They are more likely to spend money on things like concerts, travel, or fun events rather than on physical goods. These experiences often become memories they share online, which also boosts their social identity. For them, the value of an experience often matters more than owning something. Gen Z is creative, bold, and very aware of the world around them. These generations are more concerned about the lifestyle and try to match it with the society. They use technology as a tool to express themselves and make smart, values-based decisions. Their lifestyle is fast-paced and driven by trends, but also rooted in meaning.

Millennials:

Millennials, born between 1981 and 1996 saw the world shift from landlines and newspapers to smartphones and social media. So, while they are also comfortable with technology, they often use it in a more balanced way. Millennials are thoughtful spenders. Over time, many have taken on responsibilities like education loans, house payments, or raising children. Because of these factors, they tend to think carefully before buying. They look for quality, usefulness, and value for money. They also like to plan ahead and often compare products or read reviews before making a choice.

This generation also likes both online and offline shopping. While they enjoy the ease of shopping through apps or websites, many still values going to stores, touching the product, and experiencing it in person. This mix of online and in-person buying gives them flexibility and a sense of trust in what they purchase. Millennials care about values too. They support

brands that are honest, sustainable, and responsible. But unlike Gen Z, their support often depends on a balance between ethics and practicality. If a product is too expensive or not useful or even if it's from a good company—they might not buy it. At the same time, millennials are more responsible towards responsibility towards the generations and generations and try to collect for them as well. As per many research studied the authors also convey the generational gap in some of the factors and also states some similarity at the same time. Due to which this opinion adds value to the research paper.

Experiences are important to Millennials as well. They enjoy traveling, fitness, eating out, or spending time with friends and family. These moments are seen as ways to relax, connect, and enjoy life beyond just buying things. Many views these experiences as personal growth or rewards for their hard work. Millennials are responsible, informed, and value-driven. They are loyal to brands that stay consistent, respect their needs, and connect with their goals.

Literature Review:

Shankar,R(2024) in his research titled "Generation Z versus Millennial purchase intentions: A comparative research study based on social media marketing strategies in India with respect to the fashion and beauty industry explores how online marketing strategies influence the purchasing behaviors of Generation Z and Millennials". The research revealed that Gen Z is more responsive to online advertisements and sponsored content compared to Millennials, highlighting the heightened digital engagement of Gen Z. They are more receptive to sponsored content and online ads than Millennials, underscoring Gen Z's increased digital involvement. When it came to fashion and beauty purchases, both groups valued quality over quantity, but when these products were well-marketed, Gen Z were more likely to spend money on higher-quality goods. For example, Gen Z prefers digital engagement and visual material, while Millennials have a more conventional approach to online buying. This research offers insightful information about the changing dynamics of consumer behavior in the digital age.

Taj,R (2024) in his research titled "A Comparative Examination of Gen Z and Millennials' Consumer Behavior and E-commerce Adoption" highlights the main distinctions and parallels between Millennials and Generation Z in terms of their e-commerce adoption and consumer

behavior. He analyses that born between 1997 and 2012, Generation Z is the first generation to have grown up with cell phones or smart phones and the internet, therefore they are very accustomed with digital world. Millennials, who were born between 1981 and 1996, on the other hand, witnessed the transition from traditional to digital media, which resulted in a slower uptake of e-commerce. As individuals go through different phases of life, such as establishing a profession and taking on family duties, their buying habits are impacted by convenience, value, and brand loyalty. While sustainability and ethical company practices are important to both groups, Gen Z prefers social commerce and smooth transactions, while Millennials conduct more in-depth product research.

Lina (2023) in her research titled "A Comparatives Study of how Social Media Influences the spending of Gen Y and Gen Z". According to this study, Gen Z and Gen Y have different buying habits. Gen Z is more logical and experience new things whereas Gen Y depends on first-hand knowledge and comparison data. Businesses looking to comprehend and interact with youthful consumers in the digital age will find these insights to be helpful. A research comparing Gen Y and Gen Z reveals distinct purchasing behaviours. Gen Y relies on personal experiences and comparative information, while Gen Z is more rational and resistant to impulsive buying.

Thangvel (2021) in his study investigates how Indian Millennials and Generation Z online shoppers make decisions. According to their research, both generations have favorable opinions about internet buying, with Generation Z being more enthusiastic than Millennials. Generation Z prefers ease and is more likely to make impulsive purchases because they were raised in an era of digital technology and are influenced by the creator and influencers. It also says that compared to Millennials, Generation Z is more influenced by opinions and social media trends and places a higher value on social desirability.

Problem Statement

The purpose of the study is to examine and contrast the spending patterns of Millennials and Generation Z, emphasizing the variables that affect their choices. Despite the fact that both generations actively purchase online, there are notable differences in their tastes, driving forces, and financial habits. Growing up in a digital age, Gen Z places a higher emphasis on

convenience, rapid gratification, and social media impact than Millennials, who are typically more cost-conscious and research-focused when making purchases. The study looks at how their shopping patterns are influenced by social media, sustainability, brand loyalty, and economic considerations. In order to better understand and interact with both generations, the research identifies gaps in current knowledge, including the long-term impact of influencer marketing and emotional connections with brands, as well as the role of economic conditions and financial upbringing in shaping spending patterns. By addressing these aspects, the study explores the psychological and emotional drivers behind their buying behaviors, which is important for businesses to understand in order to develop effective marketing strategies tailored to each generation.

Research Methodology

Objectives of the Study

1. To assess how much of their income each generation saves and whether they prioritize saving over spending.
2. To identify the investment avenues—such as stocks, real estate, and others—favored by each generation and examine their respective approaches toward financial risk.
3. To compare the income distribution between savings and non-essential expenditures among Gen Z and Millennials.
4. Analyze whether different generations prefer riskier investments or safer saving options.

Research Design

The financial practices of Millennials and Generation Z are analyzed and contrasted in this study using a descriptive research design. This method aids in comprehending their financial decision-making, saving practices, and spending priorities. The research finds trends, patterns, and significant distinctions between the two generations by methodically gathering and analyzing data. A standardized questionnaire is used to collect the data and facilitating the comparison of financial practices.

This approach enables scholars to make significant inferences regarding the financial

management practices of every generation and the factors that impact their choices. Enhancing financial services and marketing tactics requires an understanding of these generational financial practices. The ultimate goal of this study is to provide a comprehensive understanding of how Gen Z and Millennials approach budgeting and financial planning.

Sampling Method

The data that is collected for the very first time and the information is being gathered from individuals via a survey on their saving and spending patterns. The questionnaire developed is utilized to gather responses using the Convenience Sampling Method. The data was collected from 300 respondents from Gen Z and Millennial.

Limitations

Despite having 300 responses, the study's sample size might not accurately reflect all Gen Z and Millennials in all geographic locations, socioeconomic brackets, and backgrounds. The results' applicability to the wider public, particularly those in rural or minority communities, may be limited by the replies' potential bias toward urban, educated, or tech-savvy people. Because the participants were selected primarily on their ease of accessible rather than random or stratified sample, convenience sampling carries the potential of selection bias. The accuracy and variety of the findings may be impacted by this approach's potential to overrepresent some populations (such as students or working professionals in particular areas) and underrepresent others.

Response bias happens when survey respondents provide responses that don't accurately reflect their true attitudes or actions. Because the responses no longer accurately reflect the people's true tales or criticisms, this kind of bias might result in distorted information and compromise the overall validity of the examiner's conclusions. Although a structured questionnaire's use of closed-ended questions guarantees consistency, it restricts participants' capacity to adequately articulate their thoughts or justify their decisions. Consequently, the information may be devoid of subtleties and in-depth justifications for financial choices.

Data Analysis

Interpretation: In this survey of 300 people, slightly more females (50.7%) responded than

males (49.3%). The gender distribution is almost equal, showing balanced participation from both.

Interpretation: Out of 300 respondents, the largest group (39%) earns between ₹300,001 and ₹500,000 annually. Very few people (only 7%) have a salary above ₹10,00,000, showing most respondents fall in the mid-income range.

Interpretation: Most respondents save between 10% to 25% (38%) or 26% to 50% (34.3%) of their income. Only a small portion saves more than 50% (9.3%), showing that high saving rates are less common.

Interpretation: More than half of the respondents (56.3%) spend less than 20% of their income on non- mandatory items. Only a small group (1.3%) spends over 60%, indicating most people prioritize essential expenses over luxuries.

1. Gen Z

Interpretation: Among Gen Z respondents, the stock market (55.4%) is the most preferred investment option, followed by mutual funds (47.8%). Traditional options like fixed deposits are less popular (28.7%), showing a shift toward modern investment choices.

Millennials

Interpretation: Most people prefer investing in Mutual Funds (54.1%) as it is the safest investing option followed by the Stock Market (50.5%), while options like Cryptocurrency and Other are far less popular (both at 16.2%). Fixed Deposits remain a moderate choice with 30.6% preference.

2. Gen Z

Interpretation: The graph shows that most people occasionally use their savings, with 43.9% saying so. Only a small portion never touch their savings, while around 26.8% regularly dip into them.

Millennials

Interpretation: The graph shows that 45% of people occasionally spend their savings, while 31.5% do so regularly. Only a few rarely or never touch their savings, indicating that most people dip into their savings at some point.

3. Gen Z

Interpretation: Most respondents agreed that financial stability is more important than enjoying life and that Gen Z takes more financial risks compared to Millennials. Many participants also showed a neutral stance on saving over luxury spending and on the riskiness of investing, reflecting mixed opinions on financial habits.

Millennials

Interpretation: Most respondents showed a mixed but cautious attitude — many are neutral or agree on saving money, valuing financial stability, and viewing investments as risky. There's no strong leaning toward risk-taking, suggesting a preference for balanced or safer financial decisions.

4. Gen Z

Interpretation: Most people spend money occasionally on dining out, entertainment, and vacations, showing balanced spending habits. Very few spend regularly or never, indicating moderate financial behavior across categories.

Millennials

Interpretation: Millennials The graph shows that most people occasionally spend on dining out, entertainment, and vacations. Very few people never spend in these areas, indicating that such expenses are common but usually not frequent.

5. Gen Z

Interpretation: Among Gen Z respondents, 58% follow the mindset of saving first and then spending, while 42% prefer spending first and then saving. This shows that a majority of Gen Z is developing a savings-focused approach.

Millennials

Interpretation: Around 68% of people prefer saving first and spending later, showing a savings-focused mindset. Only 32% spend first and save later, indicating fewer follow a spend-first approach.

Hypothesis Testing:

1. **T-test for comparison of saving between two generations.**

- **H0 (Null Hypothesis):** There is no significant generational gap in the saving of income between Gen Z and millennials.
- **H1 (Alternative Hypothesis):** There is significant generational gap in the saving of income between Gen Z and Millennials.

Table - 1:

t-Test: Two-Sample Assuming Unequal Variances		
	Variable 1	**Variable 2**
Mean	2.095541401	2.63963964
Variance	0.651069737	0.741687142
Observations	157	111
Hypothesized Mean Difference	0	
Df	227	
t Stat	-5.228619163	
P(T<=t) two-tail	3.8717	
t Critical two-tail	1.970469513	

Interpretation:

In Hypothesis Testing, p-value is a crucial measure used to determine the statistical significance of the results. In this case; p-value **3.8717** is more than significance level 0.05. So, we **Fail to reject** the Null hypothesis i.e. accept the H0.

Thus, we can say that there is no significant generational gap in the saving of income between Gen Z and Millennials.

2. T-test for comparison of spending on non-essential items between two generations.

- **H0 (Null Hypothesis):** There is no significant difference in the proportion of income spent on non-essential items between Gen Z and Millennials.
- **H1 (Alternative Hypothesis):** There is significant difference in the proportion of income spent on non-essential items between Gen Z and Millennials.

Table -2:

t-Test: Two-Sample Assuming Unequal Variances		
	Variable 1	**Variable 2**
Mean	1.52866242	1.693693694
Variance	0.532827046	0.650778051
Observations	157	111
Hypothesized Mean Difference	0	
df	222	
t Stat	-1.715295321	
P(T<=t) two-tail	0.08768639	
t Critical two-tail	1.970707395	

Interpretation:

In Hypothesis Testing, p-value is a crucial measure used to determine the statistical significance of the results. In this case; p-value 0.08768 is more than alpha 0.05. So, we **Fail to reject** the Null hypothesis
i.e. accept the H0.

Thus, we can say that there is no significant difference in the proportion of income spent on non- essential items between Gen Z and Millennials.

Findings

Based on our research, we observed some clear differences in the financial behavior and spending habits of Millennials and Gen Z. Millennials generally prefer safer and more stable investment options like mutual funds, fixed deposits, and government bonds. Their approach shows a tendency to prioritize financial security and long-term planning. On the other hand, Gen Z appears to be more open to exploring riskier investment opportunities. With greater exposure to digital platforms and financial influencers online, they are more likely to invest in equities, mutual funds, and even cryptocurrencies. This generation seems to have a higher risk appetite when it comes to investing.

When it comes to spending habits, both generations enjoy spending on entertainment, food, and fashion. However, Gen Z is far more influenced by social media trends, peer pressure, and societal expectations, often making them lean toward a luxurious lifestyle. They are driven by the need to stay updated with trends, which reflects in their spending on premium fashion, gadgets, and lifestyle products. A notable pattern among Gen Z is their preference for experiences over material possessions. They would rather spend on travel, concerts, and social outings than on long-lasting goods. Even if it means saving less, they value the joy and memory of an experience more than owning something physical.

Millennials, in contrast, are seen as more practical and economical. Many are at a stage in life where they are handling responsibilities like family, rent, EMIs, and other financial commitments. They tend to balance their spending by setting aside funds for future needs. While they do enjoy leisure activities, they often delay such expenses to prioritize bigger goals like buying a house or car. Their lifestyle spending is more calculated, and they aim to create long-term assets alongside enjoying life. Both generations, however, show signs of inconsistent saving habits. It was noticed that savings are often withdrawn or are insufficient, which may suggest either irregular income patterns or a lack of dedicated emergency funds. In essence, while Millennials focus more on financial security and asset-building, Gen Z is driven by experiences, digital influence, and high-risk investment choices, often prioritizing the "now" over the "later."

Conclusion

According to the report, Gen Z is becoming more interested in investing in stocks and cryptocurrencies and is more willing to take financial risks. Conversely, millennials exhibit a more cautious yet informed attitude by favoring safer investing alternatives like mutual funds and term deposits. Both generations do set aside a portion of their salary for savings, but Millennials are more frugal and often save money before making purchases. Gen Z demonstrates a combination of conserving and enjoying life by saving money yet spending more on lifestyle-related expenses like dining, shopping, and travel. Both generations are cautious with non-essential purchases, but Gen Z is more inclined to spend money on experiences and trendy goods that are inspired by social media. Millennials are more frugal, particularly when it comes to larger expenditures like technology or trips. Notwithstanding the insightful observations, the study had many flaws. Because convenience sampling was utilized, the findings might not be universally applicable. Additionally, respondents were unable to properly explain their financial choices due to the structured questionnaire, and outside variables like inflation or internet availability were not thoroughly examined. The broad age ranges utilized for Gen Z and Millennials were another problem; these could have overlooked the significant variances within each cohort. Nevertheless, companies, financial advisors, and legislators can benefit from the study. It may direct the development of services, financial education initiatives, and digital technologies that are tailored to the preferences and requirements of every generation. All things considered, all generations are concerned about financial stability, but their decisions are influenced by their risk tolerance, way of life, and past financial experiences.

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Cryptocurrency Regulations in India: Navigating Legal Ambiguities and Technological Innovations

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Abstract

In the recent years, cryptocurrency has emerged as a powerful financial innovation, challenging traditional banking systems and offering new possibilities for digital investment, digital transaction and financial inclusion. This paper explores the evolving regulatory landscape of cryptocurrency in India, highlighting key points such as policy shift, legal restrictions, and their implications for innovation and investment. The study analyzes government responses, including RBI's stance on virtual currencies, taxation frameworks introduced in union budgets and the development of Digital Rupee. The study also investigates how these evolving frameworks impact public trust, innovation in blockchain technology, and India's positioning in the global fintech landscape. Adopting a qualitative and policy-oriented approach, the research draws from official documents, industry white papers, expert commentary, and international case comparisons to uncover themes such as legal ambiguity, cyber security risks, and the tension between innovation and regulation. Ultimately, the paper calls for a comprehensive, transparent, and adaptive legal framework

that can foster responsible innovation, protect consumer interests, and align with global standards. As India continues to lead in digital adoption, its regulatory decisions in the cryptocurrency space will be pivotal in shaping the country's financial and technological future. The paper concludes with policy recommendations to create a sustainable crypto ecosystem in India — one that enables innovation, ensures transparency, and contributes to the digital transformation agenda.

Keywords: *Cryptocurrency, Regulation, Financial innovation, India, Digital Rupee*

Introduction

The rapid evolution of cryptocurrencies over the past decade has fundamentally challenged established financial systems, sparking new debates about the future of money, banking, and economic governance. In the global context, digital currencies like Bitcoin, Ethereum, and myriad altcoins have evolved from niche technological curiosities to influential financial assets, prompting both excitement and caution across governments, central banks, businesses, and individual investors.

Cryptocurrencies have rapidly emerged as ground breaking financial innovation coma challenging traditional banking system and creating new landscape for digital investment and transaction. Worldwide, Government are trying to create the best way to regulate cryptocurrencies summer accepting them with open up through licensing system while others are choosing to bend them entirely. India offers particularly interesting case. It rings among the top countries in terms of crypto adoption, Even though its regulatory approach has been far from clear. In recent years, Indian policymakers have fluctuated between portion and curiosity from the Reserve Bank of India early crackdown to the Government's most recent step of taxation and exploration of central bank digital currency the digital.

This paper explore the evolving regulatory landscape of crypto currencies in India highlighting the key policy shift legal ambiguity and their implications for the innovations and investment it examines the government and RBI responses (such as the RBI stance on virtual currency anti-money laundering measures taxation in Union Budget and the development of digital rupee) and analyze how these frameworks impact people trust technological innovations and India's positioning in the global fintech arena. In this paper

we also tried to explore themes of legal ambiguity, cyber security risks and the pressure between fostering innovation versus ensuring regulation. In the end, the paper calls for a clear, balanced, and adaptable legal framework — one that supports growth, keeps consumers safe, and brings India in line with global best practices. The decisions India makes now will play a big role in shaping its financial and technological future.

Ultimately, this research advocates for a forward-looking, transparent, and adaptive regulatory framework that supports the sustainable growth of the crypto sector — one that protects consumer interests without stifling creativity and aligns with international best practices. As India continues to lead in digital adoption, the way it structures its cryptocurrency policy will be pivotal in shaping the nation's financial future and technological competitiveness on the global stage.

Literature Review

The literature examining cryptocurrency regulation in India reveals a complex in evolving landscape Characterized by legal ambiguity, unclear regulatory decisions and rapid technological innovations. This review provides the finding from the academic studies, government reports, judicial ruling, policy analysis and recent developments to frame ongoing challenges and opportunities within India's cryptocurrency ecosystem.

Legal and regulatory context:

India's regulatory stance has undergone significant transformation over the past decade, moving from outright skepticism and banking bans to portion acceptance under the strict regulatory conditions. (Nikam, 2018)The Reserve Bank of India's (RBI) 2018 circular, which barred the regulated financial institutions from serving cryptocurrency business, aim to mitigate the risks such as financial instability and money laundering. (Fatima, 2022) This ban was overturned by the Supreme Court in 2020, citing constitutional concern over proportionality and due process through the leaving wider regulatory uncertainty unresolved. (Parikh, 2018) Despite the judicial relief cryptocurrency remain unrecognized. Is legal tender in India and operates within a fragmented regulatory framework lacking clarity on classification and operational norms.

(Ijara, 2024) In this researcher explored the recent developments in 2024 and 2025 show India adopting a dual approach—embracing regulatory control primarily via taxation and anti-money laundering (AML) compliance, while promoting innovation through blockchain initiatives, including the Digital Rupee Central Bank Digital Currency (CBDC). The government's imposition of a flat 30% tax on cryptocurrency gains and a 1% Tax Deducted at Source (TDS) on transactions since 2022 marks a shift towards legitimizing crypto as a virtual digital asset (VDA), though full legal recognition is pending. (Singh V. , 2023) The proposed but not yet enacted Cryptocurrency and Regulation of Official Digital Currency Bill further reflects the ongoing policy debate between potential private crypto bans and state-led digital currency promotion.

Technological and innovation Perspectives:

(Kharbanda, 2022) As per the study Cryptocurrency is increasingly understood as a gateway to broader blockchain innovations, rather than merely a financial asset class. Studied the block chain's potential in areas such as digital payments, coma, governance, supply chain management and secured Identity verification. (Ijara, 2024) Mentioned in the research paper that India's RBI led the Digital Rupee project exemplifies state efforts to harness blockchain technology under centralized control, contrasting with decentralized cryptocurrencies like Bitcoin or Ethereum.

(Finlaw, 2025) Recent government initiatives, included the National Blockchain Framework and state- level Web3 sandboxes, indicated the growing recognition of block chain's transformative potential beyond crypto assets.

Risk Management and consumer protection

(Fatima, 2022) The literature consistently flags Cyber security threats, fraud and investors perspectives Is critical concerns. The fluctuation and irreversible nature of crypto transaction complicates the regulatory oversight enabling scams, Ransom ware attacks, and money laundering. Despite of the efforts under the Consumer Protection Act and Financial intelligence Unit- India (FIU-IND) to oversee crypto activities, Effective grievances redressal Mechanism remains limited, leaving the retail investors exposed. The scholars recommended robust Know Your Customer (KYC) enforcement, Enhance the Public

Education and Improve the Interagency Corporation to build a safer market condition.

Comparative and policy-oriented analysis:

(Singh V. , 2023) India's regulatory environment is frequently described as a Gray zone when compared to more mature crypto regimes. Countries like Japan, Singapore, Switzerland and the European Union feature Clear classification system, licensing framework and investors protections that balance innovation with the financial integrity. India Policy Analyst advocates benchmarking such global best practices but emphasize local adoption adaptation to India's socio economic, technological context. (SEBI, 2022) Ongoing discussion around the multi -agency regulatory approach including the RBI, Securities and Exchange Board of India (SEBI), Ministry of Finance and FIUEND Seek to address the decentralized and cross border characteristics of cryptocurrencies. (ET, 2025) International Corporation, as demonstrated at G20 and Financial Stability Board meeting is pivotal for harmonizing the standard and combating Cryptocurrency activities.

Objectives of the Study

This study aimed to systematically examine the evolution, regulatory landscape, and socio-economic impacts of cryptocurrency in India. Specifically, the objectives were to:

1. To explore the historical development of cryptocurrencies and blockchain in India.
2. To analyze the current regulatory and legal ambiguities, including multi-agency coordination challenges.
3. To explore the recent tax and compliance policies relating to cryptocurrency in India.
4. To formulate actionable policy recommendations to support a robust, innovative, and trustworthy crypto ecosystem in India.

Research Methodology

This study adopts qualitative and policy analysis methodology aimed at comprehensively understanding the regulatory Landscape of cryptocurrencies in India. The current evolving and complex nature of cryptocurrency regulation a comprehensive analysis of law,

technology, economics and governance a qualitative approached used to capture the legal ambiguity, regulatory shifts and socio technical implications involved. This study employs following multi-source qualitative examination structure for the analysis.

Research Design

Legal analysis: The research systematically analyzed the existing general status., regulatory pronouncement, government notification and judicial decision pertaining to the cryptocurrency and digital asset within India. Key documents include RBI, circular, Supreme Court judgments, Union budget, taxation provisions and draft legislation such as cryptocurrency regulations of Official Digital Currency bill. This doctrine approach clarifies the legal status, regulatory intent and institutional role shaping the Indian crypto ecosystem.

Policy and regulatory review: Official policy documents, white papers and the government statement concerning blockchain technology and digital payment innovations have been critically examined in this research study.

Comparative international context: To understand the India's regulatory posture, the study reviews the international case studies and regulatory frameworks from the jurisdiction recognized for advancing the cryptocurrency regulations such as Japan, Singapore and EU. This comparative element highlights the regulatory best practice, lesson learned and potential adaptation paths relevant to India.

Data Source

Data and materials consist of secondary qualitative source including:

- Official government and regulatory authority publication such as RBI Circular and Ministry of Finance report and SEBI notifications.
- Supreme Court decisions affecting RBI's crypto policy.
- Union Budget documents detailing cryptocurrency taxation and compliance measures.
- Industry white papers and reports from Indian and global fintech organizations.
- Scholarly articles, law firm analysis and export commentaries on cryptocurrency.
- News articles and reports.

Analytical Framework:
The research uses thematic and interpretive content analysis to identify the core theme such as:

- Legal ambiguity and classification challenges
- Institutional jurisdiction and regulatory fragmentation
- Understanding the policies between fostering innovations and managing the risk.
- Impact of taxation policy and Digital Currency Initiative.

Limitations and scope

Due to rapidly changing legal environment, real time primary data such as interview with policymaker or market actors is limited within this study scope. The focus remain on analyzing the existing regulatory and judicial material to construct a rigorous understanding of current and emerging cryptocurrency regulatory ecosystem in India.
This combined qualitative. Legal methodology provides a solid foundation to evaluate the evolving Indian crypto currency regulatory framework, key ambiguities, innovations and policy pathways.

Analysis:

Cryptocurrencies like Bitcoin emerged over decades ago as peer to peer digital cash systems and later it grown into a global asset class and technology platform (e.g for smart contracts and decentralized finance).

Early Emergence and Rising Adoption (2010–2017)

Crypto currency's journey in India began in the early 2010s, paralleling global trends after Bitcoin's launch in 2009 and the world's first commercial transactions in 2010. By 2013, India's first cryptocurrency exchanges appeared, transitioning the asset from a niche pursuit among tech enthusiasts to broader public engagement (Chambers, 2025). The proliferation of exchanges like WazirX, CoinDCX, and ZebPay was a key factor in driving adoption, alongside a surge in altcoins that diversified the ecosystem (Pi42, 2025).

Table 1: Major Phases in Indian Crypto Evolution

Period	Key Events & Milestones	Regulatory Stance
Early 2010s	Bitcoin entry; rise of local exchanges; early niche adoption	No law; RBI warnings
2013–2017	Massive growth; public advisories from RBI, Ministry of Finance	Strong advisories, no legal status
2018–2020	RBI banking ban; industry slowdown; IAMAI v. RBI litigation	Effective ban via banking restriction
2020	Supreme Court overturns RBI ban; exchange activity surges	Judicial support for market activity
2021–2022	Draft bans not enacted; 15–20 million investors reported	Regulatory vacuum, non-criminalized
2022–2025	30% VDA tax, AML rules, Digital Rupee pilots	Regulation via taxation, not ban

Source: Reuters; Sigma Chambers, 2025; Pi42, 2025; CoinDCX, 2025; Times of India, 2025

Regulatory Ambiguity and First Warnings

Despite enthusiastic adoption, India's regulatory environment was marked by uncertainty from the outset. From December 2013 onward, the Reserve Bank of India (RBI) issued multiple warnings about the risks of virtual currencies, explicitly stating that such assets were not authorized by any monetary authority and that users transacted at their own risk. In December 2017, the Ministry of Finance issued a public advisory likening cryptocurrency to Ponzi schemes, further cautioning about illicit uses such as money laundering and terrorism financing. Despite these strong advisories, there were no formal bans, but the market operated in a legal and regulatory vacuum that heightened both enthusiasm and risk.

Heightened Scrutiny and Regulatory Crackdown (2018–2020)

As trading volumes and market participation soared in 2017–2018, regulatory skepticism grew. The RBI responded with a landmark action in April 2018—issuing a circular that prohibited RBI-regulated entities from dealing with cryptocurrencies or providing services to those involved in VC trading. This move, effectively a "financial embargo" rather than an outright legal ban, caused a sharp contraction in domestic trading as exchanges lost banking access (Taxmann, 2018). Major exchanges shut down or moved overseas, and the sector relied on peer-to-peer and workaround mechanisms to survive.

Market Adoption Trends:

(Markets, 2025) India's cryptocurrency market has seen rapid expansion over the last decade, evolving from a nascent sector with roughly 3 million investors in 2017 to an estimated 95-96 million by 2025. Early growth was concentrated in metropolitan areas, with regulatory uncertainty limiting consistent data between 2018 and 2019. Starting in 2020, retail investor participation surged sharply, boosted by increased digital adoption during the pandemic and rising awareness. (Coinlaw.io, 2025)Between 2021 and 2023, the investor base expanded significantly, reaching about 75 million, reflecting wider geographic and demographic penetration.

Table 2: cryptocurrency investor growth in India (2017–2025)

Year	Expected No. of Crypto Investors	Notes/Market Info
2017	~30 million	Emerging market; early adoption mainly in metros.
2018	Downgrade of investment	Regulatory uncertainty begins
2019	(Moderate growth)	Rise of exchanges like WazirX, CoinDCX
2020	~15 million	Significant increase in retail investors
2021	-20 million	Market accelerated; increased interest post-pandemic
2022	~80 million	Large jump in crypto holders; wider geographic spread
2023	~90 million	India ranked very high globally in crypto adoption
2024	~93 million	Continued growth despite tough regulation
2025	Stable growth (~96 million)*	Slowing investor growth due to taxes and regulation

*2025 estimated from 2024 growth trends (24%+ annual growth earlier slowed to ~3.8% YoY).

(BFSI, 2024) Growth continued into 2024, reaching around 90 million investors, but began to stabilize due to regulatory pressures and taxation policies—such as a 30% capital gains tax and a 1% tax deducted at source—leading to more cautious market behavior. Overall, India remains one of the fastest-growing crypto markets globally, with regulatory changes strongly influencing investor trends and market dynamics.

Legal Challenge and Supreme Court Reprieve

(SupremeCourt, 2020) The RBI's harsh stance prompted immediate legal challenge, anchored in the Internet and Mobile Association of India's (IAMAI) petition, which argued that the circular was arbitrary and exceeded the RBI's authority. On March 4, 2020, the Supreme Court quashed the RBI ban, holding that it was "disproportionate" and violated Article 19(1)(g) of the Constitution—the right to carry on any occupation, trade, or business.

Ongoing Ambiguity, Policy Drift, and Continued Growth (2020–2022)

Despite the Supreme Court's verdict, cryptocurrencies remained neither legalized nor explicitly regulated. (Factly, 2022)The government's official position was that cryptocurrencies were not legal tender and operated in a regulatory "grey zone"—unregulated yet not banned Parliamentary signals varied: while drafts of bills in 2019 and 2021 contemplated heavy restrictions or criminalization, none were enacted, and public statements sometimes hinted at openness to innovation.

Crisis as Catalyst: Regulation without Prohibition (2022–2025)

Recognizing the limitations of its warnings, India's regulatory approach evolved towards incremental regulation and taxation rather than bans. The Union Budget 2022 introduced a 30% tax on profits arising from virtual digital asset transfers and a 1% TDS, signaling formal monitoring and state interest in crypto gains, even as legal tender status was withheld (CoinDCX, 2022). The sector, while constrained by high tax and compliance burdens, was no longer in existence. Additionally, rising regulatory clarity emerged through anti-money laundering (AML) compliance, mandatory corporate disclosures, and the proposal of oversight under existing authorities such as the Financial Intelligence Unit-India (FIU-IND). (Council, 2023) The rollout of the Digital Rupee (CBDC) in pilots from 2022 onward reflected India's parallel commitment to leveraging blockchain technology under sovereign control.

Emerging Legislative Efforts: COINS Act 2025

(Dot, 2025) In 2025, the COINS Act (Crypto-systems Oversight, Innovation and Strategy Act) was proposed as an industry-led, rights-focused blueprint aimed at resolving India's

regulatory uncertainties. This model law emphasizes crypto users' fundamental rights to self-custody, privacy, and protocol access, while proposing a tiered regulatory regime that licenses centralized exchanges fully but exempts certain decentralized protocols from compliance burdens. It draws from global frameworks such as the EU's MiCA and Singapore's sandbox models, with the goal of encouraging innovation while safeguarding consumer rights, Policy recommendations for a sustainable crypto ecosystem in India.

Public Trust, Market Perception, and Social Impact

(Gupta, 2023) While India ranks among the top countries globally in cryptocurrency adoption, public trust remains complex because of ongoing regulatory uncertainty, instances of fraud, and inconsistent enforcement practices. (Singh L. &., 2024) Studies indicated that regulatory ambiguity and warnings from authorities contribute to cautious investor behavior and episodic volatility in crypto markets. Moreover, research highlights that media coverage of fraudulent schemes further impacts public perception, amplifying skepticism and risk aversion among retail investors (Patel, 2023).

(Sharma, 2024) Nonetheless, demographic analyses reveal rising engagement with cryptocurrencies among women and populations in smaller urban and semi-urban areas, demonstrating widening social acceptance and the potential role of digital assets in promoting financial inclusion.

General Findings:

The research reveals that India's cryptocurrency market has seen remarkable growth in both user base and technological adoption. However, the sector is hampered by persistent regulatory uncertainty, enforced through overlapping mandates among RBI, SEBI, the Ministry of Finance, and FIU-IND, resulting in a "grey zone" of unclear compliance expectations. The imposition of a flat 30% tax on crypto gains and 1% TDS, while intended to increase oversight, has led to market distortions—driving some investors to offshore platforms and dampening innovation.

Although government efforts to introduce anti-money laundering (AML), Know Your Customer (KYC), and new cyber security frameworks have improved compliance and risk

management, significant gaps remain in consumer protection, public trust, and clear grievance redressal. International comparisons reveal that cohesive, single-window regulatory approaches and regulatory sandboxes—as adopted in Singapore, the EU, and Japan—are effective in balancing innovation with systemic safeguards.

Policy Recommendations:

Following are the policy recommendations after analysis and general finding based on the current situations of cryptocurrency regulatory landscape as well as the comparative adoption done by the other developed countries as well as based on the suggestion of the scholarly articles. The recommendations are focusing on the existing structure and government's future outlooks on the cryptocurrency at India level.

- Establish a Unified Regulatory Authority:

  Create a dedicated regulator or governance council for Virtual Digital Assets (VDAs) to harmonize overlapping agency functions, providing regulatory clarity and better compliance pathways.
- Mandate Global Cyber-security Standards:

  Require crypto platforms to implement ISO 27001/NIST-compliant systems, with real-time risk monitoring, incident reporting, and insurance for both platforms and users.
- Enhance Consumer Protection and Education:

  Enact crypto-specific consumer laws and establish dedicated grievance redressal mechanisms. Launch national education campaigns to raise investor literacy and reduce scam vulnerability.
- Rationalize Crypto Taxation:

  Review and recalibrate the current taxation regime. Consider reducing the 30% tax and 1% TDS, and introduce incentives for compliant, innovative exchanges to encourage onshore growth and market participation.
- Support Innovation through Sandboxes:

  Launch regulatory sandboxes and pilot programs, drawing on best practices from Singapore and the EU, to foster blockchain experimentation and safe deployment of new digital finance products.

- Accelerate and Integrate the Digital Rupee Rollout:

  Prioritize the full-scale deployment of the Digital Rupee (CBDC), ensuring it is interoperable with private crypto-assets while supporting digital inclusion and regulatory oversight.
- Introduce Transparency and Reporting Mandates:

  Crypto platforms should be required to publish periodic disclosures—transaction volumes, reserve backing, security audit results—to enhance investor confidence and market discipline. Transparency reduces information asymmetry often exploited in frauds.
- Periodic Policy Review and Adaptation:

  Given the fast-evolving nature of crypto and blockchain, embed a mandatory periodic review clause in legislation to adapt regulations every 2–3 years, incorporating technological and market developments globally.

Conclusion:

This study tried to provide a comprehensive examination of the evolution, regulatory challenges and socio-economic impact of cryptocurrency in India. Over the decade, India has witnessed rapid growth in the cryptocurrency adoption driven by the technological innovation, demographic diversity for digital finance and expanding investor's interest. However, this growth has been accompanied by the regulatory ambiguity, taxation norms and compliance frameworks that together create a challenging environment for the market participants. The analysis reveals that while the Indian government and regulators have initiated important steps—such as taxation on crypto gains, enhanced anti-money laundering (AML) controls, and pilot launches of the Digital Rupee Central Bank Digital Currency (CBDC)—the absence of a unified, comprehensive legal framework leads to persistent uncertainty. The resulting "grey zone" regulatory landscape impedes innovation, compromises investor protection, and pushes some market activities into informal or offshore channels.

Comparative insights from jurisdictions like Singapore, Japan, the European Union, and Switzerland demonstrate that clear asset definitions, single-window regulatory authorities,

and innovation-friendly regulatory sandboxes foster balanced market development. Such examples provide lessons for India's policy formulation as it aims to nurture a secure yet dynamic crypto ecosystem. Cyber security incidents and increasing fraud cases underscore the urgent need for stronger security mandates, consumer grievance redressal mechanisms, and widespread investor education to build greater trust. Tax policies require recalibration to encourage compliance and minimize leakage without stifling growth.

Ultimately, in this study we tried to advocate for a balanced regulatory approach that harmonizes multi- agency roles under a dedicated framework, integrates internationally recognized standards, promotes consumer protection, rationalizes tax regimes, and fosters innovation through controlled experimentation. Implementing these reforms will be essential to transforming India's cryptocurrency landscape into a resilient, transparent, and globally competitive market that can support financial inclusion and technological leadership. As India stands at this regulatory crossroads in 2025, adopting a clear, adaptive, and comprehensive regulatory framework is indispensable for leveraging the benefits of digital assets while mitigating their risks. This balanced path forward can position India not just as a market leader but also as a model for emerging economies navigating the complexities of cryptocurrency governance.

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The Digital Shift in Accounting: Awareness, Adoption and Performance Impact (With special reference to Rajkot City)

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Abstract

The main objective of this study is to analyse the level of awareness, effectiveness on the performance, and find the factors affecting the adoption of digital accounting systems by Accounting Professionals, Chartered Accountants, Owners and Directors or Partners of Micro, small & medium businesses in the specific Rajkot region of Gujarat. In today's world, with the new technology adoption transformation of business is common. Through its adoption, there is a change of landscape revolutionized by enhancing efficiency, accuracy, and decision-making practices. Here digital accounting system refers to recording the financial information, representation, and reporting transmitted into digital form or electronic mode. Lots of Accounting software and Applications are in use for this work. Majorly for making accounting work complete, every business needs to have it certify by Chartered Accountants and in some

cases to be prepared by Professional Accountants.

Hence, to understand complete situation, this research was conducted. The decision base of accepting a total digital accounting system in the organisation rests on the entrepreneur, partner, director, whether to adopt the accounting system through their efforts or to appoint a professional accountant as a bookkeeper/ accountant and to end this process by completing after getting a Certificate of Auditing (Audit report) by a Chartered Accountant. Digital Accounting surely benefits large-scale organisation's but here an attempt is made to check the benefits to MSME-type of business organizations.

This empirical research is based on a primary data survey with 56 samples. Samples were consisted of MSME's and other organizations from the market. The study adopts a structured questionnaire methodology for data collection. The core covering dimensions: 1. Awareness of Digital Accounting system, 2. Effect on Efficiency of performance and 3. Factors affecting the adoption of Digital Accounting System. The Questionnaire was consisted of close ended and Likert scaling questions. Through statistical analysis, Key factors influencing adoption were identified.

Keywords: *Professional Accountants, Chartered Accountants, Digital Accounting System, Digitalization, E-Accounting.*

Introduction

In the recent years Traditional Bookkeeping system is being shifted to Digital transformation signifying its importance to automated process, cloud-based & AI integrated systems. It transformed the functions of accounting – traditionally dependent on manual records and physical documents. It has undergone a significant change through adoption of digital accounting system. The crucial role of Micro, Small and Medium entrepreneurs which was said as the backbone of Indian Economy. The other contribution was also to generate employment, to innovate and contribute in GDP growth. The Digital transformation in accounting signifies a fundamental shift from traditional bookkeeping to automated, cloud-based, and AI-integrated systems. This paper seeks to examine the digital accounting ecosystem through three core lenses: awareness, adoption, and performance impact.

Rajkot is a major industrial city of Gujarat. It serves as a microcosm of studying the phenomenon of current scenario. It is also well-known for its Vibrant MSME sector, including engineering, auto parts, brass, electronics, diamonds and textiles. It represents unique case for examining the scope and future of how small businesses are transferring from traditional accounting methods to digital accounting methods. There are lots of available cost-effective solutions to be considered for digital accounting system like Tally, Miracle, Zoho, Quick books, Shri, Subh etc.

The findings of this pilot study of my research from localized study are expected to offer practical insights for policymakers, digital service providers, and MSME owners, aiding them in understanding the critical enablers and inhibitors of digital adoption. Further, the study contributes to the broader discourse on digital transformation in emerging economies by providing a city-level perspective on how technological change is being internalized by small businesses.

Literature Review

(Pushpalatha, 2021) In this research paper, titled as “Digital Accounting and its Growth in India” in the Journal of Emerging Technologies and Innovative Research (JETIR), Volume 8 Issue 11 of Nov.2021, Researcher Mrs Pushpalatha has studied how traditional accounting system were transformed into digital accounting systems. The researcher also studied the different software available in the market with the latest cloud computing facilities. This research was explanatory research conducted by secondary data of various field. The research resulted in the outcome of showing positive effect that how digital accounting positively affected the working of employees. It also emphasized the benefits of adoption of digital accounting system.

(Nhung, April 2023) In this research paper, titled “Digital Accounting Systems (DIS): Concepts, Components and Roles in Business” published in research journal - International Journal of Research In Vocational Studies (IJRVOCAS) Volume 3, No. 1 in April 2023. Researcher Dao Thi Hong Nhung of Dong Nai Technology University, Bien Hoa, Vietnam studied the importance of digital accounting information system. Researcher studied the

importance of use of rapid technological advancement, digital innovation has become an essential component. They also observed that technology was adopted in production, business operations, and administrative management. A pivotal role of technology was played in enhancing the efficiency, accuracy, and speed of work processes. While it was also enabling access to timely and reliable information. In the field of accounting, particularly they have witnessed a significant transformation due to these advancements. As a fundamental pillar of economic and financial management systems, accounting contributes substantially to the planning, control, and decision-making processes within enterprises.

(Sanghvi C. B., June 2024) In the research paper, titled "An Explorative study on Awareness, Effectiveness and Factors affecting adoption of Digital Accounting in small and medium Enterprises" (With the special reference to Surendranagar District of Gujarat - India) published in DIJCM Darshan – The International Journal of Commerce and Management Volume 4 Issue 1 in June 2024. Researches Sanghvi C.B & Ahir K.D has studied that how entrepreneurs of the Surendranagar District were aware about the Digital Accounting System. They also studied the tailor made accounting software currently available in market with famous Accounting softwares like Tally, Miracle, Kuber, Shri etc. They studied 50 MSME's of Surendranagar as a descriptive study as a primary research and collected data from the sample by close ended questionnaire by convenient sampling method. They also studied the factors affecting the adoption of digital accounting system to different responsible persons like owner, partner, director, manager of firm/company.

(Srinivasa Rao Yadavalli, Aug 2020) In the research paper, titled "Accounting Practices of Small and Medium Enterprises" published in the International Journal of Business and Research (IJBMR) Volume 10 Issue 4 in Aug. 2020. Researcher Mr. Yadavalli. Srinivasarao1, Dr. T. Narayana reddy & Dr. N. Giri Babu. The researcher explored configuration and overview of methodological SME's of Ongole city of Andhra Pradesh. It was presumed by the researcher that most of the SME's have full bookkeeping records. There's associate degree efficient practice of accounting info to abutment financial performance measures of SMEs. The investigation likewise demonstrated that SME proprietors and managers were quick to become familiar with how to keep precise records of their business exchanges.

Research Gap

In 2017, there was a study conducted by Dr. Yagnesh Mohan Dalwadi & Jani Harshit R. (Dalvadi Yagnesh Mohan, July - September, 2017) with the title "A Study on Factors Governing Adoption of Computerized Accounting System in SME's of Gujarat" in Journal IJRMS in Volume 5, Issue 3 (VI): July - September, 2017. Another survey was done by Sanghvi Chintan Bansibhai & Dr. K.D. Ahir (Sanghvi C. B., June 2024) with the title "An Explorative study on Awareness, Effectiveness and Factors affecting adoption of Digital Accounting in small and medium Enterprises" (With the special reference to Surendranagar District) in DIJCM Volume - 4, Issue - I, June -2024. All research were particular with single objective and different perspective. (C.R., 2018) As refered, research gap gives insights to new research.

Objectives of the Study

The objective of the study can be as follow:

- To assess the level of awareness about digital accounting systems among organizations.
- To identify the key factors influencing the adoption of digital accounting tools.
- To evaluate the impact of digital accounting on organizational performance and efficiency.

Research Methodology

The research is descriptive in a nature exploring various aspects of Awareness. This research is a primary research. Data collection process started from January 2025 till date. For data collection Questionnaire and Schedule interview method was adopted.

Data Collection

Quantitative data was collected through surveys from total distributed Questionnaire to 162 MSME's. In which 58 respondents replied and they were Director, Partner, Owner and Manager of the Company or firm. Some Accounting professionals and Chartered Accountants

were also there as respondents for reviewing the accounting trend in SMEs across Rajkot, Gujarat - India. In general, registered and non-registered MSME's were surveyed by Convenience sampling and Snowball Sampling technique. Qualitative insights were gathered through interviews also. Statistical tools such as SPSS were used to analyse survey responses.

Demographic Profile of Survey

Table 1
A Table showing Demographic details of the Survey

Particular	Details	Frequency	Percentage
Area		58	100%
Age Group	< 26 years	16	28 %
	26 to 35 years	24	41 %
	36 to 45 years	11	19 %
	46 – 55 years	06	10 %
	56 years and above	01	02 %
Gender	Male	53	91 %
	Female	05	9 %
Designation	Owner	32	55 %
	Manager	07	12 %
	Director	01	02 %
	Chartered Accountant	07	12 %
	Professional Accountants	8	14 %
	Others	3	05 %
Size of business	Micro Enterprise	20	35 %
	Small Enterprise	23	40 %
	Medium Enterprise	15	25 %
Accounting Software	Tally ERP	18	33 %
	Kuber	02	04 %

	Miracle	26	48 %
	Prompt	01	02 %
	Other	07	13 %

(Source – Data collected from Primary survey)

Descriptive Analysis & Interpretation

As per the primary data collected in Rajkot City, respondents with different age groups, different genders, and designations owing to the MSME and knowledge of the Digital Accounting System, the following result is reflected Awareness Levels**.** During the study majority of respondents (93%) of the population are aware of the Digital Accounting System, and especially the major age group of 26 years to 35 years (41%) are aware of the Digital Accounting System. As the majority of males (gender) possess the ownership of enterprises and know the Digital Accounting System.

Descriptive Statistics

	Mean	Std. Deviation	N
Awareness	4.39	.670	54
Effecton Efficiency	3.99	1.184	54

Correlations

		Awareness	EffectonEfficiency
Awareness	Pearson Correlation	1	.625**
	Sig. (2-tailed)		.000
	N	54	54
EffectonEfficiency	Pearson Correlation	.625**	1
	Sig. (2-tailed)	.000	
	N	54	54

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

Respondents show a high level of awareness (Mean = 4.39), and most agree that this awareness positively affects their efficiency (Mean = 3.99). The low variation in Awareness (SD = 0.67) indicates consistent responses, whereas the higher variation in Effect on Efficiency (SD = 1.18)

indicates more varied opinions on the effectiveness.

Among the majority of the respondents were owners who possess the knowledge of the Digital Accounting System, and the Majority of Small enterprises (40%) are analysed working in the market. In Rajkot, the majority of enterprises use Miracle software (48%) in the market.

For the satisfaction of reliability, Cronbach's alpha test was run on the data, which was 0.969 of Awareness, Effect on efficiency was 0.933 and overall it was 0.972, which was higher than 0.7 it means that its reliability is quite acceptable.

(Source – Data collected from Primary survey)

Limitation of Study

This research/study included three basic points – Awareness, Change in Efficiency, Factors affecting adoption of Digital Accounting System. There may be more other parameters influencing the decision of adoption, awareness and effect in efficiency. As the sample geography was Rajkot City of Gujarat – India, there may be other factors affecting as the change in Geographical location. If the Sample size increased, it may also vary the results. There are many other exogeneous variable affecting the study. Time frame - constraints may also be considered as limitation if changed.

Conclusion and Recommendation

The whole research was conducted with the primary data. The quantitative data of 58 samples for the study gave new insight of digital accounting systems, which hold immense potential to enhance business performance, still their success hinges on awareness, proper implementation, and change management. So the policymakers and industry leaders must focus on capacity-building initiatives, subsidized access for SMEs, and robust cybersecurity frameworks to facilitate widespread adoption.

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ESG 2.0 in Investment Banking: Navigating the New Frontier of Sustainable Finance

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ABSTRACT

In recent years, Environmental, Social, and Governance (ESG) considerations have increasingly been recognized as a critical component of decision-making in the financial sector. Within investment banking, the adoption of ESG-oriented investing has accelerated, as institutions integrate these parameters into their strategic and portfolio choices. Despite this progress, several obstacles persist, including the absence of uniform ESG reporting standards, the risk of greenwashing, and inconsistencies in regulatory frameworks. This study examines both the opportunities and challenges surrounding ESG adoption in investment banking by drawing upon secondary evidence from scholarly research, industry publications,

and practical case studies.

Findings suggest that, although the integration of ESG practices contributes to sustainable value creation and enhances stakeholder confidence, limitations such as unreliable data and fragmented regulations continue to hinder effective implementation. The paper further highlights possible strategies to address these issues and proposes a framework through which investment banks can strengthen the incorporation of ESG principles into their investment activities.

Keywords: - *ESG investing, investment banking, sustainable finance, greenwashing, ESG data standardization.*

Introduction:

Background and Purpose

In the last decade, Environmental, Social, and Governance (ESG) investing has emerged as a central development in the global financial landscape. Factors such as a firm's environmental footprint, its approach toward employees and communities, and the strength of its governance practices are now shaping investment decisions more directly than before. Even investment banks—long associated with prioritizing financial performance—are increasingly embedding ESG indicators into their strategies in response to investor demand for sustainable and ethically guided options (Eccles & Serafeim, 2013). This momentum is further supported by evidence showing that organizations with robust ESG practices often achieve stronger long-term financial outcomes (Friede, Busch, & Bassen, 2015).

Nonetheless, incorporating ESG into investment banking has proven complex. Institutions struggle with fragmented and inconsistent ESG disclosures, the growing concern of greenwashing in ESG-branded products, and the absence of universally accepted measurement standards (Berg, Koelbel, & Rigobon, 2020). Yet, the shift also unlocks significant opportunities, particularly through innovative mechanisms such as green bonds, sustainable finance products, and investment in renewable energy—areas witnessing rapid expansion within the banking sector (Tolliver, Keeley, & Managi, 2020).

This paper therefore aims to examine the extent to which ESG considerations are embedded within investment banking, highlight the major challenges hindering effective integration, and identify opportunities that could enable financial institutions to advance ESG-oriented strategies in their portfolios.

Literature Review:

1. ESG Integration in Investment Banking

The incorporation of Environmental, Social, and Governance (ESG) factors into investment banking practices has been extensively examined in academic research. According to Eccles and Serafeim (2013), firms that adopt ESG principles tend to create long-term value and foster stronger stakeholder confidence, suggesting that ESG-oriented strategies can enhance financial performance over time. Likewise, the meta-analysis by Friede, Busch, and Bassen (2015), which reviewed more than 2,000 empirical studies, revealed that nearly 80% reported either neutral or positive links between ESG outcomes and financial returns. This body of evidence reinforces the argument that embedding ESG considerations into investment processes can strengthen financial resilience and corporate reputation.

Nonetheless, the path toward consistent ESG integration remains complex. Linnenluecke et al. (2021) point out that the absence of standardized tools to evaluate climate-related risks restricts the ability of banks to embed environmental considerations effectively into their portfolios. Without harmonized ESG frameworks, aligning financial activities with sustainability objectives becomes difficult. Furthermore, Dörry and Schulz (2018) argue that fragmented international regulatory regimes limit the comparability of ESG disclosures, thereby constraining banks from accurately assessing the financial implications of ESG performance.

2. Greenwashing and Data Inconsistencies

One of the most persistent problems in ESG investment is the practice of greenwashing, where financial products are promoted as ESG-compliant despite failing to meet genuine sustainability standards. An investigation by Berg, Koelbel, and Rigobon (2020) into ESG-

branded exchange-traded funds (ETFs) found that approximately 40% of these instruments contained assets inconsistent with their stated ESG claims. Such practices not only mislead investors seeking ethically responsible options but also weaken confidence in the credibility of ESG markets.

Alongside greenwashing, inconsistent and unreliable ESG data poses a serious challenge for investment banks. Khan et al. (2022) emphasize that the lack of comparability and transparency in ESG information undermines its usefulness for decision-making. When ESG datasets are fragmented or inaccurate, the ability of financial institutions to evaluate the sustainability and long-term performance of potential investments is severely compromised. This limits the extent to which ESG principles can be fully embedded into investment decision-making processes.

3. Opportunities in ESG Investing

Despite these difficulties, ESG investing opens up meaningful opportunities for investment banks to expand their sustainable finance activities. Green bonds, which provide funding for renewable energy projects and low-carbon initiatives, represent one of the most promising pathways. Tolliver, Keeley, and Managi (2020) show that green bonds have been instrumental in directing capital toward clean energy and climate-resilient sectors, thereby supporting international sustainability objectives. The growing appetite for such instruments has not only diversified banks' investment options but also increased investor demand for ESG-compliant products.

Moreover, the rise of value-driven investment preferences offers banks additional opportunities. Amel- Zadeh and Serafeim (2018) observe that institutional investors are increasingly guided by ethical and sustainability considerations, sometimes even over traditional financial returns. Investment banks capable of designing credible ESG-oriented products are therefore positioned to attract this new class of investors while gaining a competitive advantage in the financial market.

1. Research Methodology:

1.1. Research Problem

Investment banking faces significant challenges in integrating Environmental, Social, and Governance (ESG) factors due to the absence of standardized frameworks, metrics, and consistent regulations, which undermines accurate financial valuations. Although ESG considerations are increasingly influencing investment decisions, no comprehensive framework currently exists to assess their direct impact on valuation models. The lack of standardized metrics, inconsistent data, and fragmented regulations complicates decision-making processes, making it difficult for investment banks to evaluate the financial impact of ESG integration with precision.

1.2. Approach

This study adopts a mixed-methods approach, drawing on both qualitative and quantitative dimensions. It relies exclusively on secondary data sourced from academic journals, industry reports, regulatory documents, and case studies to evaluate the current state of ESG integration in investment banking. The aim is to critically assess the challenges encountered by investment banks in adopting ESG principles and to identify potential opportunities for improving integration practices.

1.3. Research Design

The research design is descriptive in nature, relying on qualitative-dominant analysis of secondary data. The objective is to investigate the trend of ESG investing in investment banking, focusing on the challenges posed by the absence of standardized frameworks and regulations, while also examining opportunities for enhanced ESG adoption. Data is drawn from peer-reviewed literature, industry reports published by leading investment banks and consultancy firms, regulatory documents such as the EU Taxonomy, IFRS, TCFD, and SASB, market intelligence platforms including Bloomberg, MSCI, Refinitiv, and Morningstar, as well as established financial news outlets like Reuters, Bloomberg, and the Financial Times. The study uses document review, thematic content analysis, and where relevant, basic trend or correlation analysis of quantitative indicators such as ESG deal

volumes and financial performance. The scope is limited to investment banks operating between 2018 and 2024 across North America, Europe, and Asia-Pacific. Ethical considerations are minimal, as only published data is utilized, and all sources will be cited appropriately. Limitations include variations in ESG reporting practices, restricted access to proprietary datasets, and the evolving nature of ESG standards globally.

1.4. Data Analysis

The study employs secondary data analysis, which allows for the examination of historical developments, regulatory frameworks, and institutional practices without the need for primary data collection. Data is critically assessed for reliability, relevance, and potential bias, with findings triangulated across multiple sources to enhance credibility and validity. Qualitative content analysis is applied to identify recurring themes, challenges, and opportunities in ESG integration, offering nuanced insights into how investment banks respond to evolving sustainability regulations and global financial narratives.

1.5. Sampling Method

A purposive sampling method has been adopted to ensure that only the most relevant and credible data sources are included. Sources are selected on the basis of their direct relevance to ESG integration in investment banking, their authority and reliability, and their publication within the 2018–2024 timeframe. The sampling focuses on global financial regions such as North America, Europe, and Asia- Pacific, drawing from peer-reviewed journals, industry and consultancy reports, regulatory documents, market intelligence platforms, and high-quality financial news outlets. Alongside this, the data undergoes critical analysis to ensure robustness. Themes and patterns are identified through qualitative content analysis, while triangulation across different types of sources strengthens the validity of findings. This approach enables a comprehensive evaluation of ESG challenges, regulatory inconsistencies, and financial impacts in the investment banking sector.

1.6. Hypothesis

The hypothesis of this study is that the integration of ESG factors into investment banking will lead to improved long-term financial performance and increased investor trust, but the

lack of standardized data and metrics remains a significant challenge to successful implementation.

H1: Investment banks operating in regions with consistent ESG regulations demonstrate higher ESG deal volumes and valuations compared to those in regions with fragmented ESG policies.

H2: Case studies reveal that the lack of standardized ESG reporting frameworks is the most frequently cited barrier to ESG integration in investment banking.

H3: There is a positive correlation between the use of third-party ESG rating providers and investment banks' confidence in ESG valuation accuracy.

H4: Investment banks with specialized ESG advisory teams are more likely to identify ESG investing as an opportunity rather than a compliance challenge.

H5: Over the last five years, investment banks that actively integrate ESG into their product offerings have shown a statistically significant increase in revenue from ESG-related financial instruments (e.g., green bonds, ESG-linked loans).

2. Analysis and Findings:

The analysis of secondary data reveals several key findings related to the integration of ESG factors in investment banking. First, investment banks operating in regions with well-defined ESG regulations, such as the European Union, show higher ESG deal volumes and innovation, particularly in green bonds and sustainability-linked loans. This supports Hypothesis 1 (H1) and emphasizes the importance of regulatory clarity in facilitating ESG finance.

Second, across various case studies and reports, the absence of standardized ESG reporting frameworks is consistently identified as the primary challenge in ESG integration. Banks struggle to compare ESG performance across industries and regions due to inconsistencies in data quality and disclosure practices, affirming Hypothesis 2 (H2).

Third, findings indicate that investment banks relying on third-party ESG rating agencies tend to express greater confidence in ESG-related financial valuations, supporting Hypothesis 3 (H3). These banks benefit from consistent metrics, although reliance on external providers also introduces concerns about transparency and comparability.

Fourth, institutions with dedicated ESG teams or advisory units show a more proactive attitude toward ESG investing, often viewing it as a source of strategic advantage and innovation rather than a compliance burden. This aligns with Hypothesis 4 (H4) and illustrates the role of internal ESG leadership in changing organizational perspectives.

Lastly, analysis of ESG-related financial performance over the last five years indicates that banks actively integrating ESG into their offerings have achieved notable growth in ESG-related revenue streams, particularly from products like green bonds and ESG-linked derivatives. This supports Hypothesis 5 (H5) and suggests that ESG integration, despite its challenges, offers measurable long- term financial benefits.

Overall, the findings validate the central hypothesis that while ESG integration can enhance financial performance and investor trust. Lack of standardized frameworks, metrics, and regulations remains a critical obstacle. The study highlights a growing need for harmonized global ESG standards, improved data transparency, and deeper integration of ESG into risk valuation models. Investment banks that successfully navigate these challenges stand to gain both reputational and financial advantages in the evolving sustainable finance landscape.

3. Discussion & Conclusion:

The findings clearly illustrate that ESG integration in investment banking is both a strategic imperative and a growing source of financial value. Regulatory environments, organizational leadership, and access to reliable ESG data collectively shape how effectively banks can implement ESG considerations into their operations. While the potential rewards of ESG integration i.e., enhanced reputation, investor confidence, and revenue growth; are evident, persistent challenges remain. Chief among them is the absence of globally harmonized ESG

standards and the continued reliance on inconsistent third-party metrics.To fully capitalize on the opportunities presented by ESG finance, investment banks must advocate for and contribute to the development of standardized, transparent reporting frameworks. Additionally, internal investment in ESG capabilities and risk models will be crucial to embed sustainability at the core of financial decision-making. As ESG considerations become integral to both regulatory and market expectations, those institutions that lead in integration and innovation are likely to emerge as frontrunners in the future of sustainable finance.

This study highlights the growing importance of ESG investing in investment banking and the challenges that come with it. Despite the potential for long-term value creation, significant barriers remain in the form of greenwashing, data inconsistencies, and regulatory fragmentation. Future research should focus on developing standardized frameworks and metrics to enable better integration of ESG factors into investment banking.

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A Study on Investor's Preferences Towards Mutual Fund Plans in Gujarat

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Abstract

Mutual funds are an essential part of modern investment strategies, offering diversification, professional management, and liquidity. They provide investors access to a wide range of asset classes without requiring direct market expertise. The primary types of mutual funds include equity funds, debt funds, hybrid funds, and index funds, each catering to different risk appetites and investment horizons. These funds operate under regulatory oversight to ensure transparency and investor protection. By pooling resources, mutual funds enable small and large investors alike to benefit from economies of scale and expert financial management, making them an attractive choice for long-term wealth creation. The study is based on investor's preference for diverse range of mutual fund services designed to cater to the varied financial goals and risk profiles of investors. With a strong research-driven approach and a philosophy of "Buy Right, Sit Tight," the companies emphasizes long-term wealth creation through focused investment strategies. Their offerings include equity funds, debt funds, hybrid funds, index funds, and thematic funds, providing options for growth, stability, and diversification.

Keywords: *mutual, SIP, investment,*

Introduction to mutual fund

Mutual funds in India are investment vehicles that pool money from multiple investors to invest in a diversified portfolio of stocks, bonds, or other assets. They are managed by Asset Management Companies (AMCs) and regulated by the **Securities and Exchange Board of India (SEBI).** As of January 2024, the total AUM of the Indian mutual fund industry is over

₹50 lakh crore (₹50 trillion), showing a strong increase from **₹10 lakh crore in 2014.** The mutual fund industry has grown at a **CAGR of ~18-20%** over the past decade. The number of **Systematic Investment Plans (SIPs)** has exceeded **7.5 crore** (75 million), indicating growing retail investor participation. In mutual fund industry, mainly people invest in two types of funds. One if open ended Mutual Funds wherein Investors can buy or units right from the fund at the current value all its assets (NAV). This type of gives you lots of and easy access to your when you want it. Another is closed-ended Mutual Funds wherein funds last

for fixed amount of time usually a few years. These units can be traded only on exchanges where and their prices change based on the demand.

Mutual Fund players in Ahmedabad

Ahmedabad hosts several prominent mutual fund companies and distributors offering a range of investment services. Here are some notable entities in the city:

1. UTI Mutual Fund- UTI Mutual Fund is one of India's oldest and most trusted mutual fund companies. Established in 1963 as the Unit Trust of India (UTI), it played a pioneering role in the development of the mutual fund industry in India. Today, UTI Mutual Fund operates as a SEBI-registered Asset Management Company (AMC) and offers a diverse range of investment products. UTI Mutual Fund Schemes offer equity funds naming UTI Nifty 50 Index Fund, UTI Flexi Cap Fund, UTI Value Opportunities Fund, UTI Midcap Fund and UTI Small Cap Fund. Debt Funds naming UTI Short Term Income Fund, UTI Bond Fund, UTI Liquid Fund. Hybrid & Solution-Oriented Funds naming UTI Equity Savings Fund, UTI Hybrid Equity Fund, and UTI Retirement Benefit Pension Fund
2. ICICI Prudential Mutual Fund-ICICI Prudential Mutual Fund is one of India's leading asset management companies (AMCs). It is a joint venture between ICICI Bank (one of India's largest private sector banks) and Prudential Plc, a global financial services group based in the UK. The company has a strong presence in mutual funds, offering a wide range of investment options. Few popular ICICI Prudential Mutual Fund Schemes in Equity Funds (Growth-Oriented) includes ICICI Prudential Bluechip Fund, ICICI Prudential Midcap Fund, ICICI Prudential Smallcap Fund, ICICI Prudential Value Discovery Fund, ICICI Prudential Nifty Next 50 Index Fund – Passive fund tracking

Nifty Next 50. Debt Funds which yield Stable Returns include ICICI Prudential Liquid Fund, ICICI Prudential Corporate Bond Fund as well as ICICI Prudential Gilt Fund. Hybrid & Solution-Oriented Funds include ICICI Prudential Equity & Debt Fund, ICICI Prudential Multi-Asset Fund, ICICI Prudential Retirement Fund.

3. SBI Mutual Fund SBI Mutual Fund is one of India's largest and most trusted asset management companies (AMCs). It is a joint venture between State Bank of India (SBI) and Amundi, a leading European asset management company. With a strong legacy and a diverse range of mutual fund schemes, SBI Mutual Fund is a popular choice among investors. Few popular SBI Mutual Fund Schemes include Equity Funds (Growth-Oriented) naming SBI Bluechip Fund, SBI Small Cap Fund, SBI Flexicap Fund, SBI Equity Hybrid Fund and SBI Magnum Midcap Fund. Debt Funds include SBI Liquid Fund, SBI Corporate Bond Fund and SBI Magnum Gilt Fund. Hybrid & Solution-Oriented Funds issued by SBI include SBI Equity Hybrid Fund, SBI Multi-Asset Allocation Fund, as well as SBI Retirement Benefit Fund. SBI also issues Tax-Saving Fund.
4. Birjubhai Acharya IMF Pvt Ltd is a prominent financial investment advisory firm based in Ahmedabad, Gujarat. With over 17 years of experience, the firm offers a comprehensive range of financial services tailored to meet individual and corporate investment need. The Key Services Offered by the company Mutual Fund Portfolio & Analysis, Portfolio Restructuring, Financial Planning, Stock Portfolio & Analysis, Portfolio Management Services and Demat Account Planning.
5. Palaash Invest Smart-Palaash Invest Smart is a financial services firm based in Ahmedabad, India, specializing in mutual funds, portfolio management, loans against mutual funds, and term insurance. They are offering Key Services in the field of Mutual Funds, Portfolio Management Services (PMS), Capital Market Investments and Fixed Income Products, Insurance Solutions.
6. Rational Investments is a financial services firm based in Ahmedabad, Gujarat, specializing in investment consultancy and wealth management. Established in 2014 by Mr. Nimit H. Shah, the firm has been providing tailored financial solutions to its clients. Key Services Offered by them are Mutual Fund Distribution, insurance Consultancy, financial Planning, portfolio management.

7. Shanghai Investment is a financial services firm based in Ahmedabad, Gujarat, India. The company offers a comprehensive range of investment products and services tailored to meet diverse financial goals. Key Services Offered by the company are Equity Trading, Commodity Trading, Mutual Funds, Company Deposits, Life Insurance, Portfolio Management, Currency Trading and Online and Offline Trading.

Literature review

(Savita, 2024) Greater emphasis on financial literacy drives among females and youths should be the aim of the mutual fund industry. Government initiatives to introduce financial studies at the school level are pressing. Retention of adults who are already experienced investors is equally a focus area. Enhanced investor satisfaction, public education through advertisements and campaigns, and target-oriented programs like DAP and IAP will fuel awareness and investment. The mutual funds have very exciting returns with moderate risks, much ahead of the banking industry assets, and hence innovative schemes are required to meet the diverse investor needs.

(Mathew, KP, Dr. R. Amudha, Sudhahar, & Joseph, 2023) Behavioural finance demonstrates that the stakeholders themselves, the institutional investors, the practitioners, the markets, and the managers are all irrational at many times. However, inventions in the financial sectors, such as fintech and artificial intelligence, help address this irrational behaviour, as indicated by Barberis (2013a, 2013b). There are several benefits that can be gained through the study of behavioural finance, in terms of helping retail and institutional investors, financial advisors, agents, and brokers gain better understanding of the unpredictability of the market. The ability to address doubts from becoming influential results in better comprehension of market behaviour, which allows them to make better decisions that do not get negatively affected by irrational actions.

(G.C.Venkataiah & Rao, 2018) The results of the study show a similar investment pattern between both genders, especially in gold investments. Age groups have similar tendencies toward real estate and insurance but divergent opinions on stocks, gold, bank savings, and post office savings. Broadly speaking, investors have an inclination toward capital appreciation and earnings, ranging from the short to the long term, in their investment decisions across various

avenues. It is interesting how these insights underline the fact that a number of influences are constantly forming and reforming the behaviour of investors at shared preferences and very distinct considerations along demographic and financial spectra.

(Dhiraj & Kothari , 2012) The study concludes the awareness and issues within the post-office deposit schemes are not much influenced by the demographic factors other than monthly income. That is the high-income groups have a reduced willingness to invest. Safety and security are basic reasons for investment and Deposits Pledges are an unpopular option. Except for Recurring Deposits and Post Office Savings Bank A/C, awareness among the people in general is quite low. However, there is a positive opinion, though of low returns. Almost all respondents know about these schemes through friends, relatives, and agents highlighting their major role in spreading awareness.

(Sharma, 2012) The study focuses on investor satisfaction and the different factors that influence mutual fund investment. In this study, the benefits offered by mutual fund companies can be broadly classified under three groups: scheme-related attributes, monetary benefits, and sponsor-related factors. The most important findings of the present study are that if a company wants to attract investors in India, it should focus on full disclosure, regular updates, safety assurance, competitive returns, and effective customer service. These are very instrumental factors in gaining the trust of investors and winning their long-term patronage within the mutual fund industry.

(Saini, Anjum, & Saini, 2011) The paper has zeroed in on mutual fund investments and investor behaviour and has observed that, over time, there is a growing preference for portfolio managers and mutual funds resulting from the expertise factor combined with their accessibility. Factors that influence the investment objectives, and financial advisors. Challenges include the conversion of potential investors and the innovating of new schemes so that mutual fund companies can remain confident and have growth in the industry. Mutual fund companies have an ultimate role in developing sector strategies, coupled with investor expectations.

(Wali & Kiran, 2009) The present study talks about the risk-return trade-off of mutual fund services based on investors' perception. Emphasis is laid on ascertaining these expectations since mutual funds have failed to grow at rates regarded as desirable. Investors are now turning

to mutual funds to invest in the volatile equity market with calculated risk. Current mutual fund offerings, though, seem not to be entirely pegged to the preferences of the investors. It identifies critical gaps in the existing framework that may be worth pursuing for an AMC. The findings also bring out the imperative need for innovation and improvement in service quality by the AMCs to serve the investors better and perhaps accelerate growth in the sector.

Objectives of the Study

1. To assess the awareness and understanding of mutual funds and bank deposits among investors.
2. Factors influencing the choice of mutual funds or bank deposits as a form of investment by investors.
3. Relative risk and return perceptions of mutual funds and bank deposits.
4. Trends in investment behaviour of different demographic segments.

Research Methodology

A convenience sampling was used which focused on university students and young professionals regarding their perceptions of investing in mutual funds and bank deposits. The questionnaire included sections on preferred investment options, key factors influencing their decisions, and the impact of digital platforms on their investment choices. This study offered valuable insights into how these demographic views and decides between mutual funds and bank deposits. Total of 318 respondents were surveyed using online questionnaire. Within the duration of 40 days during January and February, 2025.

Limitations of Study

1. **Sample Representation:** There may be an error or bias due to non-response or the under- representation of some demographic groups.
2. **Data Accuracy:** The reliability of self-reported data and the associated response bias

3. Generalizability: The findings may be specific to the population under study and hence cannot be applied universally

4. Time Constraints: This is the time constraint for data collection and its analysis that can limit the depth of insights.

Respondents Profile

	Criteria	**Frequency**	**Percentage**
Gender	Male	176	55.30%
	Female	142	44.70%
	Total	**318**	**100%**
Age	18-30	304	95.60%
	30-45	8	2.50%
	46-60	4	1.30%
	above 61	2	0.60%
	Total	**318**	**100%**
Annual Income (Rs.)	Less than 100000	200	62.90%
	100000-250000	82	25.80%
	250000-500000	30	9.40%
	>5000000	6	0.1.9%
	Total	**318**	**100%**
Occupation	Student	232	73%
	Business Person	14	4.40%
	Employed	68	21.40%
	Home maker	0	0%
	other	4	1.30%
	Total	**318**	**100%**
Investment Preference	Mutual fun	156	49.10%
	Bank deposits	80	25.20%
	Other	82	25.85
	total	**318**	**100%**
Investment Reasons	Tax saving	28	8.80%
	Return on money	68	21%
	Save for future	164	51.60%
	Safety and liquidity	26	8.20%
	Invest to beat inflation	10	3.10%
	The power of compounding	22	6.90%
	Total	**318**	**100%**
Familiarity	Very familiar	122	38.40%
	Somewhat familiar	132	41.50%
	Not familiar	64	20.10%

	total	**318**	**100%**
Investment option	Yes, mutual fund	188	29.60%
	Yes, bank deposits	124	19.50%
	Both	88	13.80%
	No	236	37.10%
	Total	**318**	**100%**
Riskier option	Mutual funds	114	35.80%
	Bank deposits	48	15.10%
	Both equally	42	13.20%
	Not sure	114	35.80%
	Total	**318**	**100%**
Satisfaction from MF	Very satisfied	56	17.60%
	Satisfied	114	35.80%
	Neutral	124	39%
	Dissatisfied	14	4.40%
	Very dissatisfied	10	3.10%
	Total	**318**	**100%**
Satisfaction from Bank Deposits	Very satisfied	38	11.90%
	Satisfied	120	37.70%
	Neutral	132	41.50%
	Dissatisfied	14	4.40%
	Very dissatisfied	14	4.40%
	Total	318	**100%**
Review of MF	Monthly	100	31.40%
	Quarterly	46	14.50%
	Annually	58	18.20%
	Rarely	44	13.80%
	Never	70	22%
	Total	318	**100%**
How often review BD	Monthly	98	30.80%
	Quarterly	52	16.40%
	Annually	68	21.40%
	Rarely	30	9.40%
	Never	70	22%
	Total	318	**100%**

Tools for managing MF	Financial calculators	94	29.60%
	Investment apps	160	50.30%
	Websites	60	18.90%
	Fin care wealth management	2	0.60%
	Financial agent	2	0.60%
	Total	318	**100%**
Tools for managing BD	Financial calculators	126	39.60%
	Investment apps	128	40.30%
	Websites	64	20.10%
	total	318	**100%**

Hypothesis 1: Chi-square Test

H0: There is no significant association between presence of Investment preference and Gender of the respondents.

H1: There is significant association between presence of Investment preference and Gender of the respondents.

Finding

The Chi-Square Tests table shows that the Pearson Chi-Square value is 0.352 with 2 degrees of freedom and a significance level of 0.839 which is greater than 0.05, indicating that there is no statistically significant association between the variables being tested. It means that there is no significant association between Investment Preferences and gender of the respondents.

Hypothesis 2: Hypothesis on Perception of Risk

H0: There is no significant difference in the perception of risk between mutual funds and bank deposits across different occupational groups.

H1: There is a significant difference in the perception of risk between mutual funds and bank deposits across different occupational groups.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Occupation and perception of risk	318	100.0%	0	0.0%	318	100.0%

Riskinesss of investment option

		Which investment option do you perceive as riskier?				Total
		Bank deposit	Both equally	Mutual funds	Not sure	
Occupatio	Businessman/ women	0	2	8	4	14
	Employed	6	12	18	32	68
	Other	0	2	2	0	4
	Student	42	26	86	78	232
Total		24	48	42	114	318

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.105	.070	-1.324	.188
Ordinal by Ordinal	Spearman Correlation	-.091	.076	-1.147	.253
N of Valid Cases		318			

Finding

The correlation analysis shows that there is a weak, negative relationship between occupation and the perception of risk between mutual funds and bank deposits, with Pearson's R value of -0.105 and a p- value of 0.188. Since the p-value is greater than 0.05, this suggests no significant correlation between occupation and risk perception in this sample

Recommendations

- Suggest diversified investment strategies to balance risk and return for investors considering mutual funds or bank deposits.

- Encourage research and financial education to enhance investor awareness and decision-making when evaluating mutual funds and bank deposits.
- Propose regular portfolio reviews and consultations with financial advisors for investors to optimize their holdings in mutual funds or bank deposits.
- Advise on the importance of long-term investment perspectives and patience for achieving financial goals with mutual funds or bank deposits.
- Risk-return equation can be balanced through an appropriate mixture of mutual funds and bank deposits. For instance, you might want to invest some in mutual funds if the returns seem relatively high, while others may go into bank deposits just for safety.
- It's a good idea to learn about how these investments work before you put your money in. The more you know, the better choices you'll make.
- Do run through your investments from time to time, and take the advice of a financial advisor to keep them on track.
- Remember that investment is for the long-term. It is only if you are very patient and give it some time that it will grow and help you realize your financial aspirations.

Conclusion

The study brings around the fact that customers/investors have diversified preference and perception for the Mutual Fund Schemes and Bank Deposits. Mutual funds can give higher returns but come with more risk, making them good for long-term investments if you're okay with some ups and downs. Bank deposits are safer and offer steady, but lower returns. They're better for short-term savings or if you want to avoid risk. Investors pick based on their comfort with risk and financial goals. This overall expose the need of understanding such needs of different scales and risk-taking avenues of investors. Mutual funds should work towards more transparency and higher performance to gain the trust of more conservative investors, while for more assurance about the safety and stability of depository products, banks should continue to communicate.

An Analytical Study on Short Term Pre-IPO and post-IPO performance of SMEs

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Abstract

This study investigates short term operating performance of small and medium enterprises (SMEs) before and after going public. It analyzes profitability by using Earnings per share (EPS), Return on Assets Ratio (ROA), Sales to Assets Ratio and Operating Income on Assets Ratio; liquidity by using Current Ratio and leverage by using Debt to Equity Ratio.

SMEs often get better at managing their money and changing how they use their funds after going public. But they don't always start making profits right away. This goes against what people expect when a company goes public. SMEs showed mixed results after the IPO. Profitability declined mostly but liquidity got better. The biggest positive change was in leverage as the SMEs reduced their dependence on debt and became financially stable. Overall, IPOs helped with liquidity and debt but didn't guarantee stronger profits in the short term.

Keywords: *SME, IPO, Operating performance*

Introduction:

An Initial Public Offering (IPO) is when a private company offers its shares to the public for the first time. It helps the company to raise money from investors to grow its business or to pay off debts or to improve their operations. An IPO is a big step forward for SMEs with limited resources. It helps them to raise funds through public and to become financially stable. From a past decade, there has been a rise in the number of SME IPOs in India. SME IPOs are not directly listed on BSE (Bombay Stock Exchange) and NSE (National Stock Exchange), but they are listed on special platforms like BSE SME and NSE Emerge. These platforms are made to support smaller companies in the stock market. They make it easier for SMEs to meet listing requirements and connect with investors.

It is important to understand how the financial performance of SMEs change after IPO as more and more SMEs are going public. Investors want to see if the company makes more profit, government and regulators want to know if the IPO helps SME to grow, whereas banks and business partners also want to see if the company improves its performance.

Literature Review:

Most of the researches have been done on mainboard IPOs focusing on large companies, but smaller business especially SMEs have been unexplored. This review looks at what different studies have found about IPOs especially in the short term.

The study by Changyun Wang (2004) looked at 747 Chinese IPOs from 1994–1999 and found a sharp drop in operating performance after listing, with no clear link to ownership type or concentration. The analysis was limited by its focus on accounting metrics and a narrow time frame. Achima Chalarat's research on 36 Thai IPOs showed that both ROA and ROE declined post-IPO, and while venture capital involvement had mixed effects, ownership structure didn't significantly influence performance. Himanshu Puri (2012) analyzed 100 Indian IPOs and found strong short-term gains that faded by the 30th day, with 2009–10 being the best-performing period. However, long-term trends and investor behavior weren't explored.

Yi Zhao and colleagues (2022) studied 225 Chinese IPOs and discovered that both pre- and post-IPO investor attention negatively impacted returns, especially when sentiment was negative. The relationship was non-linear, and online attention didn't fully capture investor

sentiment. Craig Galbraith and Gregory Merrill (2001) examined 28 B2B e-commerce IPOs and found significant short-term underpricing and long-term underperformance, with firm strategies affecting first-day returns more than industry factors. Fei Jiang and Lawrence Leger (2010) evaluated IPO allocation reforms in China and found reduced underpricing and improved market efficiency, though the study was limited to short-term performance and A-share listings.

Nadia Marcha Chintya and team (2020) explored how IPOs in Indonesia affected competitor performance. Both IPO firms and competitors saw positive returns, but no strong spillover effects were found. The study had low explanatory power and limited sector classification. Faisal Aski Ardiansyah and colleagues (2025) analyzed 189 Indonesian IPOs and found that profitability and market value reduced underpricing, while leverage had no effect. However, many influencing factors were not included. Abdul Latif and team (2023) studied 113 Indonesian IPOs and found that industry sector was the only significant factor affecting firm value, with most variation unexplained.

Finally, Avdhesh Kumar Shukla and Tara Shankar Shaw (2018) revisited post-IPO performance in India, analyzing 413 firms. They found declines in ROA and turnover ratios, while operating cash flow recovered after two years. Sales and capital expenditures grew faster than peers, but the study excluded financial firms and relied on secondary data.

Research Gap:

Most of the studies conducted on IPOs have focused on large companies or look at long term performance. But SMEs are different, they face different challenges than large scale companies and behave differently around the time they go public. There have1. not been enough researches on how SMEs perform financially before and after going public. This research focuses on short term operating performance of SMEs before and after their IPO.

Research Methodology:

Research objectives

1. To evaluate short term profitability before and after the IPO.
2. To assess changes in financial leverage before and after the IPO.
3. To examine liquidity position of SMEs before and after the IPO.

Hypothesis

H_1: There is no significant difference in the short-term profitability of SMEs before and after the IPO.

H_2: There is no significant difference in the short-term financial leverage of SMEs before and after the IPO.

H_3: There is no significant difference in the short-term liquidity of SMEs before and after the IPO.

Study Design

This research uses an analytical approach to study how the financial performance of SMEs changes before and after their IPO. It is designed to compare financial data from both time periods using numbers and facts. The study is based on secondary data and uses statistical methods to check if the changes are meaningful and reliable.

Sample Selection

The study focuses on SME IPOs listed during the years 2021 and 2022. A total of 59 offerings were recorded in 2021 and 109 in 2022. However, due to data limitations, only 56 IPOs from 2021 and 99 from 2022 met the criteria for inclusion. Accordingly, the final sample comprises 155 SME IPOs that were analyzed in this research.

Variables

The study evaluates six key financial ratios to measure different aspects of operating performance: To evaluate profitability:

- ROA (Return on Assets): Assesses how efficiently a company utilizes its assets to generate net income.
- OI/A (Operating Income to Assets): Measures operating profitability relative to total assets, indicating core business efficiency.
- S/A (Sales to Assets): Evaluates how effectively a firm uses its assets to generate revenue.
- EPS (Earnings Per Share): Reflects the earnings attributable to each outstanding share, representing shareholder value.

To analyze leverage:

- D/E (Debt to Equity Ratio): Indicates the degree of financial leverage and reliance on debt financing. To analyze liquidity:
- CR (Current Ratio): Measures the firm's ability to meet short-term liabilities using current assets, reflecting liquidity.

Statistical Techniques

To find out if the changes in performance before and after the IPO are real or just random, the study uses a Paired-Sample T-Test. This test compares two sets of related data, in this case, the same companies' performance before and after going public. It helps show whether the differences in financial results are significant or not.

Tools and Software

Microsoft Excel: Used for initial data cleaning, organization, and tabulation.

SPSS (Statistical Package for the Social Sciences): Utilized to perform the paired-sample t-tests and generate statistical outputs, including mean differences, t-values, and significance levels.

Findings of Study:

Table 1:

Profitability 1 year before and after the SME IPOs came in 2021				
	ROA	OI/A	S/A	EPS
Mean 2020	0.07110756	0.15744787	2.30984602	3.849464
Mean 2022	0.06182492	0.14481464	1.47027941	5.520357
t-stat	0.40700927	0.33067129	2.92730568	-0.62529
Pearson Correlation	-0.0078852	-0.0216021	0.47347832	0.089876

Findings of the Profitability Ratios for the SMEs offered in 2021.

ROA measures how efficiently a company uses its assets to generate net income. There is a slight decline in ROA post IPO which suggests that there is gradual decline in the additional output

or value we get from each new unit of an asset acquired. But the value of t-statistics is low which indicates that it is not statistically significant. The Pearson's correlation is near 0 which states that there is no continuity in asset efficiency from pre to post IPO.

Operating Income on Assets (OI/A) Ratio measures how efficiently a company uses its assets to generate operating income. The decline in Operating income on assets ratio is statistically insignificant but Pearson's correlation is negative which suggests disruption in operational consistency post IPO.

Sales to Assets (S/A) Ratio indicates how effectively assets are used to generate sales. The statistically significant decline indicates that there is decline in operational efficiency post IPO. There is a positive correlation which suggests that the ability to generate sales from its assets has improved.

Earnings per Share (EPS) is a fundamental measure of a company's profitability from an investor's perspective. It indicates how much of a company's profit is allocated to outstanding shares of common stock. The average EPS has improved post IPO. Pearson's correlation is very weak, which implies that there is almost no relationship between pre and post IPO of EPS.

Overall, the findings shows that SMEs in 2021 did not consistently improve their performance after going public. Most firms became less efficient in using their assets to generate income and sales. EPS improved, but it was likely driven by few standout companies. There is no link between how companies performed before and after going public, which means that after going public, SMEs didn't guarantee better results.

Table 2:

Profitability 1 year before and after the SME IPOs came in 2022				
	ROA	OI/A	S/A	EPS
Mean 2021	0.159876648	0.546272719	6.833047216	3.15282828
Mean 2023	0.134603747	0.25980837	2.607982507	11.3717172
t-stat	0.211286056	0.666569212	0.791319926	-1.00472156
Pearson Correlation	-0.01828535	-0.02333189	-0.030972538	-0.01049399

Findings of the Profitability Ratios for the SMEs offered in 2022.

Mean ROA decreases post IPO which indicates that companies become less efficient at turning assets into profits but it is statistically insignificant. Pearson's correlation is near 0 which indicated there is no link between pre and post IPO of Return on Assets.

Operating income on assets ratio slightly declines post IPO which indicates that companies made lesser operating profit per rupee of assets. This could be due to high operating costs or poor use of new capital. But the decline is not statistically strong.

Compared to companies in 2021, the Sales to assets ratio of companies in 2022 declined post IPO. This could be due to poor utilization of assets to generate sales or slower demand or other market challenges.

After IPO, EPS jumped sharply, but again t-statistics states that the change is not statistically significant. It is likely to be driven by a few high performing firms.

Overall, the findings shows that after going public, most SMEs in 2022 didn't show strong or consistent improvements in how they used their resources to make money. The ability to use assets efficiently declined. Some firms did well, but the improvements were not consistent.

Table 3:

Profitability 1 year before and after the SME IPOs came in 2021 and 2022				
	ROA	OI/A	S/A	EPS
Mean Y - 1	0.127805237	0.405794064	5.198858397	3.40451613
Mean Y + 1	0.10830946	0.218262248	2.196941387	9.25767742
t-stat	0.254182649	0.683088759	0.880831519	-1.10252634
Pearson Correlation	-0.014165939	-0.019175422	-0.024306323	0.00195294

In this analysis, ROA declines slightly after the IPO which indicates that companies became less effective at converting their assets into earnings for the SMEs offered in 2021 and 2022 together. It means there is a minor drop in asset productivity post listing. However, t-statistics shows that the change is not statistically significant, which means that the decline could be due to random variation rather than a meaningful shift in performance. Also, the Pearson's

correlation is near 0 which states there is no relationship between ROA before and after going public.

Following the IPO, Operating income on assets ratio declined nearly by 50%, which indicates that the companies earned significantly less operating income per rupee of assets. This could be due to increased operating expenses. But, t-statistics suggests that the change is not statistically significant. Moreover, the slightly negative correlation between pre and post IPO of operating income on assets ratio indicates lack of consistency in operating performance across companies.

After the IPO, Sales to Assets ratio sharply declined, which states that companies became less effective at converting assets into sales. This could be due to underutilization of newly acquired assets, slower market demand or other competitive challenges post IPO. T-statistics reveals that the change is not statistically significant. Slightly negative correlation between pre and post IPO Sales to assets ratio indicates that firms with strong sales efficiency before the IPO did not necessarily maintain the performance after going public. This points towards lack of continuity in assets driven revenue generation after going public.

After IPO, EPS rose significantly from ₹3.40 to ₹9.26, which indicates that the companies became more profitable on the basis of per share. This indicates improved net income or changes in share structure. However, t-statistics indicated that the rise is not statistically significant. The correlation between pre and post IPO EPS is very weak, which means that the companies with higher EPS before going public did not maintain or improve their earnings after going public.

Overall, after going public, the SMEs didn’t guarantee better performance. Most of the firms became less efficient and their profitability results were inconsistent and unpredictable. There is no strong relation between how companies performed before and after going public.

Table 4:

Liquidity 1 year before and after the SME IPOs came in 2021, 2022 and combined 2021 and 2022			
Current Ratio (CR)			
	2021	2022	2021-22
Mean Y -1	0.18948	2.20241252	1.470437059
Mean Y + 1	7.0031878	5.0383315	5.752824701
t-stat	-2.244123	-3.2540955	-3.455991229
Pearson Correlation	0.0855996	0.8995283	0.193463166

For the SMEs offered in 2021, the average current ratio before IPO was 0.189 which was extremely low and rose to 7.00 post IPO, which indicates improvement in liquidity after going public. The t-statistics is -2.24 which indicates that the change is statistically significant. It means the improvement in liquidity is not random, but it reflects a real shift in financial health. The Pearson's correlation is 0.0856 which is vert weak. It indicates that the companies with poor liquidity before IPO did not necessarily maintain the same liquidity afterwards.

For SMEs that went public in 2022, the average current ratio before IPO was 2.2 which rose to 5.04 post IPO. It is still strong but lower than the post-IPO level of the SMEs in 2021. The t-statistics is -3.25 which indicates that the change is statistically significant. The Pearson's correlation is 0.8995 which is very high and indicates that there is a strong relationship between pre and post IPO liquidity. Firms that had good liquidity before IPO managed to maintain in after the IPO. This means there is consistency in financial management.

When both 2021 and 2022 are combined, the average current ratio before IPO was 1.47 which rose to 5.75 post IPO. This shows that there is overall improvement in liquidity. The t-statistics is -3.46 which indicates significant change statistically. Pearson's correlation is 0.193 which is weak but positive. It indicates that there is some relationship between pre and post IPO liquidity but not so strong.

Table 5:

Leverage 1 year before and after the SME IPOs came in 2021, 2022 and combined 2021 and 2022			
Debt to Equity (D/E) Ratio			
	2021	2022	2021-22
Mean Y -1	8.0509378	4.57259696	5.837448
Mean Y + 1	1.6903477	0.87061118	1.168697
t-stat	1.8272833	3.58111539	3.28029
Pearson Correlation	-0.042863	0.17169273	0.005788

For the SMEs that were offered in 2021, the average debt to equity ratio was 8.05 which is very high. This indicates that the companies were very much dependent on debt compared to their equity. One year post IPO, the average debt to equity ratio dropped sharply to 1.69 which indicates major reduction in debt levels. This indicates that the IPO funds were likely used to pay off debts or strengthen the equity. The t-statistics is 1.83 which indicates the change in the debt to equity ratio pre and post IPO is statistically significant. The Pearson's correlation is -0.043 which is negative but weak. This indicates that there was no consistent pattern between before and after going public.

For the SMEs that went public in 2022, the average debt to equity ratio was 4.57 which is high and indicates a fair amount of debt usage. One year after the IPO, the average debt to equity ratio dropped to 0.87 which shows a strong improvement in leverage and shift towards a good financial health. The t- statistics is 3.58 which means that the change in debt to equity ratio before and after going public is statistically significant. The Pearson's correlation is 0.172 which is weak but positive. It indicates some consistency that firms with better leverage before IPO managed to maintain in after going public.

When SMEs of both the years are combined, the average debt to equity ratio declined from 5.84 pre- IPO to 1.17 post IPO which shows improvement in financial structure. The t-statistics is 3.28 which indicates that the change in debt to equity ratio is statistically significant. The Pearson's correlation in 0.0058 indicating almost no relationship between pre and post IPO leverage.

Interpretation of the Study:

The overall profitability of SME companies one year before and after their IPOs in 2021 and 2022 shows a mixed and inconsistent pattern. In general, key profitability indicators like Return on Assets (ROA), Operating Income to Assets (OI/A), and Sales to Assets (S/A) tended to decline after the IPO, suggesting that companies became less efficient at generating profits and using their assets. However, Earnings Per Share (EPS), which reflects how much profit is earned per share, showed different trends. it dropped sharply after the 2021 IPOs but increased significantly after the 2022 IPOs. When both years are combined, EPS actually improved post-IPO, even though other profitability measures declined. Statistically, most of these changes were not strong enough to be considered significant, except for S/A in 2021, which showed a meaningful drop. The correlation values were generally weak, which means a company's profitability before going public didn't strongly predict how it would perform afterwards. Overall, while IPOs may help companies raise funds, they don't guarantee better profitability in the short term, and the results vary depending on the year and the specific metric used.

The liquidity position of SME companies measured by the Current Ratio shows a noticeable improvement one year after their IPOs in both 2021 and 2022. Liquidity refers to a company's ability to pay its short-term liabilities, and a higher Current Ratio generally indicates better financial health. Before the IPOs, the average Current Ratio was quite low, especially in 2021, suggesting that many companies may have struggled to cover their short-term liabilities. After the IPOs, the CR increased significantly, especially in 2021, indicating that companies had more current assets available relative to their current liabilities. This improvement indicates that the IPOs may have helped strengthen their liquidity, possibly by providing new capital. However, the t-statistics show that these changes weren't statistically strong, which means we can't be fully confident that the IPOs caused the improvement. The correlation between pre and post-IPO liquidity was very high in 2022, suggesting that companies with strong liquidity before the IPO managed to maintain it afterwards.

The leverage position of SME companies, measured by the Debt-to-Equity ratio, shows a clear and positive shift after their IPOs in both 2021 and 2022. Leverage indicates how much debt a company uses compared to its own equity. A lower Debt to Equity ratio means that the company is less dependent on borrowed money. Before the IPOs, SMEs had very high debt to

equity ratios, especially in 2021 suggesting they were heavily dependent on debt. After going public, their debt to equity ratios dropped sharply, indicating that they significantly reduced their debt levels and improved their financial stability. This change is statistically significant, especially in 2022 and in the combined data. The weak correlation values suggest that a company's debt level before the IPO didn't strongly predict its debt level afterwards. Overall, the findings indicate that IPOs helped SMEs reduce their financial risk by lowering their reliance on debt, which is a positive outcome for long-term sustainability.

Conclusion

In summary, while IPOs did not guarantee improved profitability in the short term, they were associated with stronger liquidity and lower financial risk. These findings offer valuable insights for investors, policymakers, and SME promoters, highlighting the importance of post-IPO financial strategy and the varied impact of public listing on different aspects of firm performance.

Practical Implications

The study provides valuable insights into how small and medium-sized enterprises (SMEs) perform financially before and after going public through an IPO. These findings can be useful for several groups of people in real-world decision-making:

For Investors

- Be cautious with SME IPOs: The research shows that while some financial aspects improve after an IPO (like liquidity and lower debt), profitability and efficiency often decline.
- Don't rely only on pre-IPO performance: Just because a company was doing well before going public doesn't mean it will continue to perform well afterwards.
- Look deeper into fundamentals: Investors should study a company's business model, growth strategy, and financial health, not just the hype around the IPO.

For Policymakers and Regulators

- Support post-IPO performance: Since many SMEs struggle with profitability and

efficiency after going public, there is a need for policies that help them manage growth and financial planning.

- Improve SME readiness: Training programs, financial literacy initiatives, and advisory services can help SMEs prepare better for life after listing.
- Strengthen listing platforms: Platforms like BSE SME and NSE Emerge can be improved to offer more post-listing support, such as mentorship or compliance guidance.

For SME Owners and Management

- Plan beyond the IPO: Raising money through an IPO is just the beginning. Companies need strong strategies to use that money wisely and grow sustainably.
- Focus on operational efficiency: After going public, SMEs should work on improving how they use assets to generate sales and profits.
- Maintain investor confidence: Since earnings per share tend to drop, companies must communicate clearly with shareholders and show how they plan to improve performance.

Limitations of the Research:

- This study only looks at the performance of SME IPOs one year before and one year after they went public. That is a very short period to judge the full impact of an IPO. Some changes in performance, especially improvements, might take longer to show up. A longer-term study could give a more complete picture.
- 155 SME IPOs offered in 2021 and 2022 are analyzed. While this is a decent number, it is still a relatively small sample compared to the total number of SMEs in India.
- The research focuses only on Indian SME IPOs. The findings may not apply to SMEs in other countries.
- Six financial ratios (ROA, OI/A, S/A, EPS, D/E, and CR) were used in this research. While these are important indicators, they don’t tell the whole story. Non-financial factors like management quality, market competition, innovation, and customer satisfaction also affect a company’s performance but weren’t included in this study.

- Paired-sample t-test is used to compare performance before and after the IPO. This method is useful for detecting changes, but it doesn't explain why those changes happened.
- The study does not take into account for external factors like economic trends, stock market volatility, or industry-specific events that might have influenced the companies' performance.

Future Scope of the Research:

- While the study provides useful insights into the short-term financial performance of SME IPOs, there are several ways this research can be expanded and improved in the future.
- The research focuses only on the one-year period before and after the IPO. Future studies can look at longer time frames, such as 3 to 5 years post-IPO, to understand how SMEs perform in the medium and long term.
- SMEs operate in a wide range of industries. Future research could compare performance across different sectors to see which industries benefit most from going public and which face more challenges.
- Since the study is based on Indian SME IPOs, future research could include SMEs from other countries to see how IPO performance varies across different economic and regulatory environments. This would help build a more global understanding of SME IPO behavior.
- The study focuses on financial ratios, but future research could include non-financial indicators like customer satisfaction, employee growth, innovation, and brand value.
- While the study used the paired-sample t-test, future studies could apply more advanced statistical techniques like regression analysis, machine learning models, or qualitative interviews.
- Future research could also look at how external factors such as stock market trends, interest rates, or government policies affect SME IPO performance. This would help separate company-specific changes from broader market influences.
- Another interesting area for future study is how investor sentiment and behavior impact SME IPOs.

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A Critical Comparative Study of Financial Literacy, Practical Application, and Gender-Based Confidence among B. Com and BBA Students in Rajkot

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Abstract

Financial literacy is progressively recognized as an inevitable life skill, mainly for Gen Z, who are swiftly navigating through a growing digital financial landscape. This study seeks to compare the financial literacy, practical application, and gender-based confidence of undergraduate Gen Z students pursuing B.Com and BBA programs in Rajkot. While commerce students are ordinarily exposed to theoretical constructs, management students often go in for functional financial context. An online structured questionnaire was conducted during June–July 2025, with 78 valid responses collected from undergraduate students across major universities in Rajkot. The findings reveal that B.Com students demonstrated stronger theoretical understanding of financial concepts, whereas BBA students reported slightly higher financial confidence. Female respondents exhibited higher accuracy in financial literacy but

expressed lower confidence, while BBA males showed the reverse pattern—greater confidence despite weaker conceptual accuracy. These contrasts suggest a gap between knowledge and confidence, shaped by academic orientation and gender. The study provides insights that can inform targeted interventions in undergraduate financial education, focusing on bridging the divide between conceptual knowledge and practical empowerment.

Keywords: *Financial literacy, financial confidence, Gen Z, gender-based confidence, B.Com, BBA, Rajkot*

Introduction

In today's quickly evolving economic world, financial literacy is no longer a choice—it is a must. As individuals face increasing monetary responsibilities at an early age, the capacity to make informed decisions about saving, investing, borrowing, and spending has become a key life skill. This is especially true for Generation Z (Gen Z), the first generation to grow up fully connected with digital tools. Surrounded by UPI apps, online banking, and social media tips about money**,** Gen Z students often appear aware — but this exposure doesn't always mean true understanding. Knowing terms isn't the same as using them properly**.**

This study focuses on the young learners pursuing B.Com and BBA degrees in Rajkot. Their educational backgrounds are particularly suitable to this research: while B.Com (Bachelor of Commerce) typically emphasizes theoretical knowledge in accounting, taxation, and economics, BBA (Bachelor of Business Administration) inclines towards practical business, investment, and managerial skills. This disparity offers a valuable possibility to examine how curriculum structure influences real-life financial literacy and application.

Beyond academic focus, gender plays a considerable role in shaping financial practices and confidence. Numerous studies advocate that, even when financial knowledge is equal, men and women may go against in their self-perceived confidence, risk appetite, and decision-making liberty. Responses from our survey indicate this divide, indicating that female students are more likely to take suggestions from family members and express second thoughts in making independent financial choices, whereas male students exhibit slightly higher self-reported confidence and independency.

The present study was conducted during June–July 2025 with 78 undergraduate students from universities across Rajkot. It is guided by three fundamental research questions:

1. How does financial literacy differ between B.Com and BBA students?

2. What role does gender play in shaping financial confidence and investment preferences?

3. How do theoretical versus applied academic orientations influence practical financial application among Gen Z students?

The primary aim of this study is to critically compare financial literacy, its practical application, and the confidence levels across gender and academic streams (B.Com v/s BBA). With over 100 student responses collected from universities such as Atmiya University, Marwadi University, RK University and Saurashtra University, the data impart a diverse and representative glance into the financial perspective of young Indian graduates.

Review of literature

Financial literacy in India continues to be threatening low, as highlighted by the National Centre for Financial Education (NCFE, 2019), which proclaimed that only 27% of Indians have basic level of financial literacy. This is additionally reinforced by findings amidst the NCFE–NISM Financial Literacy & Inclusion Survey (2023), which point to wide disparity in understanding necessary concepts such as budgeting, inflation, and interest rates. These findings are notably troubling for the younger population, who—regardless of being highly active in the digital space—struggle to master the core principles that supervise financial decision-making. The data indicate that amplified attention to digital finance instruments does not automatically render into financial capability, revealing a fundamental disparity between access and understanding.

This divide becomes even more apparent when looking at Gen Z's financial habits. Goyal (2024) conducted a concentrated study on the impact of cashless payments and discovered that over 75% of Gen Z respondents reported a growth in impulsive purchases due to the convenience provided by platforms like UPI. The ease of access to digital payment systems

has, enigmatically, contributed to financially undisciplined behavior, particularly among metropolitan youth. Many participants depended heavily on peers or social media for financial advice, rather than on organized or credible sources. This enhances the urgent need for educational assistance that addresses not just knowledge shortfalls but also behavioral patterns molded by digital convenience and social persuasion.

The impact of financial literacy on investment behavior has also been carefully studied. As explained by Nag and Shah (2022), financial knowledge has a remarkable and positive effect on Gen Z's investment purpose. Their study further disclosed that elements such as perceived behavioral control and individual mindsets act as mediators, meaning that even financially literate individuals might hesitate to invest if they lack conviction or control over their financial landscape. Assisting this, Elango et al. (2023) emphasized the role of social standards and cognitive factors in determining investment behavior among Indian teenagers. Both studies imply that financial education must surpass textbook definitions and must instead be intellectually empowering, socially relevant, and circumstantially practical to drive actual involvement in financial markets.

Dugar and Madhavan (2023) found that family behaviors, peer groups, and digital ecosystems all play a part in how young individuals save, invest, and think about money. The shift from financial dependence to independence is a gradual one and is frequently guided more by learned behaviors and ecological effect than by classroom instruction. These insights further highlight the intricacy of financial behavior among adolescence, showing that educational improvements must include both formal instruction and factual financial engagement.

A critical feature of financial behavior is the gender-based dissimilarity in financial confidence. While countless studies have explored knowledge discrepancy, the OECD (2020) international survey brings out a subtle but equally crucial issue: confidence. The report found that across most partaking countries, women often matched or surpassed men in financial knowledge, but disclosed notably lower confidence when utilizing that knowledge in real-life financial decisions. This confidence gap acts as a hidden obstacle, preventing generally capable individuals—particularly women—from undertaking with financial tools or making autonomous decisions. In an Indian context, where socio-cultural conventions can amplify such hesitations, tackling gender-based financial confidence is a must to achieve true financial

inclusion.

Academic background also plays a significant role in financial literacy outcomes. The study conducted by Vyas, Bhatt, and Shah (2024) in Ahmedabad surveyed financial literacy levels across students from distinct academic streams and found that those studying commerce and management revealed notably higher levels of financial awareness contrary to their peers in non-financial fields like arts and science. This proposes that formal curriculum design and stream-specific exposure directly impact students' financial competencies. Such findings emphasize the need to blend practical financial education across all disciplines, not just in commerce-related fields, to create a more financially healthy student population—especially in semi-urban regions like Rajkot, where educational inequality can amplify existing financial gaps.

Research Methodology

This study follows a comparative and descriptive research framework aimed at understanding financial literacy, its practical application, and gender-based confidence amidst undergraduate students pursuing B.Com and BBA degrees in Rajkot. The study concentrates on students belonging to Generation Z, who are highly exposed to online financial instruments but may lack formal financial knowledge or decision- making confidence.

A total of 78 valid responses were compiled through a structured online survey. The respondents were determined using a non-probability convenience sampling method, considering accessibility and willingness to participate. All participants were currently studying in their undergraduate degrees, assuring significance of the scope of the study. The sample was heterogeneous in terms of gender and academic stream, allowing for thoughtful analysis between commerce and management students.

Data was gathered entirely through an online Google Form, distributed via WhatsApp groups, institutional networks, and direct outreach to students. The survey was entirely voluntary, with no incentives offered, and it guaranteed privacy and prudence of the respondents. Moreover, the study relied on secondary data from trustworthy sources, including the NCFE Financial Literacy and Inclusion Survey (2019), the OECD/INFE International Financial Literacy

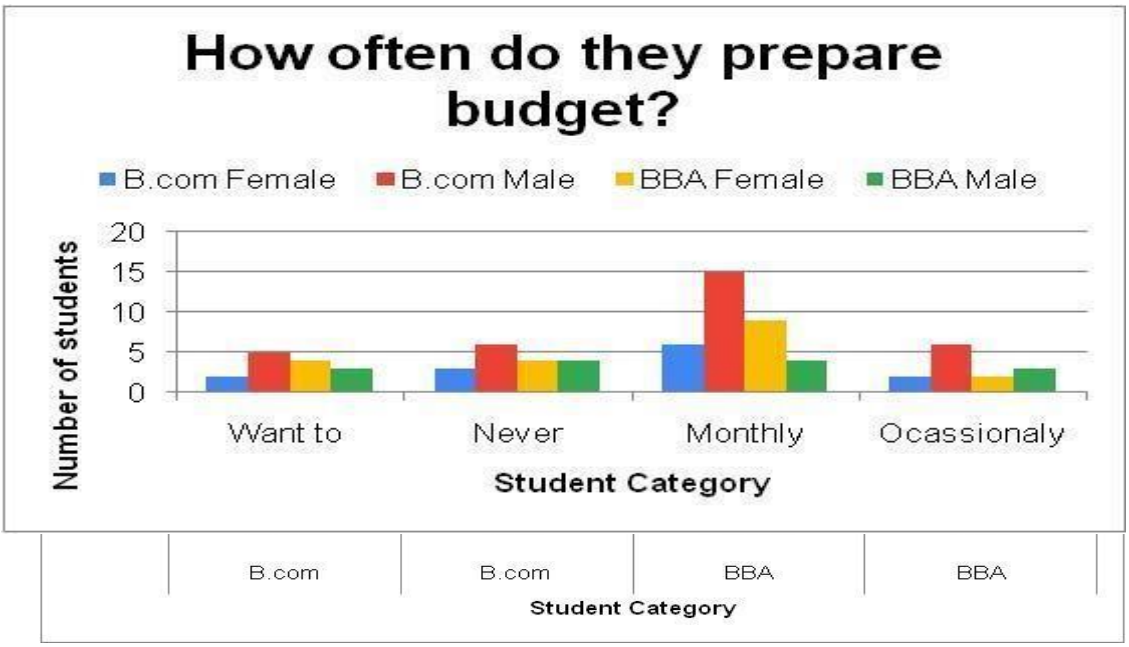
Survey (2020), and peer-reviewed regional studies focused on Gujarat.

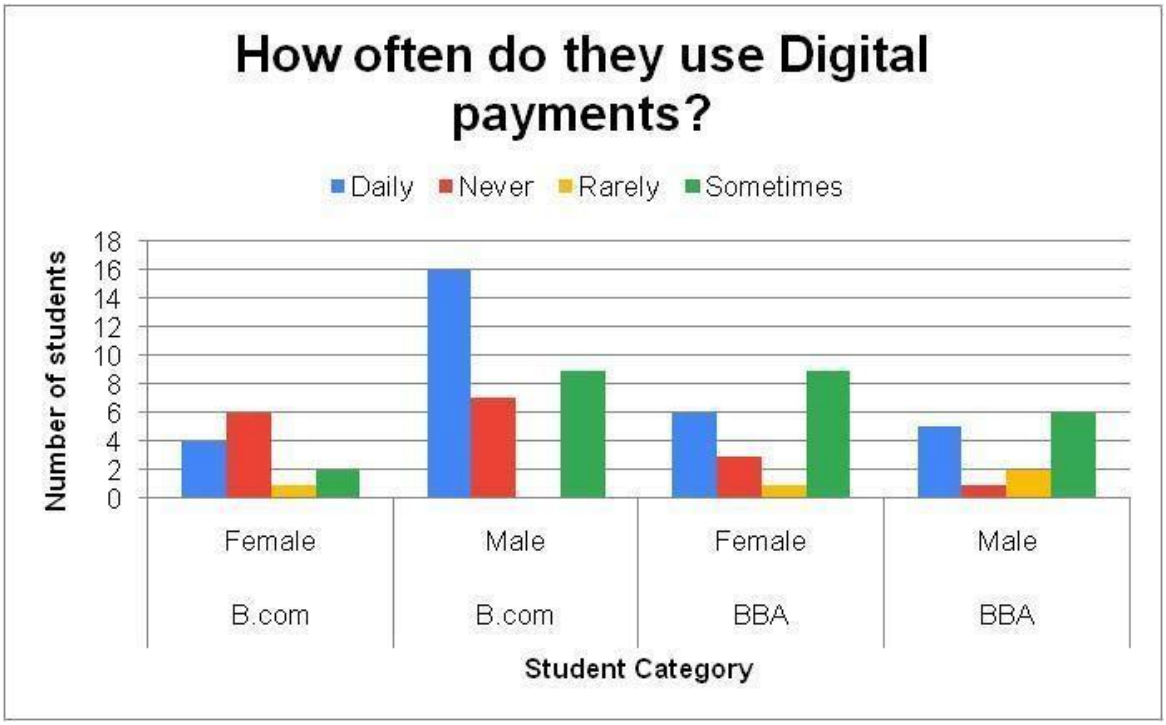
The data collection tool was a structured questionnaire divided into three sections. The first section concentrated on demographic details such as age, gender, academic stream, year of study, and university. The second section examined financial literacy through multiple-choice and conceptual questions on topics like inflation, returns, and financial tools. The third section focused on practical application and financial confidence using Likert scale items and real-life financial situation. This structure allowed the study to capture both conceptual understanding and behavioral aspects of financial intelligence.

All data was assembled and examined using Microsoft Excel. Primary descriptive statistics and pivot tables were used to abridge and envision trends in the data. Comparisons were made between B.Com and BBA students, also between male and female respondents, to survey potential contrast in financial knowledge, practical utilization, and self-esteem. These analytical tools helped unveil patterns and relationships crucial to the research questions.

Data Analysis & Interpretation:

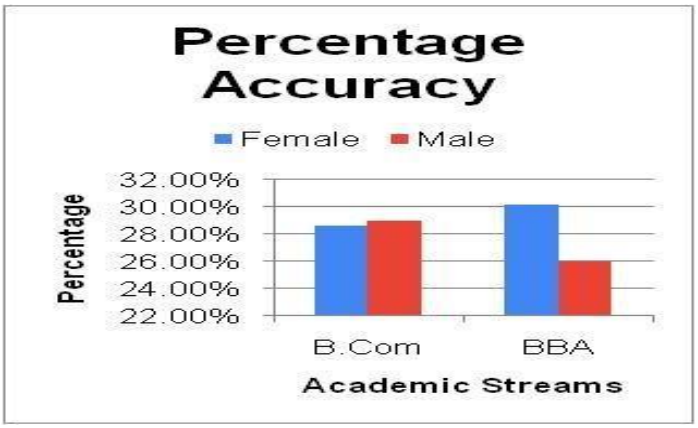
Financial Awareness





The data shows that a significant portion of students across all division possess a personal savings account, with B.Com males having the largest share. Budget preparation habits differ: while many B.Com males prepare budgets monthly, a significant number of students across all categories either never prepare one or only do so sometimes. Digital payment usage is extensive, especially among B.Com males, many of whom use such platforms daily. BBA students also show significant usage, though their frequency is slightly lower. Overall, awareness and use of basic financial tools like bank accounts and digital payments is remarkably higher among B.Com students.

Financial Literacy

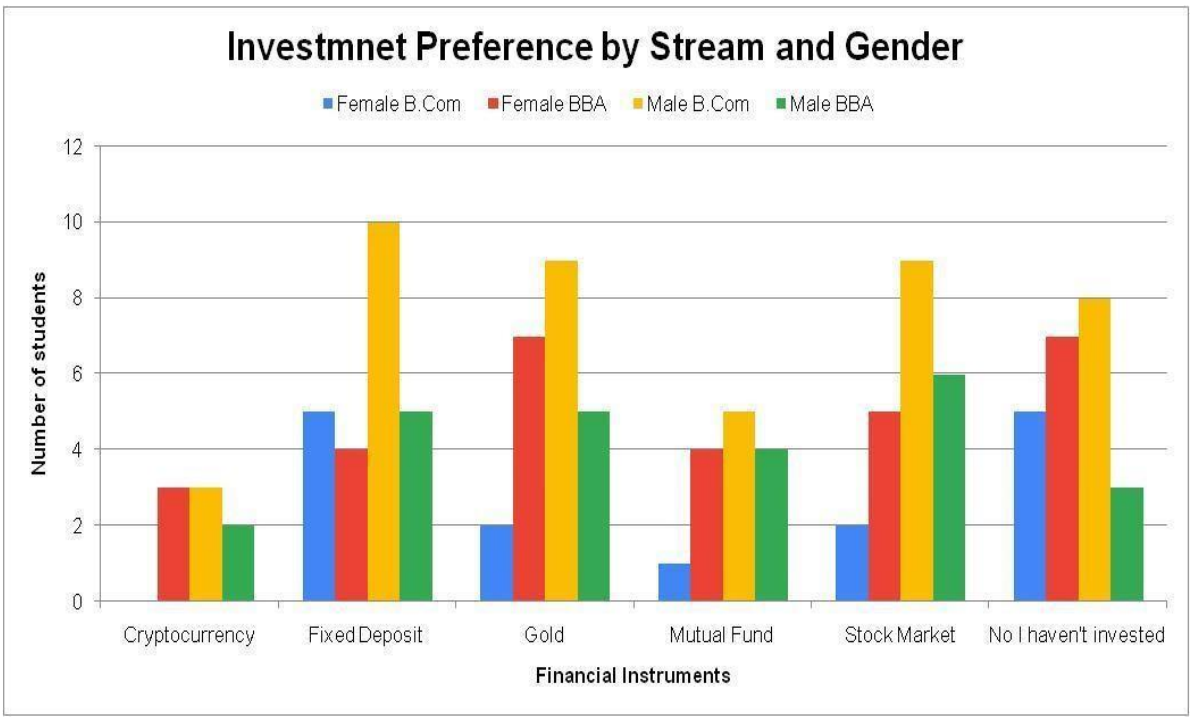


Percentage Accuracy			
Gender	**B.Com**	**BBA**	**Overall**
Female	28.67%	30.14%	29.40%
Male	28.98%	25.97%	27.48%
Overall	**28.83%**	**28.06%**	**28.44%**

This chart represents the average financial literacy accuracy on the basis of correct responses to literacy questions, segmented by academic stream and gender. The scores were evaluated from a total of 858 possible marks, with 11 questions attempted by each of the 78 participants. When comparing financial literacy, female students performed slightly better than male students. Surprisingly, BBA females displayed the highest accuracy percentage amidst all subgroups. However, male BBA students exhibited the lowest accuracy, indicating a gender gap within that stream. On average, B.Com students bested their BBA counterparts, being consistent with the idea that commerce education places more focus on core financial concepts. These results indicate at a possible link between academic orientation and the functional keeping of financial knowledge.

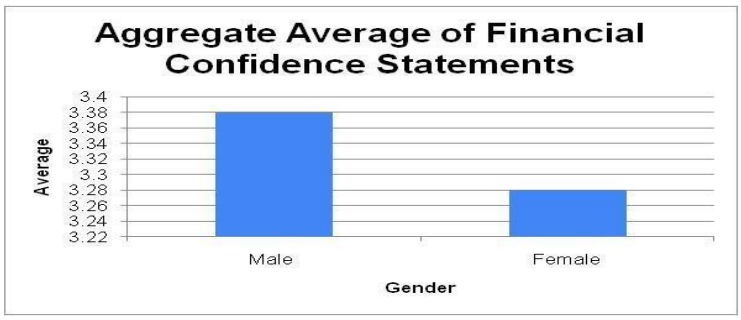
Investment Preferences

Gender	Academic Stream	Crypto currency	Fixed Deposit	Gold	Mutual Fund	Stock Market	No I haven't invested
Female	B.Com	0	5	2	1	2	5
Female	BBA	3	4	7	4	5	7
Male	B.Com	3	10	9	5	9	13
Male	BBA	2	5	5	4	6	3



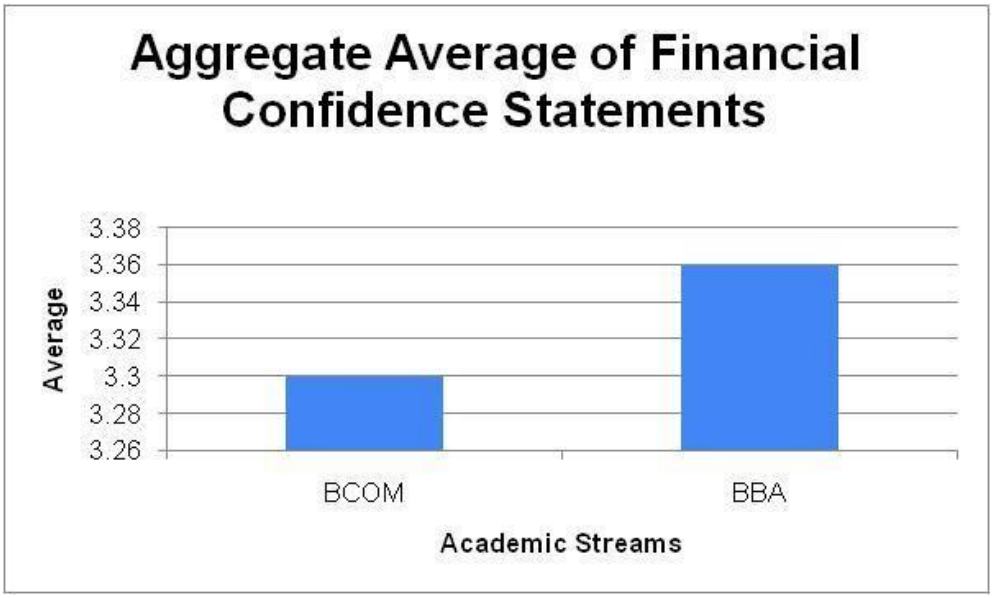
The investment pattern discloses clear differences across gender and academic streams. Male B.Com students exhibit the highest participation across almost all traditional instruments, mostly fixed deposits, gold, and stock markets. Female BBA students reveal a strong preference for gold and also engage reasonably in other instruments, though a considerable number report not having invested at all. Female B.Com students display the least activity overall, with low numbers in all investment types. Intriguingly, male BBA students show a relatively balanced pattern with lower non-investment responses, indicating higher engagement even with a smaller sample. In general, traditional instruments like fixed deposits and gold remain popular, while crypto currency and mutual funds show limited uptake among all groups.

Financial Confidence



Gender	Aggregate Average
Male	3.38
Female	3.28

Academic Streams	Aggregate Average
BCOM	3.3
BBA	3.36



The aggregate data on financial confidence discloses that male students exhibit slightly higher confidence levels than females, with an average score of 3.38 compared to 3.28. Stream-wise, BBA students show modestly higher confidence than their B.Com peer, averaging 3.36 and 3.3 respectively. These figures suggest that while the difference is trivial, male students and

those pursuing management educations tend to feel self-possessed in handling financial tasks. This comprise areas such as decision- making, digital finance, and understanding investment risks. The data infers a general sense of preparedness among BBA students, although all groups reflect moderate levels of financial confidence overall.

Findings and Discussions:

The findings reveal a obvious contrast between financial knowledge and financial confidence, particularly when assessed by gender and academic stream. Female students demonstrated higher accuracy in financial literacy, hinting a solid understanding of fundamental financial concepts. In spite of that, this strength in knowledge did not render into equally high confidence levels. Many female respondents disclosed lower independence in making financial decisions and greater hesitation when it came to investment behavior. This pattern advocated that despite being well-informed, female students may lack the assurance or support to apply their knowledge in viable financial scenarios.

A similar disconnect was spotted among B.Com students, who exceeded BBA students in financial literacy scores. Even with this advantage, B.Com students—both male and female—scored lower in confidence-related indicators like decision-making, risk understanding, and trust in their financial judgment. This reveals that while commerce education may build stronger theoretical foundations, it may not sufficiently furnish students with the confidence to act on that knowledge in real-life financial affairs.

Contrarily, male students from the BBA stream demonstrated the highest levels of financial confidence, particularly in areas like digital finance, product risk understanding, and trust in their own financial decisions. At the same time, their literacy scores were the lowest among all groups. This gap underlines the possibility that confidence can exist autonomously of actual competence, possibly influenced by exposure, personality traits, or a more industry-focused curriculum.

Investment preferences further support these trends. B.Com males were the most proactive investors, with engagement across a range of traditional financial instruments. However, many B.Com females reported no investment activity at all, aligning with their lower confidence levels. BBA students showed modest investment behavior, with females displaying a balanced

but cautious approach. Across all groups, instruments like fixed deposits and gold remained the top choice, while mutual funds and crypto currencies were scarcely chosen.

Predominantly, the data shows that financial literacy and financial confidence do not always go hand in hand. Female students and commerce students look more informed but less confident, while BBA males are more confident even with weaker financial knowledge. This contrasting composition point to a deeper need for practical financial education that not only informs but also equip students—especially those who know what to do but hesitate to take action.

Conclusion:

This study divulges that financial behavior among undergraduate students is determined by a complex interaction of knowledge, confidence, gender, and academic orientation. While B.Com students displayed stronger financial literacy, their lower confidence in applying this knowledge hint that theoretical understanding alone does not warranty practical engagement. Female students, in spite of scoring higher in accuracy, were more hesitant in making financial decisions or participating in investments, featuring the need for greater encouragement and experiential learning opportunities. On the other hand, BBA males revealed higher confidence across decision-making and risk-handling, even though their literacy levels were relatively lower, implying that confidence may sometimes be independent of competence. The bias for traditional investment options and limited engagement with modern financial tools mirrors a cautious outlook among the majority of students. These findings prioritize the importance of designing educational interventions that not only refine knowledge but also build the self-assurance required to steer real-world financial decisions, mainly for groups that show potential but lack practical empowerment.

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A Comparative Financial Performance Analysis of Selected Regional Rural Banks in India

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Abstract

Regional Rural Banks play an important role for development agriculture and rural area of Gujarat, West Bengal, Jammu and Kashmir, and Kerala. The RRBs have more reached by its network in rural areas of Gujarat, West Bengal, Jammu and Kashmir, and Kerala. Their level of financial stability is a key factor in the success of rural finance in Gujarat, West Bengal, Jammu and Kashmir, and Kerala. A vital source of funding for rural regions, regional rural banks are responsible for supplying various forms of agricultural credit in rural areas with the loans that they need. The majority of regional rural banks are now interchange with issues including loan recovery, past due, non-performing assets, and other issues. There are two RRBs in Gujarat, one RRB in West Bengal, J&K and Kerala. This study evaluates the performance of RRBs in the Gujarat, West Bengal, Jammu and Kashmir, and Kerala, focusing on key

financial parameters such as profitability, asset quality, credit growth, and financial efficiency. This paper attempts to evaluate the performance of non-performing asset of RRBs in Gujarat, West Bengal, Jammu and Kashmir, and Kerala as on 31st March 2024. The study is based on secondary data collected with the help of annual reports of selected Regional Rural Banks annual report, published data and RBI.

The present study, an analytical research design of Key Performance Indicators Analysis was used to measure variables such the number of districts and branches covered, investments, loans, recovery of loan, deposits and productivity. According to the report, Keral Gramin Bank (KGB) has largest branch network and J&K Grameen Bank (J&KGB) has lower branch network covered compared to other selected banks and Gujarat Gramin Bank (BGGB) has largest district coverage. The Keral Gramin Bank (KGB) has a higher productivity and Gujarat Gramin Bank (BGGB) has lower productivity compare to other selected regional rural banks.

Keywords: *Baroda Gujarat Gramin Bank (BGGB), Saurashtra Gramin Bank (SGB), Bangiya Gramin Vikash Bank (BGVB), J&K Grameen Bank (J&KGB), Kerala Gramin Bank (KGB), Financial Performance.*

Introduction

Regional Rural Banks play an important role for development agriculture and rural area of Gujarat, West Bengal, Jammu and Kashmir, and Kerala. The primary objective of RRBs was to develop agriculture, trade, commerce, small-scale industry, and other productive activities in rural areas by acting as a professionally managed alternative channel for lending money to agricultural laborers, small and marginal farmers, and socioeconomically weaker groups. In order to support agriculture and the rural economy, RRBs are designed to mobilise resources and deploy them locally.

Under the terms of the Ordinance issued on September 26, 1975, and the Regional Rural Banks Act of 1976, Regional Rural Banks (RRBs) were founded in 1975. Ensuring adequate institutional finance for agriculture and other rural sectors is the goal of regional rural banks. The RRB's operational scope is restricted to the region that the Government of India (GoI) has designated as including one or more state districts. In India, the Central Government, State Governments, and sponsoring banks jointly hold RRBs. The Central Government owns 50% of the issued capital of an RRB, the Sponsor Government owns 35%, and the State Government owns 15%.

The Government of India (GoI), based on recommendations of the Vyas Committee (2004) government started the process of consolidation of RRBs by combining RRBs sponsored by the same bank within state. The RRBs periodically go through a process of amalgamation, as of January 2013, 25 RRBs merged with 10 Regional Rural Banks and total 67 RRBs remain. In March, 2016, there were 56 RRBs covering the network of 14494 branches, serving 525 districts across the nation. In April 2020, there were 43 RRBs.

In currently, the 'One State-One RRB' policy, which the Finance Ministry is now implementing, intends to rationalise costs and streamline operations by combining forty-three RRBs into twenty-eight banks by May 1, 2025.

Review of literature

1. Megha Shetty and Sudhindra Bhat (September 2022), conduct study on Comparative Study on Selected Regional Rural Banks of South India. The main objective of the study is to evaluate the

   entire performance of the southern region for 2020 to 2021. For analysis of the study, they used key statistical and financial statement from 2019-20 to 2020-21 with the help of secondary data. They used CAMEL model to check the operation scale of 1-10 for both the years of all ten banks. The fining of the study shown a variation from year to year and can only be limited by using these locations. NPA is the reason for the potential to rank tenth, even though leverage is strong.

2. Purvi Derashri, Anil Mewara and Nikhil Adiyal (March 2025), research paper title is a comparative financial performance analysis of regional rural banks of west zones. The study evaluates the key financial parameters of performance of RRBs in west zone of India. The researcher used secondary data and analyzed trends, challenges and the impact of government policies on selected banks. They finding that while RRBs contribute significantly to rural financial services, they face challenges like non-performing assets (NPAs), illiteracy of people about technology and limited technological adoption. The researcher suggests that improving the efficiency and sustainability of RRBs in the region.
3. Madhusoodan Tripathi (September 2024), conduct a study on A Comparative Study of

Prathama U.P. Gramin Bank and Aryavart Bank. The main objective of this paper is to comparative study of Prathama U.P. Gramin bank and Aryavart bank. They used the secondary data for analysis and the time period taken for comparative analysis was 2020 to 2023. The study concludes that Aryavart Bank has higher in district covers, deposit, advances with compare to Prathama U.P. Gramin Bank. The Prathama U.P. Gramin Bank is higher in branches in UP, more NPA and Net Profit compare to Aryavart bank. Study suggest that Both banks should expand their hands in all districts of Uttar Pradesh, focus on creamy layer of rural regions, concentrate on the desire as- well-as the capacity to pay.

4. Ahmed Mukut Choudhury (March 2014), examine A comparative study of Rural Banking in Assam. Researcher main objective of the study is to comparative picture of the status and extent of rural banking infrastructure in rural Assam, especially in the post reform era. The study found that during the period from 1991 onwards, in Assam, expansion of bank branches is mainly focused in the urban and semi-urban areas while the rural areas has been facing the problem of scarcity of bank branches. Study found that within 20 years following the banking sector reforms of 1991, the study discovered that a 21.26% increase in the total number of bank branches (259 branches) was linked to a 10.82% decrease in rural branches (96 branches), a massive 69.30% increase in semi-urban branches, and a 177.58% increase in urban branches of SCBs in Assam.

5. Abhay Kumar Kapre and Anil Kumar Soni (March 2013) they examine a study on a comparative study of regional rural banks in Chhattisgarh state. The study main focus on the comparison of financial performance of RRBs in Chhattisgarh as on 31st March 2011. The researcher used the secondary data for data collection. Based on the research they conclude that Chhattisgarh Gramin Bank (CGB) is largest bank in district coverage and branch network compare to other RRBs in Chhattisgarh but the productivity of Chhattisgarh Gramin Bank (CGB) is lower of compare of Durg Rajnandgaon Gramin Bank (DRGB) and Sarguja Kshetriya Gramin Bank (SKGB).

Research gap

The regional rural banks are impacting the rural areas. Researcher try to make research on an analytical research design of Key Performance Indicators Analysis was used to measure

variables such the number of districts and branches covered, investments, loans, recovery of loan, deposits and productivity.

Objective of study

Following are the main objective of the study.

- To comparative study of selected Regional Rural Banks in Gujarat, West Bengal, Jammu and Kashmir, and Kerala.
- To analyze the key performance indicators of selected Regional Rural Banks in Gujarat, West Bengal, Jammu and Kashmir, and Kerala.
- To measure financial performance of selected Regional Rural Banks in Gujarat, West Bengal, Jammu and Kashmir, and Kerala.
- To present necessary conclusion and suggestions helpful in improving function of selected RRBs.

Hypothesis of study

RRBs selected from Gujarat, West Bengal, Jammu and Kashmir, and Kerala are important banks of state as far as its role in agricultural loan and rural development is concerned. Some of the important hypotheses regarding the performance of selected RRBs from Gujarat, West Bengal, Jammu and Kashmir, and Kerala have been formulated as below:

- The selected RRBs in Gujarat, West Bengal, Jammu and Kashmir, and Kerala have made a substantial quantitative progress.
- He qualitative progress of selected RRBs in Gujarat, West Bengal, Jammu and Kashmir, and Kerala has been found to be highly impressive.
- The macro performance is highly substantial.

Significance of study

The research study is significant to evaluate financial performance of selected RRBs from Gujarat, West Bengal, Jammu and Kashmir, and Kerala. The results/findings of the present study are useful to the policy planners in their efforts to improve the working of selected RRBs

in Gujarat, West Bengal, Jammu and Kashmir, and Kerala.

Scope and limitations of study

The study is considered only financial analysis factor another factor are ignored. The study covers a specific period of 2023-24. Findings may not always be relevant to other district in the state / country.

Area of study

The study is based on the performance of selected RRBs in Gujarat, West Bengal, Jammu and Kashmir, and Kerala. Therefore, study covers only a selected RRBs of state of Gujarat, West Bengal, Jammu and Kashmir, and Kerala to the fulfillment of objectives of the study.

Period of study

For collection of the secondary data on financial performance of the selected RRBs in Gujarat, West Bengal, Jammu and Kashmir, and Kerala year was selected 2023-24 for reference period.

Tools and techniques used for data analysis

The comparative analysis of selected RRBs in Gujarat, West Bengal, Jammu and Kashmir, and Kerala has been analyzed with the help of key performance indicators. Analytical Techniques: In order to examine the regional rural banks' comparative financial performance, an analysis of key performance indicators was conducted.

Type of data and method of collectionof data

The study is based on empirical in character based on the analytical method. The study is mainly based on secondary data which is collected, compiled and calculated from annual reports of NABARD, RBI and RRBs annual report of Baroda Gujarat Gramin Bank (BGGB), Saurashtra Gramin Bank (SGB), Bangiya Gramin Vikas Bank, J&K Grameen Bank, and Kerala Gramin Bank Other related information collected from journals and websites.

Data analysis and interpretation

COMPARISION OF REGIONAL RURAL BANKS- KEY PERFORMANCE INDICATORS

Presents the Key Performance Indicators of RRBs in Gujarat as on FY 2023-24					
Items/ Indicators	SAURASHTRA GRAMIN BANK	BARODA GUJARAT GRAMIN BANK	BANGIYA GRAMIN VIKAS BANK	J&K GRAMEEN BANK	KERALA GRAMIN BANK
Sponsored Bank	STATE BANK OF INDIA	BANK OF BARODA	PUNJAB NATIOANL BANK	J&K BANK	CANARA BANK
District Covered	11	22	12	13	14
Total Branches	258	487	587	216	634
Rural Branches	163	326	496	167	53
Semi Urban Branches	34	104	68	35	542
Urban Branches	53	27	23	14	39
Metropolitan	8	30	-	-	-
Share Capital	245343	782807	17512709	5894425	7011792
Share Capital Deposit	98408159	128592638	195273519	57101504	245098298
Reserves	13164030	6050147	359781	(1328192)	16075453
Total Owned Funds	119351428	141907043	222943958	68735095	331067196
Borrowings	7685197	3272909	4927800	5963866	49474876
Investments	26682553	465519474	112549685	11237811	51149171
Loan issued as on FY 2023-24	60009046	56039952	80429842	22814014	215548160

Recover Percent (June position)	91.43	85.44	88.35	69	96.68
Net Profit After Tax	2282153	1730671	120.17 (Cr.)	37606	6845866
Gross NPA Percent	2.17	2.16	9.57	4.07	2.12
Productivity Per Branch	660529	428962	482300	433534	771271
Productivity Per Staff	160467	125167	122568	76381	131944
Source: Annual Reports of SGB, BGGB, BGVB, J&KGB, KGB. (Figures: Rs. In Thousand.)					

Table 1: Presents the Key Performance Indicators of RRBs of SGB, BGGB, BGVB, J&KGB, KGB as on FY 2023-24.

Findings

The key performance indicators of RRBs in Gujarat, West Bengal, Jammu and Kashmir, and Kerala are presented in Table 1.

All the indicators exhibit positive and significant growth. Followings are major observation and findings.

- The Baroda Gujarat Gramin Bank (BGGB) is largest district covered bank and Saurashtra Gramin Bank (SGB) has lower district cover compare to selected bank.
- The Kerala Gramin Bank (KGB) has largest bank in Branch Network then Saurashtra Gramin Bank (SGB), Baroda Gujarat Gramin Bank (BGGB), Bangiya Gramin Vikas Bank (BGVB), and J&K Grameen Bank (J&KGB).
- The share capital of Bangiya Gramin Vikas Bank (BGVB) is Rs.17512709 thousand, Kerala Gramin Bank (KGB) share capital is Rs.7011792, J&K Grameen Bank (J&KGB) share capital Rs.5894425 thousand, Baroda Gujarat Gramin Bank (BGGB) share capital is Rs.782807, Saurashtra Gramin Bank (SGB) share capital is Rs.245343 thousand.

- The total owned fund of Saurashtra Gramin Bank (SGB) are Rs. 119351428 thousand, Baroda Gujarat Gramin Bank (BGGB) are Rs. 141907043, Bangiya Gramin Vikas Bank (BGVB) are Rs.222943958 thousand, J&K Grameen Bank (J&KGB) are Rs. 68735095 thousand, Kerala Gramin Bank (KGB) are Rs.331067196.
- The Kerala Gramin Bank (KGB) provided maximum borrowing compared to Baroda Gujarat Gramin Bank (BGGB), Saurashtra Gramin Bank (SGB), Bangiya Gramin Vikas Bank (BGVB) and J&K Grameen Bank (J&KGB).
- The Kerala Gramin Bank (KGB) accepted/ received maximum deposit compared to Baroda Gujarat Gramin Bank (BGGB), Saurashtra Gramin Bank (SGB), Bangiya Gramin Vikas Bank (BGVB) and J&K Grameen Bank (J&KGB).
- The Kerala Gramin Bank (KGB) issued maximum loan in compared to Baroda Gujarat Gramin Bank (BGGB), Saurashtra Gramin Bank (SGB), Bangiya Gramin Vikas Bank (BGVB) and J&K Grameen Bank (J&KGB).
- The recovery performance of Kerala Gramin Bank (KGB) is higher than Baroda Gujarat Gramin Bank (BGGB), Saurashtra Gramin Bank (SGB), Bangiya Gramin Vikas Bank (BGVB) and J&K Grameen Bank (J&KGB).
- The Gross NPA of Bangiya Gramin Vikas Bank (BGVB) is higher than Baroda Gujarat Gramin Bank (BGGB), Saurashtra Gramin Bank (SGB), Kerala Gramin Bank (KGB) and J&K Grameen Bank (J&KGB).
- The productivity per Branch of Kerala Gramin Bank (KGB) is higher than Baroda Gujarat Gramin Bank (BGGB), Saurashtra Gramin Bank (SGB), Bangiya Gramin Vikas Bank (BGVB) and J&K Grameen Bank (J&KGB).
- The productivity per Staff Saurashtra Gramin Bank (SGB) is higher than Baroda Gujarat Gramin Bank (BGGB), Kerala Gramin Bank (KGB), Bangiya Gramin Vikas Bank (BGVB) and J&K Grameen Bank (J&KGB).

Limitations of the study

The main limitations of the study are as follows;

- The information was gathered via secondary data from publications and articles; respondents may have given biassed information.
- The Present Study covered only Regional Rural Banks in Gujarat, West Bengal, Jammu and Kashmir, and Kerala.
- The Research is gathered data from the Secondary data so the Tools used have their own Limitations.
- This Study included only the Regional Rural Banks of Gujarat, West Bengal, Jammu and Kashmir, and Kerala. So, that study conclusions generalization may not have universal applicability.
- The Study does not cover all the Regional Rural Banks in India. So, the research study of interpretations and findings cannot be generalized without further supporting Researches.

Future scope of the study

- Geographically, this Study covers Regional Rural Banks of Gujarat, West Bengal, Jammu and Kashmir, and Kerala in India. The present study does not include other RRBs of other State in India. This type of Study can be done in other RRBs in India like Andhra Pradesh Gramin Bank, Bihar Gramin Bank, Arunachal Pradesh Gramin bank, Uttar Pradesh Gramin Bank, etc.
- Future research of this type with a broader geographic scope is possible.
- Performance Indicators Study is broad scope in banking and finance.

Suggestions

- Increasing the usage of ATMs and e-Lobby in isolated area.
- Banks used Rural credit cards, which have a higher credit limit issue.
- The RRBs needs to modify their loan policies.
- The execution of plans must be carried out in a more accountable and open manner.
- The RRBs are required to maintain adequate liquid assets, margin, carefully review loans, and strive to improve the quality of work produced by their employees.
- To increase their capacity and reach a new rural marker, the RRBs must set up efficient

coordination with other institutional financial cooperative banks, agencies, commercial banks, and local stakeholders.

- Effective credit administration needs to be improved by the RRBs.

Conclusion

Under the RRBs Act of 1976, the Indian government formed Regional Rural Banks (RRBs) to bridge the credit flow gap for the rural poor. The RRBs were founded "with a view to developing the rural economy by providing, for the purpose of developing agriculture, commerce, industry, trade, and other productive activities in the rural areas, the provision of credit and other facilities, particularly to small and agricultural, marginal farmers, artisans, laborers, and small entrepreneurs, and for matters connected therewith and incidental thereto." Gujarat, West Bengal, Jammu & Kashmir, and Kerala all have regional rural banks that are essential to their rural lending systems. As we analyze the data it shows that RRBs in Gujarat, West Bengal, Jammu & Kashmir, and Kerala are working for the 360-degree development of rural area of state. In short, we can say that it providing rural Gujarat, West Bengal, Jammu & Kashmir, and Kerala all round assistance and proved to be an institution where "Growth with Social Justice" exists.

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Harnessing Green Financing for a Stronger and Greener Future

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Abstract

Green financing has emerged as a critical vehicle to foster sustainable development and boost resilience against environmental and economic disasters. The use of green financial instruments like carbon credits, sustainability-linked loans, and green bonds provides a revolutionary way to finance renewable energy projects, low-carbon infrastructure, and climate adaptation efforts as the threats posed by resource depletion and climate change grow. Through a detailed review of the literature, this study investigates how green financing might promote long-term resilience by ensuring that investments adhere to environmental, social, and governance (ESG) principles. The essay delve into opportunities and potential challenges to further integrating green finance practices across varied businesses.

The study's conclusions show that green finance offers a fresh route for infrastructure and capital to reach industry. Furthermore, as green money becomes more widely available digitally, it makes it simpler for people and businesses to find sustainable investment options and resources for monitoring their environmental impact. Ultimately, it become strategic necessity for ensuring a resilient and sustainable future, not merely an economic instrument.

Keywords: *Green finance, climate resilience, sustainable investment, green bonds, ESG.*

1. Introduction

New financial tools are needed to assist sustainable development because of the growing risks of climate change, biodiversity loss, and unstable economies. A game-changing strategy for allocating funds to ecologically friendly initiatives while boosting socioeconomic resilience is green financing. Green finance, which PwC (2013) defines as financial products and services that "integrate environmental considerations into lending decisions, ex-post monitoring, and risk management processes," places a high priority on investments in energy efficiency, renewable energy, and climate adaptation that are in line with international frameworks such as the UN Sustainable Development Goals and the Paris Agreement. This paradigm change is a response to the historical bias of traditional finance for fossil fuel projects, which, in spite of their environmental costs, yield larger profits than green alternatives (Sachs, 2019).

In its broadest sense, green finance includes funding for green investments made by the public and commercial sectors, policy incentives, and specialized financial products such as green bonds within their respective institutional frameworks (Lindenberg, 2024). Fundamental obstacles to execution, however, include institutional hurdles and internal conflicts between financial and environmental goals (Wang, 2016). This study analyzes the prospects, difficulties, and policy implications of green funding in order to investigate its role in creating a resilient future.

2. Literature Review

Implementing green finance, which is defined as financial products and services that support environmentally sustainable projects (Dörry & Schulz, 2018), is difficult due to a number of factors, such as low returns, complex risks, long-term financing shortages, and a lack of market-player capacity (Taghizadeh-Hesary, 2020). By allocating funds to climate solutions, important tools like carbon credits (World Bank, 2022), sustainability-linked loans (OECD, 2021), and green bonds (Climate Bonds Initiative, 2023) seek to lessen these difficulties. Green securities, climate finance, carbon finance, green insurance, and green infrastructure bonds are examples of broader green finance products (Akomea- Frimpong, 2021). Interest

rates, risk profiles, social justice considerations, religious standards, environmental restrictions, and banking regulations all have an impact on the acceptance of policies. However, incorporating social equality, improving transparency, and matching financial incentives with sustainable objectives are necessary for effective implementation (Fu, 2023).

Disparities still exist even while green finance rules as a whole reduce the financial barriers to green innovation: privately held businesses with strong innovation capacities have little access to green funding (Yu et al., 2021; Makeel et al., 2025). Although operational challenges including environmental parameter integration, policy coherence, and standardization have not been addressed, corporate environmentally responsible activities increase value for non-financial stakeholders as well as shareholders (Gilchrist et al., 2021; Islam et al., 2014). In order to attain sustainability, scholars recommend combining ecological and financial market frameworks (Akomea-Frimpong et al., 2022). Organizations such as the Asian Development Bank measure green finance as "climate mitigation finance" in order to finance regional environmental sustainability (Khan et al., 2021).

3. The Role of Green Finance in Resilience Building

By carefully allocating funds to initiatives that strengthen ecological and socioeconomic systems, green finance goes beyond conventional funding. Its revolutionary potential in reducing vulnerabilities associated with resource constraint and climate change is confirmed by empirical studies. The key mechanisms that improve resilience are examined in this section:

3.1 Diversification of Energy Sources and Reduced Fossil Fuel Dependence

Green finance lessens dependency on unstable fossil fuel markets and imported energy by giving renewable energy (solar, wind, and hydro) investments top priority. This diversification reduces

greenhouse gas emissions, which are a key component of climate resilience, improves national energy security, and protects economies from price shocks (IPCC, 2023).

3.2 Climate-Resilient Infrastructure Development

Green finance allocates funds to climate-adaptive infrastructure, including drought-tolerant farming, flood-resistant urban drainage systems, and strengthened coastal defenses. In the face of growing climate disruptions, these investments protect communities, reduce disaster recovery costs, and guarantee the continuation of critical services (Hallegatte et al., 2019).

3.3 Fostering Inclusive Growth through Green Employment

High-quality jobs that are accessible to underserved populations are produced by investments in green industries (such as circular manufacturing, sustainable forestry, and the installation of renewable energy). In addition to lowering poverty and increasing community-level resilience to economic and environmental stressors, this encourages fair economic participation (ILO, 2021).

3.4 Catalyzing Biodiversity Conservation and Ecosystem Restoration

Investments for species conservation, habitat preservation, and ecosystem restoration are mobilized by green finance (e.g., reforestation bonds, blue finance for oceans). By maintaining vital ecosystem services that support food security, catastrophe mitigation, and human health—such as pollination, carbon sequestration, and water filtration—these programs improve resilience. Economic incentives for preserving endangered ecosystems are produced by financial mechanisms such as conservation trust funds and biodiversity credits (IPBES, 2019; Finance for Biodiversity Initiative, 2023).

3.5 Mitigating Systemic Financial Risks Through ESG Integration

Green finance forces institutions to calculate ecological risks (such as supply chain disruptions and stranded fossil fuel assets) by requiring Environmental, Social, and Governance (ESG) disclosures and climate stress testing. This lessens exposure to "brown investments," which are carbon-intensive, stabilizes financial institutions against climate shocks, and reroutes capital to industries that are future- proofed. Through programs like the Network for Greening the Financial System (NGFS, 2021; Bolton et al., 2020), central banks are becoming more aware of this responsibility.

4. Capitalizing on Transformative Pathways: Strategic Opportunities in Green Finance

Following are strategic opportunities in green finance for Resilient and Sustainable Future

4.1. Mobilizing Private Capital Through Blended Finance

In order to de-risk green investments and release substantial private funding for sustainable projects in emerging areas, blended finance models strategically use public or philanthropic assets. Institutional investors are typically discouraged by risk-return hurdles, which these methods address by providing concessional loans, co-investment structures, and first-loss guarantees. This strategy can accelerate the deployment of renewable energy and climate-resilient infrastructure while filling the $2.9 trillion annual SDG finance gap.

4.2. Digitalization of Green Finance via Fintech

Through automated impact verification, tamper-proof carbon monitoring, and real-time ESG analytics, artificial intelligence, blockchain, and IoT technologies are transforming green finance. These developments democratize access to financial instruments linked to sustainability, lessen the risk of greenwashing, and cut due diligence expenses by 30 to 50%. Additionally, digital platforms improve transparency in green bond markets and allow dynamic pricing for carbon credits, opening up scalable investment avenues.

4.3. Mainstreaming Biodiversity and Natural Capital Finance

Coral reef preservation and forest carbon sequestration are among the ecological services being monetized by new tools such as blue bonds, species conservation credits, and debt-for-nature swaps. These mechanisms provide financial rewards while funding important conservation initiatives by giving natural capital an investible value. By converting biological assets into strategic economic resources, this opportunity supports the worldwide "30x30" biodiversity targets and is consistent with the Kunming-Montreal Framework.

4.4. Scaling Green Securitization for Infrastructure

Institutional investors looking for inflation-hedged yields are drawn to illiquid green assets (such as solar leases and energy-efficient mortgages) when they are bundled into tradable

securities. Green securitization unleashes money for climate-smart agriculture, circular economy centers, and grid modernization while reducing financing costs for renewable projects by 1.5–3% points. Every year, this sector has the potential to raise $1.7 trillion for sustainable infrastructure, especially in underserved areas.

4.5. Finance for Transition in Hard-to-Abate Industries

Transition bonds and sustainability-linked loans offer specialized funding for the adoption of decarbonization technologies in carbon-intensive sectors including steel, shipping, and aviation. Interest rates linked to KPIs for emissions reduction encourage the use of carbon capture devices, hydrogen, and circular manufacturing models. This $5.1 trillion market prevents stranded assets while addressing 45% of global emissions that are not included in traditional green portfolios.

4.6. Developing Local Currency Green Bond Markets

Green bonds denominated in domestic currencies remove the risk of foreign exchange in developing nations, allowing climate investments in water management, solar farms, and sustainable forestry. In comparison to dollar debt, sovereign issuances (like India's ₹350 billion bonds) lower borrowing costs by more than 200 basis points while also strengthening local capital markets. This strategy creates financial ecosystems for regional climate objectives that are self-sustaining.

5. Key Challenges Impeding Green Finance Growth

5.1. Disjointed Standards and the Dangers of Greenwashing.

Divergent interpretations of "green" activities and inadequate verification processes allow for false sustainability claims, undermining market credibility and taking funds away from projects with real benefit (Flaherty et al., 2021).

5.2. Market-Specific Regulatory Inconsistencies

Global green investment pipelines are fragmented and cross-border capital flows are impeded by the complexity of compliance caused by disparate national rules and disclosure

requirements (UNEP, 2022).

5.3. Biases in Risk Perception and Knowledge Gaps

Despite shown long-term returns, institutional engagement is suppressed by low investor awareness on green asset performance and exaggerated views of technology and regulatory risks (G20 Green Finance Study Group, 2023).

6. Strategic Policy Recommendations for Scaling Green Finance

6.1. Harmonize Taxonomies of Global Sustainability

Use established frameworks (like the EU Taxonomy) to identify green activities that qualify, as this will ensure comparability and lower the cost of due diligence for foreign investors.

6.2. Implement Specific Financial Rewards

To increase risk-adjusted returns and draw in private investment, implement central bank preferential lending rates, credit guarantees, and green investment tax incentives.

6.3. Use PPPs to Promote Blended Finance

Establish public-private partnerships with provisions for first-loss capital to reduce the risk of emerging- market projects, especially in areas that are sensitive to climate change.

6.4. Require Specific ESG Disclosures

To prevent greenwashing and improve market transparency, mandate consistent reporting of environmental impacts (such as GHG Scope 1-3 emissions) using audited measurements.

7. Conclusion

By rerouting funds toward climate mitigation, biodiversity protection, and equitable economic systems, green finance serves as an essential accelerator for creating a resilient, sustainable future. Although renewable energy transitions, climate-resilient infrastructure, and the development of green jobs demonstrate its indisputable promise, there are still many obstacles to overcome, such as inconsistent regulations, fragmented standards, and investor reluctance. Policymakers must give global taxonomy standardization (such as the adoption

of the EU Taxonomy), de-risking strategies (such as blended finance), and required ESG disclosures to counteract greenwashing top priority if they want to unleash the revolutionary potential of green finance. Financial institutions should increase their investments in difficult-to-abate industries by utilizing transition financing and fintech advances.

In the end, accelerating a just low-carbon transition requires coordinating public incentives, private investment, and cross-border cooperation. To guarantee that finance functions as a catalyst for both ecological stewardship and socioeconomic resilience, future initiatives must focus on digital integration, accessibility in emerging economies, and systemic risk regulation.

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User Perceptions of India's Digital Rupee vs UPI Wallets: Exploring Usability, Trust, and Their Impact on Sustainable Development Goals

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Abstract

An important milestone in India's digital financial development is the Digital Rupee (e₹), the retail Central Bank Digital Currency (CBDC). The Reserve Bank of India (RBI), in partnership with a few public and private sector banks, launched the e₹ in December 2022 with the goal of offering a digital payment option that is efficient, safe, and sovereign. This study examines

how the public responds to e₹ wallets by evaluating their adoption readiness, awareness, usability, and trustworthiness while contrasting them with prominent e-wallets like Paytm and PhonePe. The study used a mixed-method exploratory methodology, integrating primary data from 50 participants with secondary insights from official circulars, RBI publications, NPCI documents, and public-facing material from participating Indian banks. Report from IMF, BIS, and worldwide CBDC use cases are also incorporated. Users find notable difference between e-wallets and digital rupee wallets. Because UPI wallets are so widely used and include cashback features, they find them to be quicker, simpler, and more rewarding. Although they are a little more difficult to use and less accustomed to, CBDC wallets are thought to be safer and less vulnerable to fraud or cybercrime. UPI is more satisfactory, but CBDC has possibilities for the future and shows promise in terms of technological security. The study also explores how e-wallets can promote the Sustainable Development Goals (SDGs) over and above the usability, with a focus on SDGs 4 (Quality Education), 12 (Responsible Consumption), 16 (Strong Institutions), and 17 (Partnerships). The findings are used to provide practical suggestions for enhancing the interoperability, design, and public awareness of CBDC wallets in order to promote sustainable digital adoption.

Keywords: *Central Bank Digital Currency, Digital Rupee, Digital Wallets, Sustainable Development Goals, Financial Inclusion, e₹ Adoption.*

1. Introduction

1.1 Background and Context

Due to digital innovation in financial services, the world economy is rapidly changing. The accessibility and inclusiveness of financial services have been redefined by public digital infrastructure and mobile- based banking systems, which are particularly noticeable in emerging economies like India. The Unified Payments Interface (UPI), the Jan Dhan-Aadhaar-Mobile (JAM) Trinity, and rising smartphone usage have all helped India become a global leader in digital financial inclusion during the last ten years. UPI has become a major force among these advances, enabling over 10 billion transactions per month (NPCI, 2024) and enabling frictionless, real-time payments for even the most distant users.

At the same time, India has started a more ambitious digital financial innovation with the introduction of the Digital Rupee (e₹), a Central Bank Digital Currency (CBDC). The Reserve Bank of India (RBI) has been implementing the e₹ in pilot programs from November 2022. Its goal is to serve as digital legal tender by simulating the operations of physical currency and utilising blockchain-inspired technology to improve efficiency, control, and traceability. India's response to the future of digital currency backed by a sovereign is the Digital Rupee.

1.2 Digital Rupee and UPI: A Comparative Need

1.2.1 The Digital Rupee: India's Central Bank Digital Currency

The Reserve Bank of India (RBI) designed and issued the Digital Rupee (e₹), which is India's first attempt at a sovereign digital currency. The Digital Rupee, a Central Bank Digital Currency (CBDC), is a digital form of legal cash that is intended to supplement rather than replace current paper money. It is intended to provide confidentiality, certainty of settlement, and use of real currency in a programmable and digitally safe manner.

In November and December 2022, the RBI introduced the Digital Rupee in two test programs:

- e₹-W (Wholesale): Designed for securities settlement and interbank transactions.
- e₹-R (Retail): Made for everyday transactions and the general public

The Digital Rupee is a direct obligation of the central bank, which lowers settlement risks and boosts confidence in contrast to digital payments made through bank accounts. The retail CBDC is now available through a few institutions and kept in wallets specifically designed for it. Similar to UPI interfaces, it facilitates peer-to-peer (P2P) and peer-to-merchant (P2M) transactions via QR codes, but it does so without the involvement of commercial banks in the fund generating process. Additionally, the Digital Rupee is programmable, opening up possible applications including conditional payments, cross-border transfers, and targeted subsidies. Adoption is still restricted, though, because of a lack of incentives, public awareness, and interface familiarity.

1.2.2 Unified Payments Interface (UPI): A Success in Digital Public Infrastructure

The Unified Payments Interface (UPI), which was introduced by the National Payments Corporation of India (NPCI) in 2016, has revolutionised the Indian payment system. With a UPI ID and a mobile device, consumers may move money across bank accounts utilising this real-

time, interoperable payment system. Many people may now make digital payments because to UPI's integration with private applications like PhonePe, Google Pay, Paytm, and others.

The simplicity, speed, and rewards of UPI are the foundation of its success; consumers take advantage of cashback incentives, bill payment capabilities, and smooth merchant transactions. The ecosystem facilitates platform interoperability, is controlled, and is based on bank accounts. From little street sellers to massive e-commerce companies, it now facilitates over 10 billion transactions per month. Additionally, UPI has greatly aided India's financial inclusion narrative and made it possible for underserved populations to become financially empowered.

1.2.3 Comparative Relevance and User-Centric Evaluation

Although they both function within the broader context of digital financial transactions, UPI wallets and Digital Rupee wallets represent distinct processes and ideologies. While CBDC wallets represent a digitally native currency issued directly by the central bank, UPI wallets serve as intermediates connected to bank accounts. While CBDC is currently in experimental stage with little support for merchants and little marketing to users, UPI thrives on an established, incentive-driven environment.

Important distinctions emerge in the areas of trust and perception, usability and features, transaction mechanics, and inclusion potential from the perspective of the user experience.
In order to comprehend how these platforms are seen, what obstacles exist for adoption, and what needs to be improved in order to be in line with India's digital economy objectives and the larger Sustainable Development Goals (SDGs), a comparative user viewpoint is therefore crucial.

2. Digital Rupee Wallets: A New Era of Sovereign Digital Currency

The Reserve Bank of India (RBI) has launched the Digital Rupee (e₹), a digital equivalent of physical currency, through selected commercial banks like State Bank of India, ICICI Bank, IDFC First Bank, Yes Bank, Union Bank of India, Canara Bank, Bank of Baroda, HDFC Bank, Kotak Mahindra Bank, Punjab National Bank, and Axis Bank. These banks offer access to the e₹ through their CBDC mobile applications or wallet features.

E₹ transactions are facilitated by digital tokens, mimicking physical cash, stored in a user's digital wallet. These tokens can be used via QR codes for merchant or personal transactions, maintaining anonymity and finality similar to cash. The system also allows programmable payments and traceable transfers, and is being explored for offline payments and cross-border transactions as the infrastructure evolves.

Digital Banknotes and Coins

Transactions are accepted at a few merchant shops, retail chains, educational institutions, and public canteens in the more than 13 cities where the pilot has now been extended. However, due to a lack of incentives (such as discounts or cashback), fewer merchant connections, and poor consumer awareness, its adoption is still modest. The idea of digital currency tokens, which resemble UPI payments in appearance but differ in origin, risk, and architecture, is also unknown to users.

Notwithstanding these early drawbacks, banks are aggressively scaling the CBDC wallet infrastructure by providing integration through stand-alone applications or functionality added to already-existing mobile banking systems. Additionally, the RBI has been exploring UPI QR code interoperability solutions, which might increase acceptance by enabling consumers to pay across platforms using the same interface.

3. UPI Digital Wallets: India's Everyday Payment Backbone

Conversely, digital wallets that rely on UPI, such PhonePe, Google Pay, Paytm, and Amazon Pay, are already well-established in India's digital landscape. As middlemen connected to users' bank accounts, these wallets facilitate smooth real-time payments for P2P transfers, merchant payments, bill payments, ticket purchases, and much more. The Digital Public Infrastructure (DPI) architecture, which includes UPI wallets, has transformed India's paperless economy,

particularly after 2016.

The simplicity of use, reward-based interaction (such as cashback or scratch cards), and trust that is developed over time are what make UPI wallets so popular. UPI wallets are extensively used in both urban and rural areas, processing over 10 billion transactions each month.

4. Aligning Digital Finance with Sustainable Development Goals (SDGs)

Digital payments' growing popularity is closely related to the goal of inclusive, sustainable development and goes beyond simple convenience. A number of targets, including SDG 4 (quality education through digital literacy), SDG 10 (reduced inequalities through financial inclusion), SDG 12 (responsible consumption), SDG 16 (transparent institutions), and SDG 17 (partnerships for infrastructure and innovation), could be impacted by innovations like the Digital Rupee as the world moves closer to the Sustainable Development Goals (SDGs).

UPI has previously shown how public-private cooperation may enhance economic participation, accessibility, and transparency, particularly for underserved populations. By providing government subsidies, benefits, and welfare payments in a tamper-proof digital format, the Digital Rupee might build on these improvements by enhancing traceability and reducing leakage.

5. Review of Literature

In line with the Sustainable Development Goals (SDGs), an increasing amount of research highlights the transformational potential of Central Bank Digital Currency (CBDC), particularly India's Digital Rupee (e), and e-wallets, such as UPI applications. (Chaturvedi et al.,2024) Studies on UPI usage show that it offers outstanding financial inclusion, interoperability, and user ease. Its great acceptance is driven by merchant ubiquity and incentives. (Pradhan et al.,2024) Throughout the nation, digital wallets have transformed informal business and enabled billions of transactions.

On the other hand, preliminary data on the Digital Rupee indicates that it has unique characteristics, including digital programmability, offline payment capability, and central-bank responsibility, which might improve institutional confidence and transaction transparency (Rajagopal et al., 2023;). Do perceptions of danger and reward influence people's

desire to use CBDCs? In just one year, the Digital Rupee pilot program's circulation increased from ₹234 crore to over ₹1,016 crore, indicating its scalability (as reported in the RBI annual report and summarised by the media) and generating interest in cross-border CBDC use cases. (Gautam et al., 2022)

Crucially, there aren't many studies that compare user impressions on these two platforms in a systematic manner. Prior UPI experience increases the possibility of adopting e₹, according to recent behavioural models based on UTAUT frameworks.(Das & Das, 2024; Sharma et al., 2024) Performance expectancy, social influence, and perceived risk are important factors. Such studies highlight the important roles that incentive systems, trust paradigms, and user interface familiarity play in the adoption of digital currencies(Ghosh and Bhatia, 2025)

UPI and CBDC adoption are two different but complimentary routes from an SDG viewpoint. The Digital Rupee directly promotes SDGs 16, 12, and 17 through its capacity to provide offline access, traceable welfare payments, and institutional transparency(Pal et al., 2023) By comparing these observations, a multifaceted framework for examining user perception, policy consequences, and long- term change in India's digital economy is provided(Duvendack et al., 2023)

6. Research Gap

Though there has been a lot of research on digital payments in India, most of it concentrates on the ease, security, and acceptance of UPI, paying little attention to Central Bank Digital Currency (CBDC) wallets and how well they work in comparison to more established platforms. There is still an absence of research on how the Digital Rupee aligns with the Sustainable Development Goals (SDGs), particularly when it comes to measuring how it affects inclusivity, trust, and transaction efficiency. Additionally, user-level comparative primary data on the usability and satisfaction of both platforms are lacking in existing studies. By presenting data-driven suggestions for policymakers, connecting CBDC adoption to more general development objectives, and delivering empirical experiences from seasoned users, this paper fills the gap.

7. Research Objectives

1. To investigate and contrast user experiences, satisfaction, and usability trends between digital wallets based on UPI and digital wallet based on Rupees in India.

2. To investigate user confidence, perceived dependability, and transaction simplicity in both payment methods, emphasising the primary behavioural elements impacting their decision to select one over the other.

3. To evaluate consumers' perceptions of the reach, penetration, and advantages of Digital Rupee wallets, particularly when compared to established UPI systems, and to examine the obstacles to their broad adoption.

4. To determine how India's implementation of CBDCs fits in with the main SDGs, especially SDGs 4 (education and digital literacy), 9 (infrastructure and innovation), 10 (reduced inequalities through financial access), and 16 (transparent and accountable institutions).

5. To assess the RBI's and participating banks' institutional efforts to promote CBDC and offer policy-level suggestions based on user input and international best practices for implementing CBDC.

6. To compare consumers' comfort and simplicity of use with UPI-based apps, as well as their technological knowledge and preparedness for embracing digital rupee wallets.

8. Research Methodology

8.1 Research Design

This study uses a comparative cross-sectional research design, to assess and compare user opinions of Unified Payments Interface (UPI) wallets and Digital Rupee (CBDC) wallets in the Indian context, . To present a thorough understanding of usability, security, accessibility, incentives, and general satisfaction, the study combines primary and secondary data sources. To evaluate the findings' wider socioeconomic ramifications, they are additionally connected to pertinent Sustainable Development Goals (SDGs).

8.2 Sampling Size

Purposive sampling was used, focussing on participants who had previously used both CBDC and UPI wallets. Fifty respondents made up the final sample, guaranteeing that the findings were founded on experienced user viewpoints. More precise comparisons between the two platforms were made possible by this limited inclusion.

8.3 Data Collection

A structured Google Form survey was used to gather primary data, and it was disseminated online via email networks, LinkedIn, WhatsApp, and other digital platforms. Closed-ended, multiple-choice, ranking-based, dichotomous, and Likert scale questions were all included in the survey. Perceived security, usability, transaction speed, digital awareness, reward systems, and general contentment were important factors.

8.4 Time Period if the Study

The study period, which covered an entire year of the CBDC pilot expansion and market acceptance patterns, ran from August 2024 to July 2025.

8.5 Research Tools

Statistical Software: To compare user evaluations and preferences, IBM SPSS Statistics was utilised for paired t-tests, chi-square tests, cross-tabulations, and descriptive statistics.

Spreadsheet Tools: Data organisation, primary computations, and tabulation were done using Microsoft Excel.

Visualisation Tools: To improve interpretability, graphs, infographics, and visual data summaries were created using Microsoft Excel.

Data Validation: Prior to analysis, responses were verified for completeness and relevance.

9. Analysis and Interpretation

A thorough statistical study of user opinions on India's Central Bank Digital Currency (CBDC), commonly referred to as the Digital Rupee (e₹), and the Unified Payments Interface (UPI) is provided in this section. IBM SPSS Statistics 28, Microsoft Excel, and suitable statistical methods such as cross- tabulations, descriptive analysis, and paired sample t-tests were used to analyse the replies. To determine whether there are any notable perceptual or behavioural

changes, paired questions on related themes— one for UPI and one for CBDC—were examined.

Parameters and Tests

Sr. No.	Parameters	Statistical Tests	Questions Considered
1.	Awareness	Chi Square Test	Q11-Q26
2.	Usage	Paired T Test	Q13-Q31
3.	Frequency	Column Charts	Q14-Q33
4.	Security Perspective	Paired T Test	Q15-Q34
5.	Satisfaction Perspective	Paired T Test	Q16-Q34
6.	Challenges Perspectve	Paired T Test	Q17-Q36
7.	Overall Rating	Paired T Test	Q18-Q37

9.1 Awareness of UPI Wallets and Digital Rupee

Hypothesis of the parameter:

H_0 (Null Hypothesis): There is no significant difference in the awareness levels of UPI Wallets and Digital Rupee among users.

H_1 (Alternative Hypothesis): There is a significant difference in the awareness levels of UPI Wallets and Digital Rupee among users.

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
UPI Awareness * E₹ Awareness	50	100.0%	0	0.0%	50	100.0%

UPI Awareness * E₹ Awareness Crosstabulation			
Count			
		E₹ Awareness	
		Yes	Total
UPI Awareness	Yes	50	50
Total		50	50

Interpretation:

Since all 50 respondents were already familiar with UPI and the Digital Rupee (e₹), the Chi-Square test could not be performed. 100% knowledge among respondents was expected and acceptable, given the study was designed to explicitly target those who are familiar with digital financial platforms, including those who use CBDCs.

Because the sample was homogeneously aware, rather than because there is statistical proof of no difference, we are unable to reject the null hypothesis. It emphasises that UPI customers are probably already aware with CBDC, indicating that the sample has a high level of digital literacy or fintech participation.

9.2 Usage of UPI Wallets and Digital Rupee

Hypothesis of the parameter:

H_0 (Null Hypothesis): There is no significant difference between the usage of UPI Wallets and Digital Rupee.

H_1 (Alternative Hypothesis): There is a significant difference between the usage of UPI Wallets and Digital Rupee.

Paired Samples Test			
			Pair 1
			Usage of UPI - Usage of E₹
Paired Differences	Mean		.34000
	Std. Deviation		1.46538
	Std. Error Mean		.20724
	95% Confidence Interval of the Difference	Lower	-.07646
		Upper	.75646
t			1.641
df			49
Sig. (2-tailed)			.107

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Usage of UPI & Usage of E₹	50	.348	.013

Interpretation:

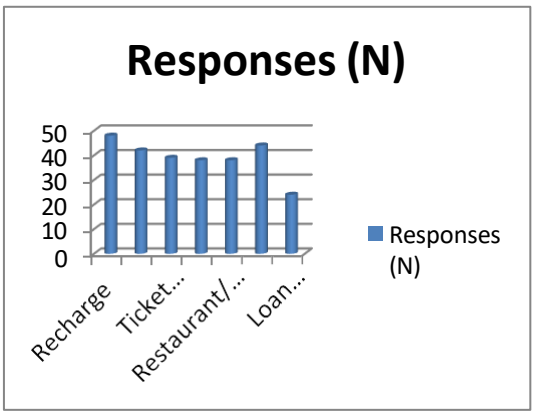
UPI's mean use score (3.16) is higher than e₹'s (2.82), suggesting that respondents are now using UPI more frequently. At the 5% level, the finding is not statistically significant, though, because the p-value (0.107) is higher than 0.05.

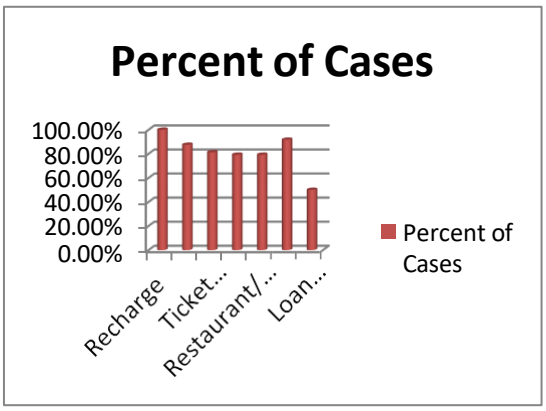
Since there is no discernible difference in the respondents' usage habits of e₹ and UPI, we are unable to reject the null hypothesis.

But according to the strong and positive correlation ($r = 0.348$, $p = 0.013$), those who use UPI regularly are also more inclined to use e₹. This suggests that early adopters of digital payments exhibited co- adoption behaviour.

9.3 Frequency and Type of Transactions

9.3.1 UPI Wallets

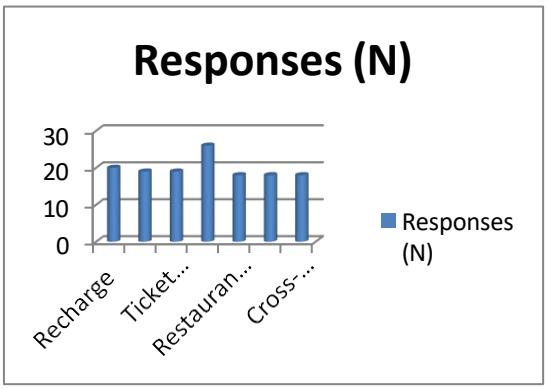


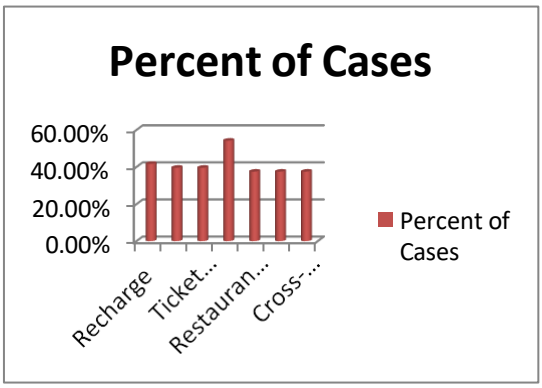


Interpretation:

The top three uses of UPI are recharge (100%), shopping (91.7%), and transfers (87.5%), suggesting that it has impacted both necessary and lifestyle transaction categories. Loans have the lowest utilisation rate (50%) indicating that consumers are still hesitant to use UPI for significant financial obligations.

Digital Rupee Wallets





Interpretation:

The usage of e₹ is currently lower compared to that of UPI. Daily purchases account for 54.2% of usage, with recharges, transfers, and trip reservations coming in second (around 40%). Due to perceived difficulty or a lack of knowledge, only about 37% of people utilise e₹ for cross-border transactions or investments.

9.4 Security Perception

Hypothesis of the parameter:

H_0 (Null Hypothesis): There is no significant difference for the given security dimensions of UPI Wallets and Digital Rupee.

H_1 (Alternative Hypothesis): There is a significant difference for the given security dimensions of UPI Wallets and Digital Rupee.

Pair	Security Dimension	Mean Difference	t-value	Sig. (2-tailed)	Interpretation
1	Trustworthiness	-0.200	-1.492	0.142	Not Significant
2	Privacy Protection	0.040	0.214	0.832	Not Significant
3	Less Prone to Frauds	0.540	2.909	**0.005**	**Significant**
4	Less Chances of Hacking	0.660	3.818	**0.000**	**Significant**
5	Less Payment Failures	0.240	1.450	0.153	Not Significant
6	Easy Authentication	-0.300	-2.049	**0.046**	**Significant**

Interpretation

For three of the six categories, the test found that user opinions differed significantly. While UPI was scored higher for ease of authentication ($p = 0.046$), users said e₹ was more secure against frauds ($p = 0.005$) and hacking ($p = 0.000$). Perceptions of payment failure risks ($p = 0.153$), privacy protection ($p=0.832$), and trustworthiness ($p=0.142$) did not differ significantly.

These observations point to areas where CBDC needs to improve onboarding procedures or the user interface (e.g., usability) while preserving its security architectural strengths.

9.5 Satisfaction Perception

Hypothesis of the parameter:

H_0 (Null Hypothesis): There is no significant difference for the given satisfaction dimensions of UPI Wallets and Digital Rupee.

H_1 (Alternative Hypothesis): There is a significant difference for the given satisfaction dimensions of UPI Wallets and Digital Rupee.

Pair	Satisfaction Dimensions	Mean Difference (UPI - e₹)	t-value	p-value	Significance
1	Ease of Use	-0.740	-4.825	**0.000**	**Significant**
2	Saves Time & Energy	-0.740	-5.308	**0.000**	**Significant**
3	24/7 Availability	-0.480	-3.280	**0.002**	**Significant**
4	Hygienic & Contactless	-0.500	-3.629	**0.001**	**Significant**
5	No ATM Needed	-0.400	-2.746	**0.008**	**Significant**
6	Offers/Discounts	-0.500	-3.352	**0.002**	**Significant**

Interpretation

In terms of satisfaction perception, UPI performs noticeably better than the Digital Rupee (e₹) across all six measured satisfaction parameters. In terms of convenience, time-saving, accessibility, cleanliness, ATM independence, and discounts, UPI has greater satisfaction levels than CBDC/e₹, as indicated by the negative mean differences. Every result is statistically significant ($p < 0.05$), indicating that the null hypothesis is rejected for every pair.

9.6 Challenges Perception

Hypothesis of the parameter:

H_0 (Null Hypothesis): There is no significant difference for the given challenges dimensions of UPI Wallets and Digital Rupee.

H_1 (Alternative Hypothesis): There is a significant difference for the given challenges dimensions of UPI Wallets and Digital Rupee.

Pair	Challenges Dimensions	Mean Difference (UPI - e₹)	t-value	p-value	Significance
1	Low literacy rate	0.300	1.878	0.066	Not Significant
2	Less technical knowledge	0.140	0.910	0.367	Not Significant
3	Payment failure/delay	-0.100	-0.726	0.471	Not Significant
4	Internet-related issues	-0.300	-2.049	**0.046**	**Significant**
5	Cybercrime risk	-0.460	-3.207	**0.002**	**Significant**
6	Duplicate payment	-0.160	-1.112	0.272	Not Significant

Interpretation

In terms of internet connectivity, it was shown that CBDC faced more difficulties than UPI. Higher perception of challenge for CBDC is indicated by the negative mean difference. Users believed that utilising CBDC was more likely to result in cybercrime than using UPI, and this finding is very important. Nonetheless, the user opinion of the two systems is essentially the same for other user hurdles including technical proficiency, literacy, and payment failures.

9.7 Overall Rating Perspective

Hypothesis of the parameter:

H_0 (Null Hypothesis): There is no significant difference for the given challenges dimensions of UPI Wallets and Digital Rupee.

H_1 (Alternative Hypothesis): There is a significant difference for the given challenges dimensions of UPI Wallets and Digital Rupee.

Paired Samples Test			
Pair 1			Overall rating for UPI Wallets - Overall rating for E Rupee
Paired Differences	Mean		.840
	Std. Deviation		1.462
	Std. Error Mean		.207
	95% Confidence Interval of the Difference	Lower	.425
		Upper	1.255
t			4.063
df			49
Sig. (2-tailed)			.000

Interpretation

When compared to e₹ (CBDC), the typical overall rating for UPI wallets (M = 4.12) is substantially higher (M = 3.28). The result is statistically significant since the p-value = 0.000 is less than 0.05.The null hypothesis is thus disproved. This demonstrates that when it comes to overall pleasure and experience, respondents view UPI wallets more favourably than e₹.

10. Findings of the Study

The study's conclusions are divided into two sections: the first is based on primary data analysis obtained from a structured survey that was completed by 50 respondents; the second part compiles secondary research findings from academic literature, government documents, RBI announcements, and international CBDC trackers.

10.1 Findings from the Primary Data

Perceived security, awareness, utilisation, satisfaction, difficulties, and overall rating are among the parameters that are examined. Bar charts, frequency distribution, paired t-test, and chi-square test are some of the statistical tools used to compare UPI and e.

1. High Awareness, but a Small CBDC Gap

   Every respondent knew about the e₹ and UPI platforms. However, because participants were either e₹ users or explorers, the study's environment was the source of the

participants' awareness of CBDC. Therefore, there was no significant difference in UPI and e₹ awareness, indicating that the sample was biassed in favour of knowledgeable consumers.

2. Use of UPI Outperforms e₹

   The mean usage score for UPI (M = 3.16) was greater than that of e₹ (M = 2.82), according to a paired t-test; nevertheless, the difference was not statistically significant (p = 0.107). This suggests that although UPI is still the most widely used payment method, early adopters are starting to use e₹, albeit more slowly.

3. Preferences for Transactions Diverge notably

   UPI is widely utilised for a variety of daily transactions, including recharges (100%), ticketing (81.3%), shopping (91.7%), and transfers (87.5%), according to multiple answer research. On the other hand, CBDC consumption was more dispersed, with travel (39.6%) and daily grocery (54.2%) displaying the highest preference. This demonstrates how deeply ingrained UPI is in daily life, while e₹ is still being tested in a small number of use cases.

4. Perceived difficulties for e₹ and UPI are different.

   Cybersecurity and internet-related concerns are more strongly linked to CBDC, according to the results of the paired t-test applied to six different challenge kinds (such as internet problems, payment failure, and duplicate payments). Cybercrime risks (p = 0.002) and internet-related problems (p = 0.046) showed statistically significant differences, highlighting user scepticism.

5. Overall Ratings Strongly Support UPI

   UPI received a mean overall rating of 4.12 from respondents, while e₹ received a mean rating of

   3.28. This difference was statistically significant (p = 0.000). This serves to confirm that, despite the potential of e₹, UPI wallets are now thought to be more effective, dependable, and user- friendly.

6. Moderate Association of Usage Patterns

   UPI and e₹ usage patterns were found to have a somewhat positive association ($r = 0.348$, $p = 0.013$), indicating that UPI users are also likely to investigate e₹ as a possible future transition path from private electronic payment systems to public digital currency.

10.2 Findings from the Secondary Sources

This section highlights both domestic and foreign observations gleaned from credible reports and databases, outlining recent developments, the global backdrop, and user perception surrounding the Digital Rupee and other Central Bank Digital Currencies.

1. India's Growth in e₹

   Since its inception in late 2022, India's Retail Digital Rupee (e₹-R) and Wholesale Digital Rupee (e₹-W) pilot projects have expanded dramatically:
   Over ₹1,016 crore was in circulation by March 2025, which is about ten times higher than the ₹103 crore that was in circulation fifteen months prior.

   Currently, 17 banks, about 6,000 users, and more than 420,000 retailers nationwide are part of the test.
   Important innovations:

   - e-payments without internet access—currently available at 17 institutions, with plans to reach 30+ by 2025
   - Used in smart contracts under programs like KCC loans and direct benefit transfers (such as farmers receiving carbon credits).
   - Standard QR codes are currently used by major banks to facilitate UPI-based e-payments. Even with increased infrastructure, e-payments still make up a relatively minor portion of India's digital payments ecosystem; in FY 2023–2024, they accounted for less than 0.0001% of all transactions.

2. India in the World's CBDC Scenario

   - Based on the number of users and circulation size (~₹1,016 crore, or US$122 million), India's e₹ is regarded as the second-largest CBDC trial globally.

- By early 2025, retail CBDCs were fully operational in 11 countries worldwide (e.g., Bahamas' Sand Dollar, Nigeria's eNaira, Eastern Caribbean DCash).
- 38+ nations are in pilot mode or testing stages, and about 36 countries have retail CBDC pilots (several of which include cross-border interoperability).

3. Pilot Nations and Cross-Border Projects
    - With more than 260 million users as of 2023 and transaction values of ¥7 trillion by the middle of 2024, China leads in terms of scale.
    - Blockchain ledgers for real-time settlement are being used to test cross-border CBDC payments through projects like mBridge (Hong Kong, Thailand, UAE, China, and Saudi Arabia with BIS support).
    - Other cross-border pilots include the Bank for International Settlements' Icebreaker idea for lower latency retail payments between jurisdictions and Switzerland-France (Project Helvetia/Jura).

4. Opinions of Users and Strategic Context
    - Central bank support for CBDCs has decreased despite early enthusiasm; in 2025, only 13% of central bankers believe that CBDCs are necessary for cross-border payments, down from 31% the previous year.
    - Customers are still cautious; according to polls (such as those conducted by Deutsche Bank), opinion towards the adoption of CBDC trails behind that of stablecoins and private digital wallets.

11. Discussion and Implications on Sustainable Development Goals (SDGs)

India's financial infrastructure has undergone a radical change with the introduction of Central Bank Digital Currency (CBDC), especially the Digital Rupee (e₹). When compared to traditional UPI wallets, users' perceptions of the Digital Rupee are conflicted but changing, according to insights gleaned from primary data. The Digital Rupee has begun to establish itself among early adopters, particularly those looking into alternatives that offer digital currency features like offline access, token-based ownership, and direct settlement with the

central bank, even though UPI continues to dominate the market due to its widespread familiarity and ease of use.

The Digital Rupee and its ecosystem support the Sustainable Development Goals (SDGs) in a number of crucial ways:

SDG 9: Infrastructure, Industry, and Innovation

The introduction of the Digital Rupee encourages the adoption of tokenised currency forms, fosters interoperability, and invests in regulatory innovation, all of which contribute to the building of digital payment infrastructure. The ecosystem shows development towards a strong financial infrastructure, especially with improved real-time retail payments and offline solutions in semi-urban areas, as numerous public and private banks have created their own CBDC wallets.

11.1 SDG 12: Responsible Production and Consumption in Technology

Due to their traceability, programmability, and auditability, CBDCs present an opportunity for improved financial flows, lower expenses associated with currency printing, and increased environmental responsibility in digital consumption. According to user opinions derived from the main data, security and transparency are important factors that influence people's decision to use digital rupees.

11.2 SDG 16: Justice, Peace, and Robust Institutions

The Reserve Bank of India created, oversees, and distributes the Digital Rupee program, which strengthens public faith in digital commodities and highlights the need of powerful institutions in spearheading technological change. Because of anticipated data security and governmental control, respondents expressed confidence that RBI-led wallets are more reliable than private apps.

11.3 SDG 17: Partnership for the Goals

A collaboration between government entities, private banks, FinTechs, and users is reflected in the ongoing e₹ experiment and ecosystem growth. The importance of multi-stakeholder collaboration for statewide adoption is demonstrated by the connections with UPI platforms, POS systems, merchant chains (Reliance Retail, Future Retail), and wallet developers

(HDFC, ICICI, SBI).

SDGs

11.5 Implications from Primary Data

User input highlights important gaps and opportunities:

- UPI has better levels of digital literacy and awareness than CBDC, indicating that focused programs are required to advance e₹ comprehension.
- Usage trends show a cautious but accepting attitude towards e₹, with many referring to it as a possible supplement rather than a replacement for UPI.
- Due to unfamiliarity, e₹ had slightly lower security and satisfaction scores, indicating the need for incentives, interface enhancements, and training.

According to the statistics, even if the adoption of CBDC is still in its early stages, it has the ability to significantly address three key areas of sustainable economic development: digital innovation, institutional trust, and financial inclusion. India's CBDC path can significantly align with SDGs and serve as a paradigm for responsible digital finance if outreach, transparency, and industry cooperation are sustained.

12. Limitations of the Study

- The small sample size of 50 respondents, which could not accurately reflect the larger Indian population, is a limitation of the study.
- Many participants had little practical experience because the Digital Rupee was still

in the pilot phase, which affected the accuracy of their responses.

- Because FinTech is dynamic, research findings could become out of date when wallet features and laws change.
- The cross-sectional design limits the ability to observe how user behaviour changes as CBDC use rises over time.

13. Further Scope of the Study

To better comprehend CBDC penetration trends in India, subsequent research can increase the sample size across a range of demographic and geographic categories. As the Digital Rupee ecosystem develops, longitudinal studies can monitor changing user perceptions. Its potential to improve financial inclusion, security, and sustainable economic growth can be further investigated through comparative studies incorporating cross-border CBDC use cases and integration with cutting-edge technology like AI-driven financial services.

13. Conclusion

The study used primary survey responses and secondary data to evaluate user perceptions of India's Digital Rupee wallets with those of current UPI-based digital wallets. Results show that the Digital Rupee is steadily gaining traction, particularly among users who value security, central bank support, and offline capabilities, even though UPI is still the most popular digital payment method because of its benefits, ease of use, and merchant integration. However, there are still major obstacles to the general adoption of CBDC, including a lack of understanding and unfamiliarity with use cases.

The analysis emphasises that, with proper scaling, India's Digital Rupee may significantly contribute to the advancement of digital innovation, financial inclusion, and other development outcomes linked to the SDGs. In order to accomplish this, the CBDC needs to develop a user-centric design, expand upon the UPI-established digital payment infrastructure, and fix any usability issues that currently exist. To guarantee that the Digital Rupee develops into a reliable and inclusive instrument for sustainable digital finance in the future, a well-calibrated strategy combining ongoing monitoring, public education, and technological advancement is necessary.

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A Conceptual study of Environment AL accounting practices and Reporting Worldwide

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Abstract

Environmental accounting incorporates sustainability issues with a company's financial and managerial procedures. Environmental accounting could be integrated into a country's national revenue accounts, financial statements of a business, and interior management accounting systems. It additionally promotes more efficient use of materials, savings on expenses, and compliance with ecological regulations. The research's major goals are to identify present concerns with environmental accounting and reporting practices. The current paper is based on a descriptive or expressive research. The researcher relied on secondary sources for this article. This article presents findings from a conceptual examination of environmental

accounting methods and reporting worldwide. In the present study, the researcher reviewed numerous national and international papers and case studies. On the basis of this research concluded that there are lack of proper standards and regulations related environmental accounting. Also, there are lack of availability of resources and monetarisation of government. It is precise that governments improve global sustainability accounting by enacting clear, binding norms and encouraging accountability through required environmental reporting.

Keywords: *Environmental Accounting, Green Accounting, Sustainable responsibility, ESG, BRSR*

Introduction:

Environmental accounting is different from other forms of accounting since it focuses on how a business affects the surroundings and includes that information in reports of finances. It expands standard accounting's concern with financial achievements to incorporate the costs and benefits of a company's environmental relations. This includes calculating and publishing data on topics such as emissions of greenhouse gases, water consumption, and management of waste in order encourage ecology and enable improved decision-making.

The word environmental accounting has different descriptions and applications. Ecological accounting may accompany national income accounting, financial accounting, and interior business management accounting. This introductory piece discusses the use of green accounting as a managerial accounting approach to inside a decision.

Green accounting is used to include environmental factors into a company's accounting for finances and management processes. This aids in understanding and controlling the environmental effects of business activity, increasing long-term viability and enhancing the decision-making process. It also allows for greater utilization of resources, cost reductions, and fulfilment of environmental requirements.

When the ordinary individual thinks of accounting, they most usually associate it with finances and money. Though numerous accounting professionals analyse financial effect, their talents are increasingly being used to ecological responsibility, including environmental impact, impact on society, emission levels, satisfaction of workers, energy consumption, and even more.

Accounting is essential to the achievement of environmental initiatives in the coming decades because businesses must be held responsible for the financial reports and the objectives they establish, and whatever they say must be verifiable. Companies will need to monitor and report how they affect the planet if they want the investors, governments, the stakeholders, moreover the general public to become interested regarding sustainability and their effect on the environment.

Environmental, Social, and Governance (ESG) accounting, also referred to as sustainability accounting, is not solely concerned with company audits keeping them to be held accountable. It also involves providing guidance to entities on their development, assisting them with establishing objectives, and collaborating with them to achieve those objectives. Because of the originality of the concept, creating reporting on sustainability for corporations may be a difficult task, it is an interesting and essential one.

Literature Review:

(Carandang & Ferrer, 2020) Environmental accounting is a growing area of study around the world, however, nothing is known regarding its applicability and relevance in the Philippines. The goal of this study is to examine the contribution of environmental accounting on the earnings and market value of publicly traded mining and oil firms in Philippines The main commercial result was that environmental accounting disclosure had no substantial influence on profitability or company value, but when adjusted for location, It can have an enormous impact on return on equity. Reporting environmental expenses has an immense effect on the return on equity. However, when adjusted for firm size, board size, number of years listed in the PSE, and location, it has a considerable impact on net profit margin, return on equity, and Tobin's Q ratio.

(Nimanthi & Nadeesha, 2021) The main aim of the research was to investigate the impact of sustainability reporting procedures on corporate results, a developing concern in Sri Lanka. The

outcome of the research demonstrated a substantial favourable relation among disclosures regarding the environment and business financial results. Yet, there has been no clear link among sustainability disclosures and company earnings in the market. Its results will help the annual report developers and legislators in significantly ecologically conscious companies lay the groundwork for sustainable disclosure practices that will lead to superior results.

(Nicholas, 2021) The study evaluated the link between green accounting and profitability in selected Nigerian oil and gas businesses. The study's findings indicate that there is no substantial relationship between environmental expenditure and net profit for the Nigerian oil and gas businesses under consideration. The report suggests that oil and gas corporations should prioritize environmental spending and disclosure to improve stakeholder trust and openness in their operations. This could contribute to improved financial performance, particularly in terms of profitability.

(Gonzalez & Jesús, 2022) This paper focuses on a structure for an environmentally sustainable bookkeeping system in a developing nation, specifically the nation of Colombia. Modern accounting methods have a strictly monetary system, excluding cost to the environment and company expenditures. On the other hand, the Green Accounting System (GAS) is a structure proposed in the current investigation that incorporates enterprises' ecological impact into their accounting systems. Based on the outcomes of the present research, each one of these had successfully integrated ecological principles in their bookkeeping procedures. As a result, the research will benefit not only academics, but also professionals and governments. As GAS contributes to transparency in the calculation of ecological bookkeeping, it also generates a shift regarding greener manufacturing, which improves the quality of the environment.

(Devarajappa, 2018) The primary goal of this article is to look into the conceptual framework for sustainability accounting in Indian industries and their reporting procedures. This study demonstrates that the concept of ecological accounting offers new dimensions and issues. There cannot be a commonly agreed approach to ecological responsibility among corporate enterprises. Most Indian companies are still unaware of environmental issues and have not found a good space in their directors' reports to provide environmental information to their stakeholders because there is no legal requirement to do so.

Objectives:

- To understand the current situation of environmental accounting.
- To uncover issues with environmental accounting and reporting methods.

Research Methodology:

This research article relies on descriptive or expressive research. The investigator relied on secondary sources for this article. Here, additional gathering techniques are employed for collecting data. The majority of the supplemental data collected comes from research papers, periodicals, newspapers, and publications on the subject. Certain aspects of the data and information were gathered from publications and articles that the researcher studied and analysed prior to doing this investigation.

Criticality of ESG Accounting:

Studies on climate change have raised public awareness of the issue of global survival during the last decade or so. We clearly acknowledge a larger ecological diversity crisis. These challenges, as well as social disasters like modern-day slavery, have been tackled in the Sustainable Development Goals of the United Nations (SDGs), which were released in 2015. Accountants understand that what can't be observed can't be managed. To provide these measurements to shareholders in a trustworthy manner, they must be included in published company financial statements.

Exactly how things are accomplished for income is understood. Ages have been spent developing trustworthy and accurate methods for collecting and exchanging accounting information between firms. However, comparable procedures do not exist for non-financial data or, as of yet, unquantified information about finances. Everyone might be talking about CO2 disclosure, for example. However, the vast majority of other SDG metrics are difficult to comprehend.

There is an additional major shift to take into account concurrently. Most of the assets and

debts were physical while traditional system of accounting was established. The effect of, say, degradation or the use of global materials went unnoticed.

Global Environmental Accounting Practices:

The Researcher determinant importance of global environmental accounting disclosure. Here are the review of some global articles and case study. The researcher studied cases from China, Zimbabwe, Malaysia, Brazil, USA and India.

1. The case of listed firms in China:

This research investigation looks at the variables that influence Environmental Accounting Information Disclosure (EAID) across Chinese firms. Utilizing samples of 200 A-shared featured enterprises, this research employs a Structural Equation Model (SEM) and multiple linear regressions to investigate how external forces, corporate performance, and corporate governance affect organizations' EAID. The findings suggest that outside pressure and corporate performance have a considerable and favourable impact on business EAID. Outside forces include regulations from the government, the media pressure, and borrowings, but profits and selling capability are among the greatest essential determinants in the performance of businesses. However, we discovered that the governance features do not have substantial effect on EAID. In addition to adding to the body of knowledge on Environmental Accounting Information Disclosure, this article offers Chinese regulators valuable insights into how to effectively encourage disclosures of environmental accounting information and increase company consciousness of Corporate Social Responsibility (CSR) satisfaction in order to promote environmental sustainability.

It is encouraging that China’s Sustainability Law was updated and officially adopted on January 1, 2015. They anticipate further legislation and rules will be released in the near future to govern China's disclosure of information regarding the social duty performed by publicly traded enterprises. The researcher comes at the conclusion in accordance to above discussed study that this research reveals how external pressures including great corporate performance considerably increase ecological disclosure in Chinese enterprises, whereas the governance of

corporations has no effect. The following emphasizes the importance of legislative guidance for increasing awareness and promoting accountability among companies.

2. The case of Zimbabwe mining industry:

The study intended to determine whether environmental accounting could be applied in Zimbabwean mining businesses. According to the report, the Zimbabwean government is not doing enough to promote the adoption of ecological bookkeeping. The administration has made no promise to provide adequate supplies for the implementation of sustainability bookkeeping. The mining industry has become politicized, rendering it harder to apply the ecological regulations; however, there are no effective laws or policies governing ecological bookkeeping challenges. The country's economic insecurity and geopolitical changes had prompted businesses to focus on its survival rather than sustainability accounting. It was additionally stated how the law enforcement does not adequately supervise and manage the operation of mining, keeping the surrounding ecosystems vulnerable to irresponsible mining practices. There are currently no ecological accounting standards. The study suggested that government entities regulate and oversee mining endeavours independently of governance, while they devote all people and financial resources to investigating what to most effectively use ecological accounting. The analysis suggests that ecological accounting is not being applied satisfactorily in Zimbabwe's mining industry according to a lack governmental involvement, unclear rules and requirements, political influence, and economic uncertainty. It calls for increased autonomy in oversight and devotion to resources to encourage the implementation of sustainable norms of accounting.

3. The Case of Public Listed Firms in Malaysia:

The main goal of this research is to assess how environmental accounting disclosure affects the economic performance of Malaysian publicly traded companies. The conceptual structure of the investigation depends on Legitimacy Theory, thereby maintains that corporations use sustainable accounting reports to fit along with the expectations of society and increase their legal standing. This investigation uses the panel data analysis technique with both fixed effects and random effects models to evaluate the influence of Green Accounting Disclosure

(GAD) on the financial outcomes of Malaysian publicly traded enterprises. The evaluation includes data from 248 organizations over 13 industries from 2019 to 2023, using important financial performance metrics such as Return on Assets (ROA), Return on Equity (ROE), and Return on Sales (ROS), while accounting for business size, performance of stocks, leverage, and size of boards. The findings show that environmental accounting disclosure has a substantial negative connection with Return on Assets (ROA), implying that while organizations use environmental disclosures to boost their legitimacy, the costs may affect short-term profitability. Still, GAD has no substantial effect on Return on Equity (ROE) or Return on Sales (ROS). The data show that market performance and debt have major impacts on the adoption of sustainable disclosures, although company size and size of board do not. Policymakers and governing bodies should acknowledge that, while environmental accounting disclosures enhance company legitimacy, their immediate influence on business performance, especially profitability, may be limited. Bursa Malaysia's obligatory sustainability reporting, enacted in 2016, has greatly enhanced environmental accounting reporting amongst Malaysian traded corporations, corresponding with Legitimacy Theory since companies utilize it to demonstrate obedience to society standards. While environmental accounting disclosure reduces Return on Assets (ROA) because of higher short-term expenses related to accordance and environmentally friendly practices, this impact correlates with previous findings. Significantly, the adverse effect on ROA, combined with a slight effect on Return on Equity (ROE) and Return on Sales (ROS), suggests that, whereas environmental efforts may face the initial fiscal obstacles, the long-term advantages of better public image and trust from stakeholders, as well as legislative motives, are critical for wider adoption.

4. The Case Study of Brazil and USA Companies:

This paper aims to advance the field of green accounting by examining whether businesses from various industries, countries, developmental stages, and legislative frameworks exhibit varying degrees of environmental disclosure. Additionally, it uses corporate characteristics to explain the extension of environmental disclosure on the official platforms of businesses in Brazil and the United States. In order to accomplish this, an Environmental Disclosure Index (EDI) was developed, and a model was employed to examine if the domain's disclosure is explained by the variables related to ecological revenues, size, profitability, loans, sector, and nation. It was

stated that US corporations stuck out from Brazilian companies across the EDI. The statistical framework indicates that ecological disclosure on company websites is mostly explained by elements such as organizational size, industry, and country of origin. Profit and debt were not significant in the model. The performance on the environment indicator was significant, but it did not align with the idea of legitimacy, which predicted a negative relationship among disclosure of environmental information and performance. It is thought that global research on corporate responsibility for the environment may enhance knowledge and ultimately explain the discrepancy in this disclosure. This research shows that a firm's environmental disclosure procedures vary considerably by its scale, businesses and country of origin, with US corporations often disclosing greater environmental details over Brazilian firms. Surprisingly, whereas green performance is associated positively with disclosure, it fails to validate the legitimacy theory's opposite relationship. Yet, profit and debt don't seem to be key factors influencing disclosure. More global research is needed to properly grasp the complicated issues underlying these discrepancies in businesses environmental reporting.

5. Environmental accounting practices in India:

The current study article focuses on the notion of Environmental/Green accounting, including its practices and reporting in India. Even while Indian corporations follow environmental laws and regulations, no clear policies have been developed at the national, state, or even company levels to ensure compliance with environmental standards. Businesses must develop an environmental policy, implement pollution control measures, follow legislation, and include environmental information in yearly reports. For sustainable growth, a clear environmental policy, as well as proper execution and accounting procedures, is required. The above stated study reflects that, when several Indian enterprises adhere to ecological standards, there remains a lack of specific and uniform green accounting practices. To ensure longevity, tougher policies, proper implementation, and transparent reporting are required.

6. How Environmental Accounting Works in India:

For the better and smoothly ongoing processes of environmental accounting the Securities and Exchange Board of India's (SEBI) revolutionary Business Responsibility and Sustainability

Reporting (BRSR) project seeks to revolutionize how Indian businesses disclose as well as managing their operations.

BRSR, which was introduced in 2021, mandates that the most prominent 1,000 Indian listed firms report on how they are doing in terms of many Environmental, Social, and Governance (ESG) components of their business activities. In addition to being a legal necessity, BRSR offers businesses a calculated chance to add advantages to the community as well as shareholders. Businesses may increase their level of competition, creative thinking, interaction with stakeholders, risk mitigation, and identity by implementing BRSR.

7. Principles of BRSR:

(1) **Ethics & Governance:** Companies have to operate and regulate their bodies for ethics, openness, and accountability.

(2) Product responsibilities: Organizations ought to supply services and products in a secure and environmentally sound way.

(3) Employee Well-Being: Companies shall praise and encouragement the good health of all staff members, especially those who work in their significance networks.

(4) Stakeholder Engagement: Organizations ought to values and respond to every concern of stakeholders.

(5) Human Rights: Companies shall defend and encourage the rights of humanity.

(6) Sustainability: Organizations ought to value and work to conserve and repair the surroundings.

(7) Public Policy: Companies who affect social and legislative policies ought to perform this responsibly and transparently.

(8) Inclusive Development: Organizations ought to encourage fair and equitable prosperity.

(9) Consumer Responsibility: Companies ought to participate as well as cherish their customers in an ethical manner.

BRSR is primarily intended for uniformity as well as encourage ESG disclosures by Indian firms. It offers a standardized framework for businesses to provide information about their

ESG performance, allowing them to incorporate ecological responsibility onto their main operations initiatives and show their dedication to socially responsible company procedures.

Conclusion:

Many industrialized countries have advanced ecological accounting, but underdeveloped countries are gradually catching up. ESG frameworks such as GRI encourage worldwide environmental disclosure. SEBI's BRSR demands ESG reporting for India's top 1,000 enterprises, increasing environmental sustainability accountability as well as transparency since fiscal year 2022-23. According to researcher after studying above mentioned national and international research work, in general the following study concludes that, still there are unclear polices and standards related to environmental accounting practices. There are lack of availability of resources and monetarization of government. It is precise that governments improve global sustainability accounting by enacting clear, binding norms and encouraging accountability through required environmental reporting.

This theoretical research underlines the importance of environmental accounting in incorporating sustainable development into a business's financial and managerial procedures, resulting in improved utilization of resources, a cost-savings strategy, and obedience to regulations. Considering its expanding significance, the study found a worldwide lack of uniform legislation and the resources to enable efficient green accounting and disclosure. Case studies from China, Zimbabwe, India, Malaysia, Brazil, and the United States show various levels of environmental disclosure, which can frequently be affected by variables such as firm size, the business sector, and country-specific constraints, instead of just profitability or debt. The report highlights India's proactive use of SEBI's BRSR framework as a promising step towards harmonized ESG disclosure.

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Abbreviation:

ESG: Environmental, Social, and Governance

BRSR: Business Responsibility and Sustainability Reporting

PSE: Philippines Stock Exchange

GAS: Green Accounting System

SDGs: Sustainable Development Goals

EAID: Environmental Accounting Information Disclosure

CSR: Corporate Social Responsibility

GAD: Green Accounting Disclosure

ROA: Return on Assets

ROE: Return on Equity

ROS: Return on Sales

EDI: Environmental Disclosure Index

SEBI: Securities and Exchange Board of India's

GRI: Global Reporting Initiative

A Literature Review on WealthTech Adoption: Extending the UTAUT Framework with Innovativeness and Risk Perception

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Abstract

The advent of WealthTech platforms has changed the investment environment due to the quick development of digital financial services. These platforms, which combine wealth management services with technology, are becoming more popular among investors cities of India.This study adds two new constructs to the Unified Theory of Acceptance and Use of Technology (UTAUT)—personal innovativeness and perceived risk to better understand the factors influencing the adoption of such platforms. These constructs are especially pertinent in contexts involving financial decision-making. The predictive value of the fundamental UTAUT constructs—performance expectancy, effort expectancy, social influence, and facilitating conditions—in predicting behavioral intention and usage behavior is assessed. In order to identify gaps, this review of the literature summarizes results from current empirical research on FinTech and the adoption of digital investments.

Keywords : *WealthTech adoption, UTAUT model, Personal innovativeness, Perceived risk, Digital investment, Financial technology*

Introduction

Innovative financial services known as FinTech have emerged as a result of the financial sector's adoption of digital technologies. Among these, WealthTech—the combination of technology and wealth management—has drawn a lot of interest, particularly because of its ability to provide individualized financial solutions at scale and democratize access to investments (Lee & Shin, 2018). WealthTech platforms, such as app-based trading tools, algorithm-based mutual fund investments, and robo-advisors, are drastically changing how people engage with the financial markets (Arner et al., 2016). By offering low-cost, easily accessible investment channels to an expanding number of tech-savvy investors, companies like Zerodha, Groww, Paytm Money, and INDmoney are revolutionizing traditional investment processes in the Indian setting. Despite their increasing popularity, the adoption of WealthTech services is still uneven due to factors such as digital literacy, trust, perceived risk, and the user's willingness to engage with technology-driven tools (Madan & Yadav, 2016; Muthukannan & Natarajan, 2020). It is crucial to comprehend the behavioral factors influencing this adoption process in order to enhance platform design, policy framing, and user engagement.

Venkatesh et al. (2003) created the Unified Theory of Acceptance and Use of Technology (UTAUT), which provides a fundamental framework for researching how people accept technology. Four major constructs—performance expectancy, effort expectancy, social influence, and facilitating conditions— that affect a person's behavioral intention and technology use are identified after synthesizing several technology acceptance models. However, recent studies have shown that adding context-specific variables might improve UTAUT's predictive power, particularly in the field of digital finance (Baptista & Oliveira, 2015; Slade et al., 2015).

This study suggests an expanded UTAUT model that incorporates perceived risk and personal innovativeness as extra dimensions to address the particular dynamics of WealthTech adoption. While perceived risk indicates worries about security, privacy, and financial uncertainty—all important considerations when it comes to digital investments—innovativeness demonstrates a person's eagerness to experiment with new technologies (Featherman & Pavlou, 2003; Rahi et al., 2022). This expanded approach is especially applicable in developing nations like India, where exposure to technology and societal

perceptions of risk influence financial behavior.

The goal of this study of the literature is to compile earlier research that used UTAUT and its expanded forms in WealthTech and FinTech settings. The study gives a conceptual basis and guidance for future research by pointing out the theoretical and empirical gaps.

Methodology

With an emphasis on the extended UTAUT model that incorporates creative behavior and risk perceptio n, this study uses a systematic literature review (SLR) approach to synthesize and critically assess studie s on the adoption of WealthTech platforms. Understanding the primary determinants of investors' intentions and actions with relation to digital wealt h management technology is the aim, particularly in developing nations like India.

Following are the research related questions for the paper.

RQ1: What are the main factors motivating investors' adoption of WealthTech platforms?

RQ2: What is the impact of UTAUT constructs on behavioral intention and WealthTech platform usage? These constructs include performance expectancy, effort expectancy, social influence, and facilitating conditions.

RQ3: How does an individual's level of innovation affect their intention to use WealthTech platforms?

RQ4: How much does the adoption and use of WealthTech platforms depend on perceived risk?

Research Design

Peer-reviewed literature from reputable academic databases, such as Scopus, Web of Science, and Google Scholar, is gathered, examined, and synthesized by the review using an organized approach. Studies that correspond with the current rise and expansion of WealthTech solutions and were published between 2013 and 2024 are given special attention.

Studies Related to Expectancy of Performance (PE)

According to Venkatesh et al. (2003), performance expectancy (PE) is the degree to which a person thinks that utilizing a specific system will enable them to accomplish their goals. It represents the alleged advantages in the WealthTech context, including better financial planning, informed decision-making, and higher investment returns.

According to Alalwan et al. (2017), PE has a major impact on users' intentions to use mobile banking. In a similar vein, Rahi et al. (2022) discovered that PE was a significant factor in the adoption of financial apps. Users that see measurable performance gains are more likely to employ WealthTech platforms, such as investment applications and robo-advisors (Sharma, 2020).

Performance expectancy is a crucial component of fintech adoption, according to recent research. According to Susanto et al.'s (2022) analysis of digital investment platforms in Indonesia, users are more inclined to embrace platforms when they believe that they would result in better investment outcomes and greater transparency. According to Kalia et al. (2023), users' trust and sustained use of robo-advisory services are also greatly impacted by performance expectancy.

Studies Related to Expectancy of Effort (EE)

The technology's ease of use is referred to as effort expectancy (Venkatesh et al., 2003). Investors are more likely to use the WealthTech platform if they believe it to be user-friendly, with easy-to-use interfaces and straightforward onboarding.

Zhou et al. (2010) verified that the adoption of mobile banking in China was greatly impacted by ease of use. Sharma (2020) found that perceived simplicity of use has a favorable impact on the uptake of digital payments in India, particularly among less tech-savvy customers. Simplified navigation, automated portfolio building, and less paperwork all contribute to WealthTech's perceived effort reduction.

According to Aljanabi and Younis (2023), the adoption of WealthTech by retail investors in emerging markets is directly influenced by the ease of transaction flow and the simplicity of user interfaces. Similar findings were made by Sharma and Baoku (2021), who discovered that user-friendly mobile app designs greatly lower cognitive burden and boost user confidence in

financial technologies.

Studies Related to Social Impact (SI)

The degree to which people believe that significant others—friends, family, peers, and financial advisors—think they should utilize the technology is known as social influence (Venkatesh et al., 2003). Alalwan et al. (2017) discovered that SI had a major impact on the adoption of digital banking in the finance sector.

Users are more inclined to investigate new-age platforms for WealthTech if they are influenced by social media reviews or recommendations from peers (Rahi et al., 2022). According to Singh et al. (2021), fintech influencers on YouTube and Instagram as well as WhatsApp groups played a role in influencing investment behavior in urban India.

In their 2022 study on cryptocurrency investments, Islam et al. found that investor preferences are influenced by digital communities and social media influencers. In support of this, Tiong et al. (2021) found that, in the Malaysian setting, peer and family encouragement were powerful motivators for the use of fintech apps.

Studies Related to Conditions for Facilitation (FC)

The degree to which people think that resources, infrastructure, and support are accessible to employ a technology is referred to as facilitating conditions (Venkatesh et al., 2003).

According to Venkatesh et al. (2012), FC has a direct impact on real usage patterns, particularly when new technology is being implemented. Panja & Mukhopadhyay (2021) highlighted that customer assistance, mobile app availability, and safe digital infrastructure greatly enhance acceptance among Indian investors in the WealthTech space.

Khatun et al. (2023) assert that continuous WealthTech use is made easier by improved user support systems, which are enhanced by integrated customer service within apps and access to financial literacy resources. Nguyen and Nguyen (2022) also discovered that the maturity of fintech infrastructure, including digital KYC and cloud-based platforms, is crucial to real system use.

Studies Related to Personal Innovativeness

According to Agarwal and Prasad (1998), personal innovativeness is the propensity of an individual to experiment with new technologies before others do. Early adopters in the diffusion curve are frequently innovators.

Personal innovativeness has a substantial impact on the desire to embrace FinTech services in India, according to Chauhan et al. (2021). Even with little human engagement, investors with a high degree of digital literacy and tech affinity were more likely to use robo-advisory platforms, according to Gupta et al. (2023) in the WealthTech space.

In their investigation of the role of personal innovation among Indian millennials, Bala and Verma (2021) discovered a substantial association with the early uptake of investment applications such as Groww and Zerodha. Despite the hazards, those who appreciate experimenting with technology are more inclined to try AI-based financial planning tools, according to Gumussoy et al. (2023).

Studies Related to Risk Perception

Financial, security, privacy, and performance hazards are all considered forms of perceived risk in FinTech (Featherman & Pavlou, 2003). It frequently serves as an obstacle to adoption.

Higher perceived risk has a negative impact on intention to use financial apps, according to Rahi et al. (2022). Sharma (2020) noted that worries about platform dependability, market volatility, and data breaches frequently deterred customers from utilizing digital investment tools in the WealthTech space, where real money is involved. Therefore, it becomes crucial to lower perceived risk through openness and regulatory compliance.

Choudhury and Singh (2023) demonstrated that the implementation of WealthTech in Tier-2 cities is severely hampered by security and data privacy issues. According to Ameen et al. (2022), conservative investors in Gulf nations have lower usage intents when they sense financial risk and have misgivings about algorithmic decision-making.

The Discussion and Implication

The current study provides a comprehensive knowledge of the factors influencing the adoption

of WealthTech platforms among seasoned investors by integrating the key constructs of UTAUT with two additional variables: perceived risk and personal innovativeness. Analyzing the behavioral factors that influence the use of this technology is essential as WealthTech continues to transform India's traditional investing landscape. The empirical results are interpreted in this section together with their theoretical, practical, and policy ramifications.

Theoretical Implication

The extension of the UTAUT model by combining risk perception and personal innovativeness is one of the main theoretical contributions of this study. Few studies have examined the UTAUT model's applicability in the WealthTech domain, particularly in an emerging economy, despite earlier research (e.g., Venkatesh et al., 2003) validating the model across a variety of technology contexts. In addition to confirming that the UTAUT paradigm is still predictively relevant in the financial technology industry, this study shows that investor traits like sensitivity to financial risk and openness to innovation are crucial in determining behavioral intention.

The conclusion that adoption is positively influenced by personal innovativeness is consistent with earlier studies showing that early adopters and tech enthusiasts are more likely to use digital financial solutions (Im, Kim, & Han, 2008; Roy & Sinha, 2022). By highlighting the part that investor personality plays in digital investing behavior, this observation deepens the literature on technological acceptance.

On the other hand, adoption intent was found to be negatively correlated with perceived risk, supporting the idea that worries about financial fraud, data security, and technological malfunctions can serve as deterrents (Featherman & Pavlou, 2003; Agarwal & Zhang, 2021). This architecture offers a sophisticated dimension to understanding resistance among otherwise eligible investors, given that financial transactions carry inherent risk, particularly on internet platforms

Practical Implications for FinTech Providers

Enhancing perceived performance: FinTech providers must ensure their platforms are user-friendly, offer timely and accurate investment recommendations, and generate tangible value for users. This aligns with the performance expectancy factor, which was a significant predictor

in the study. Offering performance dashboards, robo-advisory tools, and financial analytics can strengthen user confidence. Reducing effort expectancy: Simplifying onboarding processes, minimizing documentation, and enabling seamless navigation on mobile and web platforms can reduce perceived effort. Many first-time users are overwhelmed by complex interfaces, which can discourage continued usage.

Leveraging social influence: Social proof, such as influencer marketing, testimonials, and community- based investing forums, can be crucial in promoting adoption in India's collectivist cultural setting. Word- of-mouth is still a powerful force behind tech-based financial practices.

Creating conducive environments: WealthTech companies ought to make investments in strong support systems, such as round-the-clock chat assistance, multilingual help desks, and guides for users who are less tech-savvy. The lack of adequate support networks is the main reason why many investors are hesitant, not a lack of interest.

Promoting innovation: Businesses should take advantage of early adopters' psychology by providing premium features, rewards for referrals, or first dibs on beta versions. Tech-savvy users can become advocates by using this gamification strategy.

Implications for Policy and Regulation

The results also point to areas in which regulatory agencies like the Ministry of Finance, SEBI, and RBI can step in to encourage the safe and broad use of WealthTech platforms. Consumer hesitancy brought on by perceived risk will be reduced by establishing explicit compliance standards, enforcing KYC requirements, and launching awareness campaigns on safe investment techniques.

In order to fill in the gaps in digital awareness, financial literacy initiatives that focus on tier-2 and tier-3 cities are also required. In order to lessen economic inequality and promote inclusive financial growth as India transitions to a paperless economy, fair access to WealthTech tools will be crucial.

Prospective Research Paths

Although the current study provides insightful information, it also creates opportunities for additional research:

As digital literacy and platform offerings change over time, longitudinal studies can monitor behavioral changes.The moderating effects of demographic factors (age, income, and education) on the association between UTAUT components and adoption behavior may also be investigated in future research. In addition to the present emphasis on initial adoption, there is room to evaluate post-adoption loyalty and satisfaction. Last but not least, extending this research to further Indian cities or rural areas may confirm that the model is applicable in a variety of socioeconomic settings.

Conclusion

By combining key concepts from the Unified Theory of Acceptance and Use of Technology (UTAUT) with the extra variables of perceived risk and personal innovativeness, this study sought to investigate the factors driving the adoption of WealthTech platforms. The results confirm the importance of social influence, performance expectancy, effort expectancy, and enabling factors in determining user intention and usage behavior. Furthermore, while perceived risk continues to be a significant barrier to adoption, the inclusion of personal innovativeness emphasizes the proactive role that investors play in investigating digital financial products. The study offers contextual insights into behavioral dynamics within a fast changing digital investment ecosystem by concentrating on seasoned investors. The findings have real- world ramifications for WealthTech companies, indicating that they must build user trust, streamline user interfaces, and effectively convey value propositions. Academically, UTAUT's incorporation of risk assessment and personal characteristics provides a more comprehensive perspective on how technology is being adopted in the financial industry. Future studies could examine usage trends over time, apply the concept to different investor groups, or evaluate retention and post-adoption satisfaction. Such research will play a crucial role in creating inclusive and reliable digital investment experiences as the WealthTech industry develops.

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Behavioral Intention Toward AI Platform Usage: A Study of Management Students Using PLS-SEM

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Abstract

The rapid integration of Artificial Intelligence (AI) tools in the educational sector has transformed the way students engage with learning platforms. This study aims to investigate the behavioral intention of students to use AI platforms, with a focus on key psychological and contextual factors. Drawing on the Unified Theory of Acceptance and Use of Technology (UTAUT2), this research investigates the impact of Effort Expectancy, Social Influence, and Habit on students' behavioral intention to adopt AI tools for academic purposes.Using primary data collected through a structured questionnaire from postgraduate management students, the study employs Partial Least Squares Structural Equation Modeling (PLS- SEM) via SmartPLS to analyze the proposed model. Additionally, demographic variables such as Gender, Graduation Background, and Personal Computer Ownership are incorporated as control variables to assess their effect on the behavioral outcome.

The results reveal that all three constructs—Effort Expectancy, Social Influence, and Habit—have a significant and positive impact on Behavioral Intention. Moreover, the presence of personal computing devices further strengthens AI adoption, while variations are observed across gender and educational backgrounds. These findings offer practical insights for educators, academic institutions, and ed-tech developers in promoting AI-assisted learning tools among students.

Keywords: Artificial Intelligence (AI/ML), Education, Education 4.0, Effort Expectancy, Social Influence, Habit, Behavioral Intention, PLS-SEM

Introduction

Artificial Intelligence (AI) is rapidly reshaping the landscape of higher education by providing innovative tools and platforms that enhance teaching, learning, and academic productivity. From personalized tutoring systems and plagiarism checkers to advanced research support tools like AI chatbots and writing assistants, AI has become increasingly embedded in students' academic routines. Particularly in management education, where technology-driven decision-making and analytical thinking are essential, the adoption of AI platforms has witnessed substantial growth.

Despite the increasing availability and potential of these AI tools, student adoption remains uneven. While some students embrace AI for academic efficiency and engagement, others remain hesitant due to perceived complexity, lack of awareness, or external pressures. Understanding the psychological and contextual factors that influence this behavioral intention is crucial for promoting effective technology integration in education.

This study is grounded in the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)**,** a well-established framework in technology adoption research. It focuses on three key constructs: Effort Expectancy (how easy students perceive AI to be), Social Influence (the perceived pressure from peers and academic networks), and Habit (the extent to which AI usage becomes automatic behavior). The study also explores the role of demographic and contextual variables—namely Gender**,** Graduation Degree

background**,** and Personal Computer Ownership—to assess how these factors influence or moderate students' behavioral intention toward AI usage.

To empirically test the model, primary data were collected from postgraduate management students and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS. This approach enables the examination of complex relationships between latent constructs and provides robust insights into what drives student adoption of AI platforms.

By identifying the factors that shape students' intentions to use AI, this research contributes to both academic theory and practical application. The findings can guide educators, curriculum designers, and educational technology developers in creating targeted interventions that foster positive attitudes and effective use of AI tools in learning environments.

The study aims to aid educational stakeholders, policymakers, and technology developers, to foster a more informed and effective approach to the integration of AI in the realm of learning and education. The flow of this paper comprises Introduction to the study followed by a Literature Review, Research Methodology, Data Analysis and Findings, Conclusion and Implications, and Future scope of research.

Literature Review

Technology has become deeply embedded in various sectors, particularly education, where advancements in artificial intelligence (AI) offer transformative potential (Chen et al., 2020). AI enables personalized learning experiences by adapting content to individual student needs and tracking their academic progress (Murphy, 2019; Ouyang & Jiao, 2021). Chiu et al. (2022) classified AI's educational roles into task allocation, human-machine interaction, feedback analysis, and enhancing digital adaptability. However, challenges such as data selection, pedagogical integration, and digital inequality remain critical (Zawacki et al., 2019; Chiu et al., 2022). COVID-19 accelerated AI-based learning adoption, especially among tech-savvy Generation Z, highlighting the need for robust AI-academic alignment to meet future workforce demands (Al-Mamary et al.,

2023; Berkup, 2014; Kuleto et al., 2021). Examining AI adoption among postgraduate management students is crucial, given their future roles in AI-driven business environments (Lee & Chang, 2018; Basheer, 2023). For this, the Unified Theory of Acceptance and Use of Technology (UTAUT) and its extension, UTAUT2, provide robust frameworks. UTAUT includes performance expectancy, effort expectancy, social influence, and facilitating conditions as key predictors, moderated by age, gender, experience, and voluntariness (Venkatesh et al., 2003; Alwahaishi & Snásel, 2013). UTAUT2 adds hedonic motivation, price value, and habit, improving behavioral intention prediction to 74% (Venkatesh et al., 2016; Duarte & Pinho, 2019). UTAUT2 has been extensively applied in IT, mobile applications, healthcare, and AI contexts (Huang, 2020; Schomakers et al., 2022), though constructs like hedonic motivation and price value may be contextually excluded (Tamilmani et al., 2019).

Users believe that using AI can free them of physical and mental efforts (Gursoy et al., 2019; Lin et al., 2022). A study was conducted on AI adoption by students, and explored how students' perceptions of the ease, user-friendliness, and intuitiveness of AI applications impact their willingness to join these technologies into their learning experience (Flavián et al., 2022; Alhumaid et al., 2023). Effort expectancy is closely linked with overall user experience and positive perceptions of ease of use can impact students' learning outcomes (Tan, 2013; Alyoussef 2021). AI has the potential benefit of reducing extra load and enhancing user satisfaction in educational contexts (Nguyen, 2022). Effort expectancy has a significant impact on the behavioral intention. These discussions provide the basis for the following hypothesis of this research:

H1: Effort expectancy has a significant positive effect on the behavioral intention of postgraduate management students towards AI in learning.

Social influence is defined as how much the acceptance of technology by an individual is influenced by their social environment (Graf-Vlachy et al., 2018; Park et al., 2022). Social influence is the degree to which an individual believes that important students support their use of AI for their daily education tasks. UTAUT extended to UTAUT2 to

explain voluntary use, and social influence was among the modified construct (Baudier et al., 2020; Cabrera-Sánchez et al., 2021). Recent studies have described social influence as a strong antecedent of the behavioral intention to use AI technology in the educational sector. These discussions provide the basis for the following hypothesis of this research:

H2: Social influence has a significant positive effect on the behavioral intention of postgraduate management students towards AI in learning.

Habit means the degree to which individuals tend to perform behavior automatically due to past learning and experience (Osei et al., 2022; Yuan et al., 2022). In the concept of AI based on machine learning, a habit developed a particular relationship between the students and the AI-based education system (Rahim, 2022). Hence, habit is not only an explanation of daily routine but also predicts the degree of user engagement with this type of advanced application and technology. Prior research has analyzed this variable to study its influence on the adoption of AI (Hu, 2022; Al-Mamary et al., 2023). Therefore, based on this the following hypothesis was proposed:

H3: Habit has a significant positive effect on the behavioral intention of postgraduate management students towards AI in learning

Attitude/ behavioral intention toward using new technology is the extent of positive or negative evaluation or feeling towards the acceptance of the certain technology (Venkatesh et al., 2012). The past research considered performance expectancy and effort expectancy as strong constructs for behavior/ attitude (Venkatesh et al., 2012).

Further, in a few of the past studies, an impact of gender and graduation background was found on the adoption of technology which is discussed in the section hereafter. Gender was positively examined in the usage of advanced technology, tablet PCs, and mobile banking (Glavee-Geo et al., 2017). Based on past technology adoption model, gender has a direct impact on behavioral intentions (Liao et al., 2018; Al-Mamary et al., 2023). There has been no research on AI-based education and AI applications in the education sector

based on gender. Hence, this study found this as a research gap and investigated the impact of gender on the behavior intention to adopt AI by the select population. Additionally, there was mixed evidence for the link between the technology adoption model and the stream of education. A higher technology usage intent was found among engineering students compared to business students in Germany (Nistor et al., 2013). Similarly, research on Ukrainian students revealed that the business and economics students who were exposed to higher technology adoption were more likely and motivated to use such technology compared to engineering students with no exposure (Lingappa et al., 2020). These findings motivated the current research to study the impact of the graduation background of postgraduate management students on their behavioral intention to use AI for learning. Hence, the hypothesis for the same is as below:

H4: The behavioral intention of male and female postgraduate management students towards AI in learning is the same.

H5: The behavioral intention of postgraduate management students towards AI in learning is the same across different graduation backgrounds.

Research Methodology

The research on Postgraduate management students' adoption of AI is imperative to develop their decision-support abilities, ensuring they are prepared to leverage AI tools and platforms for informed decision-making in organizational settings.

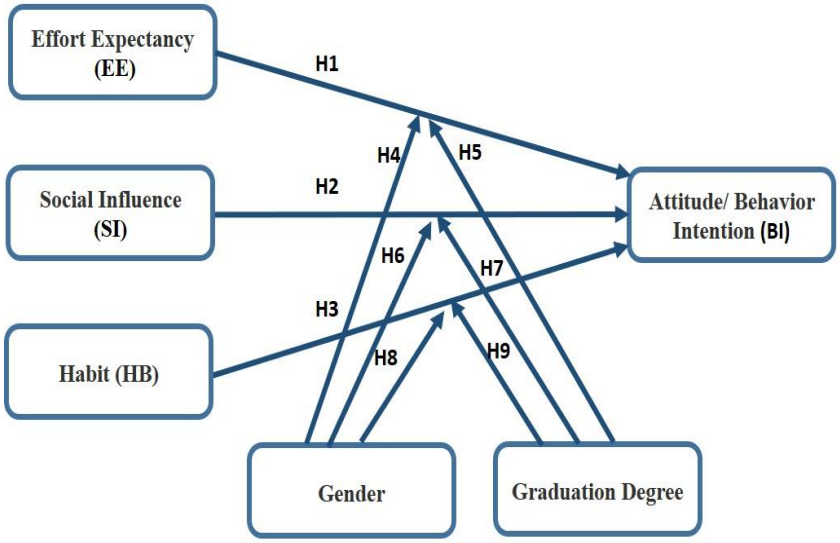
The primary objective of this study is to investigate the factors influencing students' behavioral intention to use Artificial Intelligence (AI) platforms in an academic setting. Specifically, the research aims to examine the effect of Effort Expectancy, Social Influence, and Habit on students' intention to adopt AI tools. In addition, the study seeks to analyze the impact of demographic and contextual variables such as Gender, Graduation Degree, and Personal Computer Ownership as control variables in the model. Finally, the study aims to validate the proposed structural model using SmartPLS to provide empirical evidence for the relationships among the selected constructs.

The population of the study was postgraduate management students of GenZ in the South Gujarat region. A descriptive research design and survey method were used in this study. The sampling frame comprised the current Gen Z students of the 2-year full-time MBA programme who already use AI platforms for learning. The non-probability convenience and judgmental sampling technique was used with a sample size of 300. For populations under 1,000, it is recommended to use a minimum ratio of 30 percent (300 individuals) to ensure the representativeness of the sample. However, 260 responses were received; which indicates a good response rate of 86.7%; as per (Holtom, 2008), the average response rate of 52.7% was acceptable when the respondents were individuals.

The data collection instrument was a structured questionnaire administered through an online Google Form and collected in April – May 2025. It comprised two rapport-building questions to know which AI platforms were used by students; followed by the set of questions as per the scale provided by the UTAUT2 model in the context of this study, and the gender, graduation background, and MBA Year of the respondents. The scale provided by the UTAUT2 model of technology adoption included four items of Effort Expectancy (EE), three items of Social Influence (SI), four items of Habit (HT), and three items of Behavioral Intention (BI) construct. The Behavior Intention (BI) was the dependent variable, and the remaining aforementioned constructs were the independent variables that were tested in this study using Structural Equation Modeling in Smart PLS for their probable positive impact on the dependent variable.

Five-point Likert scale of Agreement with values ranging from “1 = StronglyDisagree” to “5 = Strongly Agree” was used to capture the items in the scale proposed by the UTAUT2 model; the remaining items were captured as nominal data.

Figure 1: Proposed Model of the Study



The Data Analysis software utilized were SPSS Version 21 and SmartPLS Version 3.2.7. SPSS was used to summarize the demographic profile of respondents, analyze the rapport-building questions, and study the impact of demographic characteristics on behavioral intention. Smart PLS was employed to perform Structural Equation Modeling (SEM), to test the reliability, validity, and predictive ability of the proposed model.

A few of the justifications for using PLS-SEM are discussed here. Firstly, it offers concurrent analysis for measurement and structural model, to enable its use for generating accurate calculations (Barclay et al., 1995). Further, instead of disassembling the entire model, PLS-SEM analyzes it as a whole (Goodhue et al., 2012). Also, as per Urbach & Ahlemann (2010), PLS-SEM functions optimally when the investigation is based upon existing studies or research. Even exploratory investigations using complex models can very well use the PLS-SEM (Hair et al., 2017).

In the context of the proposed model, Cronbach's alpha and Composite reliability (rho_a/rho_c) measures were used to test the internal consistency reliability. The convergent and discriminant validity was tested using Average Variance Explained (AVE) and Fornell-Larcker criterion respectively. The combined testing of the seven aforementioned hypotheses was performed using the structural equation modeling (SEM) method. In the PLS-SEM model, hypothesis testing on the effect of each path was performed through bootstrapping analyzing the t-statistics and p-values to test whether the effect was statistically significant.

Also, a fundamental frequency analysis was performed to summarize the demographic profile of respondents and analyze the AI platforms currently used by students. Mann-Whitney U test and Kruskal- Wallis H test were applied to study the impact of gender and graduation background of students on the behavioral intention to use AI in learning respectively.

Data Analysis & Findings

The respondent profile comprised 41.9% males and 58.1% females; 49.6% with BCom. 39.6% had a BBA, 2.3% were with BCA or computer related graduation background, 1.9% each from BSc. and BE (excluding computers), 0.4% from BA, and 4.2% from other graduation background. 88.46% respondents were found using ChatGPT AI platform, followed by 20.38% using Grammarly, 15.38% using Quillbot, and 15% using other platforms such as Adobe Firefly, Canva, ChatBCG, Chingu AI, Claude, Copilot Microsoft AI, Copymatic, DeepAI, ElevenLabs, Expertia AI, Gamma AI, Google Bard, Heyday, Jenni AI, Midjourney, Notion AI, Poe AI, Tome AI, and Voice.AI.

Evaluation of Measurement Model

The first step in evaluating PLS-SEM results involves examining the measurement models, which differs for reflective and formative constructs. If the measurement models meet required criteria, researchers then need to assess the structural model (Hair et al., 2017). This UTAUT2 model is a reflective-formative model with higher order construction. The outer loadings are the results of multiple regression on its set of indicators. This value

should be greater than 0.7 (Vinzi et al., 2010). All outer loadings of the reflective constructs are above the threshold value of 0.7, thereby indicating sufficient levels of indicator reliability in this study as shown in Table 1.

Table 1: Outer Loading of Constructs

Latent constructs		Manifests and codes	Loading
Effort Expectancy	EE 1	Learning how to use AI platforms is easy for me.	0.792
	EE 2	My interaction with AI platforms is clear and understandable	0.826
	EE 3	I find AI platforms easy to use.	0.837
	EE 4	It is easy for me to learn the skill for using AI platforms	0.804
Social Influence	SI 1	People who are important to me think that I should use AI platforms	0.793
	SI 2	People who influence my behavior think that I should use AI platforms	
	SI 3	People whose opinions that I value prefer that I should use AI platforms	
Habit	HT 1	The use of AI platforms has become a habit for me.	
	HT 2	I am addicted to the using of AI platforms	
	HT 3	I must use AI platforms	
	HT 4	Using AI platforms has become natural to me.	
Behavior Intention	BI 1	I intend to continue using AI platforms in the future.	
	BI 2	I will always try to use AI platforms in my daily life.	
	BI 3	I plan to continue to use AI platforms frequently.	

The next step is to measure the reliability and validity of the constructs. The Composite reliabilit Cronbach's alpha and y (rho_a and rho_c) were used to measure the their values were in internal consistency reliability, and the acceptable range of above 0.7, which indicated internal consistency reliability.

Convergent validity was tested using Average Variance Extracted (AVE); was above the

threshold value of 0.5 for all the constructs, indicating the existence of convergent validity. The Table 3 below enumerates the values as per Fornell and Larcker criterion; the discriminant validity was established in the model as the root of AVE of all the constructs was higher than its correlation with all the other constructs. Alternatively, the discriminant validity was also measured using the Heterotrait-Monotrait ratio (HTMT); the discriminant validity was achieved as all the HTMT ratios were lower than 0.85. (Hair et al., 2017)

Table 2: Internal Consistency Reliability and Convergent Validity

	Cronbach's alpha	Composite reliability (rhoa)	Composite reliability (rhoc)	Average variance extracted (AVE)
Behaviour Intention	0.748	0.748	0.856	0.665
Effort Expectancy	0.832	0.837	0.888	0.664
Habit	0.842	0.861	0.894	0.679
Social Influence	0.792	0.802	0.878	0.707

Table 3: Fornell-Larcker Criterion for Discriminant Validity

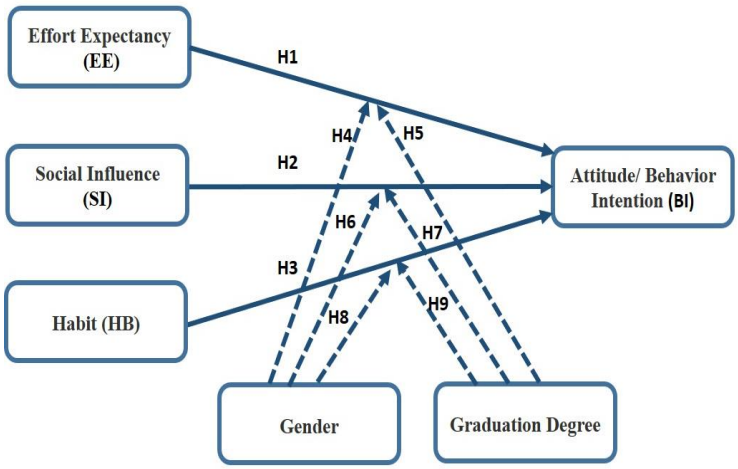
	Behaviour Intention	Effort Expectancy	Gender	Graduation Degree	Habit	Social Influence
Behaviour Intention	0.816					
Effort Expectancy	0.540	0.815				
Gender	0.153	0.320	1.000			
Graduation Degree	0.018	0.029	0.076	1.000		
Habit	0.542	0.316	0.075	-0.004	0.824	
Social Influence	0.479	0.509	0.143	0.043	0.416	0.841

Table 4: HTMT Ratio for Discriminant Validity

	Heterotrait-monotrait ratio (HTMT)
EE <-> BI	0.674
Gender <-> BI	0.175
Gender <-> EE	0.345
Graduation Degree <-> BI	0.088
Graduation Degree <-> EE	0.041
Graduation Degree <-> Gender	0.076
HT <-> BI	0.672
HT <-> EE	0.372
HT <-> Gender	0.079
HT <-> Graduation Degree	0.02
SI <-> BI	0.621
SI <-> EE	0.627
SI <-> Gender	0.159
SI <-> Graduation Degree	0.075
SI <-> HT	0.496

Evaluation of Structural Model

Figure 2: Empirical Model



The measurement of structural model comprises of collinearity assessment (VIF), coefficient of determination (R^2 value), effect size (f^2), Stone-Geisser's (Q^2), path coefficient, and significance as subsection examination tools for assessing the structural model. (Hair et al., 2019)

The Variance Inflated Factor (VIF) value is investigated to verify the collinearity. According to Diamantopoulos and Siguaw (2006) value of VIF larger than 3 indicates a potential collinearity problem. In this study it was found that all the values of the VIF were below the threshold, indicating no collinearity problem. The percentage of variance explained by the endogenous variable by the exogenous variable is indicated by the R^2 value which ranges from 0 to 1. (Hair at el., 2011). The R^2 value for this model was 0.642, indicating that performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit were able to predict the behavioral intention of postgraduate management students to use AI in learning with 64.2%.

Evaluation of effect size permits the researcher to detect the effect of each independent variable on the dependent variable. It can be measured as a small effect if the value is equal to or more than 0.02; it can be measured as a medium if the value is near 0.15 and the value exceeding 0.35 suggests a significant effect (Selya et al., 2012).

The effect size f^2 revealed small to medium effect sizes on different constructs in this model. The model's predictive relevance or power can be identified through Stone-Geisser's Q^2 (Geisser, 1974; Stone, 1974). It was found from the analysis that all the values of Q^2 were above 0 (zero), hence the model had good predictive relevance.

Figure 3: Structural Model

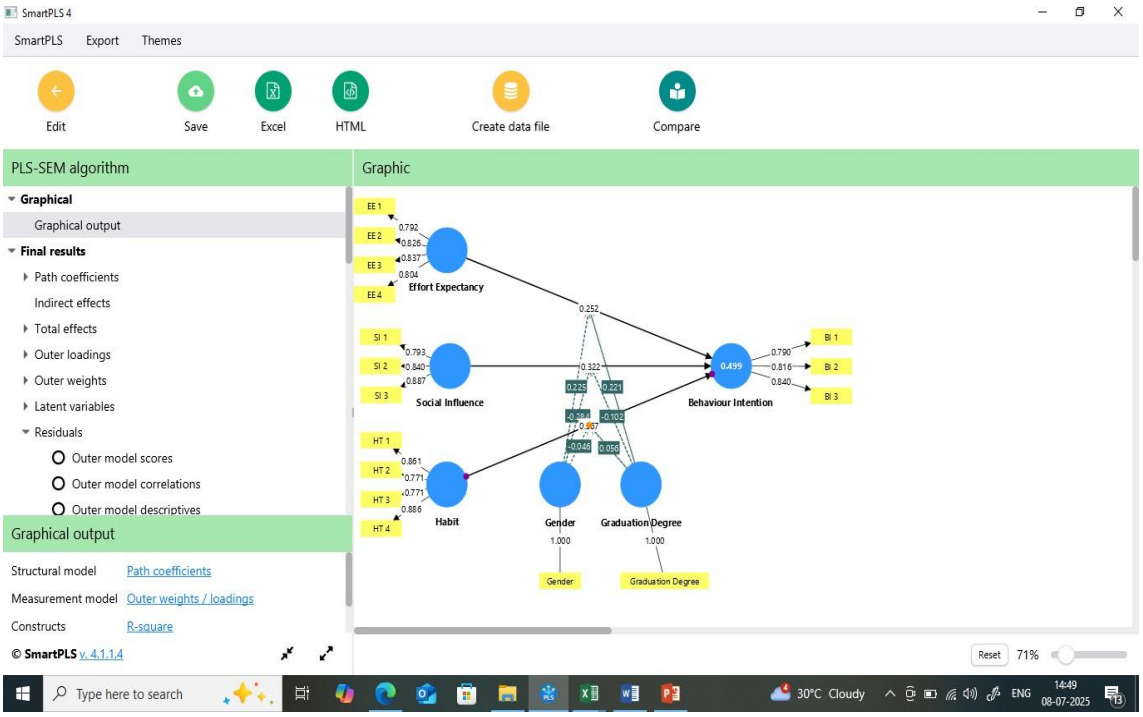


Table 5: Path coefficient significance

	P values	
Effort Expectancy -> Behaviour Intention	0.037	Supported
Gender -> Behaviour Intention	0.777	Not – Supported
Gender x Effort Expectancy -> Behaviour Intention	0.245	Not – Supported
Gender x Habit -> Behaviour Intention	0.832	Not – Supported
Gender x Social Influence -> Behaviour Intention	0.237	Not – Supported
Graduation Degree -> Behaviour Intention	0.602	Not – Supported
Graduation Degree x Effort Expectancy -> Behaviour Intention	0.223	Not – Supported
Graduation Degree x Habit -> Behaviour Intention	0.764	Not – Supported
Graduation Degree x Social Influence -> Behaviour Intention	0.614	Not – Supported
Habit -> Behaviour Intention	0.004	Supported
Social Influence -> Behaviour Intention	0.034	Supported

*Note: *Significant at 10 percent*

The path analysis results reveal that Effort Expectancy ($\beta = .093$, $p < .1$), Social Influence ($\beta = .107$, $p < .1$), Habit ($\beta = .331$, $p < .1$) had significant positive influence on Behavioral Intention (BI) of postgraduate management students towards the use of AI in learning. Hence, the results support the hypotheses 1, 2, 3.

Further, to investigate whether there was a significant difference in the behavioral intention towards the use of AI in learning across different gender (H4, H6 and H8), and graduation background (H5, H7 and H9) of postgraduate management students had no significant impact on Behavioral Intention (BI). Therefore, hypotheses 4,5,6,7,8 and 9 were rejected. So there was no moderate effect.

Conclusion and Implications

The findings of this study highlight key behavioral factors influencing students' intention to use AI platforms in academic settings. Among the core constructs, Habit**,** Effort Expectancy and Social Influence were found to have a significant and positive effect on Behavioral Intention, confirming their critical role in technology adoption. These results suggest that students are more likely to use AI platforms when usage becomes habitual, when the platforms are perceived as easy to use, and when peers or influential individuals encourage their use.

In contrast, the demographic variables—Gender and Graduation Degree—as well as their interaction effects with the main constructs, did not show any statistically significant impact on Behavioral Intention. This implies that the influence of effort expectancy, habit, and social factors on AI adoption is generally consistent across gender and educational backgrounds within the sample.

Overall, the study confirms that behavioral constructs are stronger predictors of AI platform adoption than demographic factors. These insights can assist educators and technology developers in designing strategies that encourage regular and socially supported use of AI tools in higher education.

Future Scope of Research

In this study the hedonic motivation and price value constructs did not have a significant impact on the behavioral intention toward the use of AI by students in learning; hence, future research can investigate the application of the UTAUT model and comparisons can be drawn with UTAUT2 model in the same context. Future studies may examine the moderating effect of demographic variables on the constructs of the UTAUT2 model.

The same model can be applied to study the behavioral intention of educators and policymakers to measure their readiness for Education 4.0. Various qualitative and quantitative approaches can be used to investigate the perspectives of educators, policymakers, and technology firms toward the application of AI in education.

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Evaluating the Factors Influencing Job Satisfaction of Primary School Teachers in Ahmedabad

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Abstract

Job satisfaction plays a pivotal role in the teaching profession, especially at the primary school level, where teachers are instrumental in shaping the foundational knowledge, values, and attitudes of young learners. Satisfied teachers are more likely to exhibit higher levels of motivation, creativity, and commitment to their work, which directly enhances the quality of education delivered to students. Moreover, teachers who experience greater job satisfaction tend to have lower rates of absenteeism and turnover, contributing to greater stability and consistency in the learning environment. This study aims to evaluate the various factors influencing the job satisfaction of primary school teachers in Ahmedabad, a city known for its diverse educational landscape. The research focuses on identifying the key determinants that affect teachers' satisfaction levels, such as working conditions, salary, career development opportunities, workload, administrative support, and interpersonal relationships within the school environment. Additionally, the study seeks to examine the association between the demographic profiles of the teachers—such as age, gender, years of experience, educational qualifications, and type of school—and the factors affecting their job satisfaction. A sample of 157 primary school teachers from

different schools across Ahmedabad has been surveyed using structured questionnaires. The findings are expected to provide valuable insights for school administrators, policymakers, and educational planners to enhance job satisfaction, reduce turnover, and improve the overall quality of primary education.

Keywords: *Job Satisfaction, Primary School Teachers, Teacher Retention, Educational Environment, Ahmedabad, Work Motivation, Teacher Well-being*

1. Introduction

Job satisfaction among primary school teachers in India is a multifaceted and deeply important issue that has significant implications for the quality of education and the overall development of the nation (Wicker, 2011). Primary school teachers are the backbone of the foundational education system, as they are responsible for instilling basic knowledge, values, and discipline in children during their most formative years. Their levels of job satisfaction directly influence not only their teaching effectiveness and professional commitment but also student achievement and school outcomes.

In India, the level of job satisfaction among primary school teachers varies widely due to differences in school management systems, salary structures, infrastructural support, work environments, and socio- cultural factors. Teachers in government schools often face issues such as large class sizes, insufficient teaching materials, administrative burdens, and delayed salary disbursements. On the other hand, those in private schools may struggle with job insecurity, lower salaries, and pressure to meet academic and enrolment targets. Despite these challenges, many teachers remain committed to their profession, driven by intrinsic motivation and the desire to make a difference in the lives of young learners.

One of the primary determinants of job satisfaction in the Indian context is salary and financial incentives (Spector, 2022). Inadequate remuneration often leads to dissatisfaction, especially when compared to the effort and responsibility involved in teaching at the primary level. Moreover, the lack of performance-based incentives or

opportunities for career advancement adds to the frustration of many educators. In some regions, especially rural and tribal areas, poor infrastructure, inadequate facilities, and lack of community support further dampen teacher morale.

Professional autonomy and administrative support also play a crucial role in influencing job satisfaction. Teachers who have a voice in decision-making processes and are supported by school management tend to exhibit higher satisfaction levels. Conversely, excessive administrative tasks, rigid curriculum demands, and lack of appreciation can lead to burnout and job dissatisfaction. Continuous professional development and training opportunities are also essential for keeping teachers engaged and up-to-date with modern pedagogical methods. Unfortunately, such opportunities are not always evenly distributed across the Indian educational landscape.

Work-life balance is another factor that affects job satisfaction. Female teachers, in particular, often juggle household responsibilities with their teaching duties, especially in conservative or rural settings (Sargent et. al., 2005). Long working hours, extended commutes, and the emotional labour involved in handling young students can lead to stress and fatigue. Despite this, the emotional gratification derived from student success and the respect received from the community continue to be strong motivating factors for many teachers.

In recent years, digital education initiatives such as DIKSHA, Gyankunj, and other state-level programs have aimed to enhance teaching experiences and reduce workload through the use of technology. While these have shown promise, the uneven access to digital infrastructure and training has limited their impact in many areas. Nonetheless, the shift towards technology-integrated education is gradually reshaping the expectations and experiences of primary school teachers in India.

Overall, the job satisfaction of primary school teachers in India is shaped by a complex

interplay of economic, institutional, social, and personal factors. Ensuring their well-being and professional fulfilment is essential for achieving national educational goals, including universal primary education and improved learning outcomes. Addressing the issues related to compensation, working conditions, professional development, and societal recognition can significantly enhance teacher satisfaction, thereby strengthening the foundation of India's education system.

2. Significance of the Study

This study is significant because teachers form the cornerstone of the education system, and their satisfaction directly affects not only their own well-being but also student outcomes and institutional performance. Prior research has consistently demonstrated that job satisfaction is strongly linked with teacher effectiveness and student achievement. For instance, Banerjee and Stearns (2019) found that higher levels of teacher satisfaction were associated with greater classroom engagement and improved learning results among primary students. Similarly, Skaalvik and Skaalvik (2020) emphasized that teachers with higher job satisfaction tend to display stronger professional commitment, which positively influences the overall school climate.

In the Indian context, job satisfaction is particularly crucial because primary school teachers operate within a diverse and dynamic educational landscape, often balancing limited resources, evolving pedagogical practices, and varied community expectations. Bansal and Sharma (2021) highlighted that teacher satisfaction in Indian schools is influenced not only by salary and workload but also by the perception of fairness in policy implementation and availability of professional development opportunities. This underscores the importance of contextualized research that focuses specifically on cities like Ahmedabad, where both government and private schools coexist and are influenced by different governance structures.

The present study also carries policy-level significance. Evidence suggests that improving teacher satisfaction reduces turnover and enhances retention, thereby ensuring

stability in the education system. Yue et al. (2022) reported that consistent administrative support and fair school policies are major predictors of teacher retention. By analysing factors such as workload, compensation, and fairness of policies, this study provides empirical insights that can guide school administrators and policymakers in designing strategies to strengthen teacher engagement and reduce attrition rates.

Furthermore, this research contributes to the broader academic literature on organizational behavior and educational management by offering data-driven findings from Ahmedabad. Karakus and Ucar (2020) argued that localized studies provide critical inputs for comparing cross-cultural determinants of job satisfaction and allow policymakers to frame interventions suited to regional needs. Thus, the outcomes of this study will not only benefit the schools and teachers of Ahmedabad but will also add to the growing body of knowledge on teacher job satisfaction in developing economies.

3. Literature Review

Tejas Yadav (2019) conducted an empirical study on job satisfaction levels among government and private school teachers in urban areas of Maharashtra. The study emphasized the influence of work environment, administrative support, and recognition on teachers' overall satisfaction. Yadav found that government school teachers reported higher job satisfaction compared to their private counterparts, primarily due to job security, timely salaries, and lesser pressure from performance targets. However, private school teachers expressed greater autonomy in teaching methods but faced lower levels of institutional support and job stability. The study concluded that consistent professional support and recognition play vital roles in shaping positive job satisfaction, regardless of the school type.

Kusum Chaudhary (2020) investigated the psychological and motivational determinants of job satisfaction among female primary school teachers in northern India. Her study highlighted that factors such as emotional well-being, interpersonal relationships at work, and perceived respect from students and parents contributed significantly to job satisfaction. Chaudhary also noted that a lack of promotional avenues and limited

opportunities for skill enhancement often led to frustration and professional stagnation. The research emphasized the importance of emotional and social motivators over financial incentives in the case of female educators, especially in semi-urban and rural contexts.

Chetan Sengupta (2021) conducted a comprehensive analysis of teacher satisfaction in the context of the National Education Policy (NEP) 2020 implementation in selected schools in West Bengal. Sengupta focused on how new policy mandates and digital teaching requirements influenced teacher morale. The study revealed mixed outcomes—while some teachers were excited about the new pedagogical reforms and training initiatives, others expressed anxiety over technological adaptation and increased workloads. Sengupta's work underscored the need for gradual implementation and sustained teacher training to maintain satisfaction during periods of systemic change.

Priya Mukherjee (2021) explored the correlation between job satisfaction and student performance in primary schools in Gujarat. Through a mixed-methods approach, she examined how satisfied teachers contributed to student engagement and academic success. The study found a strong positive relationship between the two variables. Teachers who felt respected, well-supported by school leadership, and had access to adequate teaching resources reported better classroom experiences and student outcomes. Mukherjee concluded that teacher satisfaction must be seen not only as a workforce issue but also as a key determinant of educational quality.

Anirudh Chatterjee (2022) focused his research on urban private school teachers in Delhi NCR, analyzing job stress, work-life balance, and administrative workload as determinants of job satisfaction. Chatterjee discovered that the increasing administrative burden, such as excessive reporting and parent- management meetings, left teachers with little time for lesson planning and personal life. Despite decent pay packages in some elite private institutions, dissatisfaction arose from lack of autonomy and burnout. The study recommended policy reforms to redefine teacher roles and create a more balanced and

sustainable professional environment.

Manish Reddy (2023) conducted a qualitative study involving interviews with primary school teachers from Telangana to understand intrinsic motivators and personal fulfillment as components of job satisfaction. Reddy found that teachers who felt a sense of purpose and believed they were making a real difference in children's lives reported higher satisfaction levels, even when working under constrained financial or infrastructural conditions. The study emphasized that meaningful student- teacher interactions, support from school leadership, and opportunities for professional growth were essential for maintaining long-term job satisfaction.

Ankit Naik (2023) undertook a comparative study between teachers in smart schools and traditional schools in urban Gujarat to analyze the role of technological integration in job satisfaction. Naik found that teachers in smart schools generally expressed higher satisfaction due to reduced workload through digital tools, interactive content, and access to real-time student feedback. However, he also noted concerns related to over-reliance on technology and the need for continuous digital training. The study recommended integrating technology with adequate training and balancing it with traditional pedagogical practices to ensure sustained teacher satisfaction.

4. Research Methodology

4.1 Research objectives

1. To analyse the factors influencing job satisfaction of primary school teachers.
2. To find out association between demographic profile of the primary school teachers and factors influencing job satisfaction

4.2 Sample size

In this study 157 primary school teachers from different schools across Ahmedabad has been surveyed.

4.3 Sampling Method

In this study the random sampling method has been employed to ensure equal representation of respondents and to minimize selection bias.

4.4 Research Hypothesis

1. H0 : Primary school teachers do not believe workload is manageable during regular school hours.
2. H0 : Primary school teachers do not believe that the salary they receive is fair compared to workload.
3. H0 : Primary school teachers do not believe that school policies are implemented fairly and consistently.
4. H0 : There is no association between demographic profile of the primary school teachers and factors influencing job satisfaction.

5. Data Analysis

1. H0 : Primary school teachers do not believe workload is manageable during regular school hours.

One-Sample Test						
	Test Value = 3					
	t	df	Sig.(2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Workload is manageable during regular school hours.	8.049	156	0.009	0.221	0.008	0.011

As per the above table it is seen that significance value is 0.009 which is lower than standard value 0.05, So Null hypothesis is rejected and it is concluded that Primary school teachers believe that workload is manageable during regular school hours.

2. H0 : Primary school teachers do not believe that the salary they receive is fair compared to workload.

One-Sample Test						
	Test Value = 3					
	t	df	Sig.(2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Salary they receive is fair compared to workload.	12.276	156	0.011	0.602	0.015	0.458

As per the above table it is seen that significance value is 0.011 which is lower than standard value 0.05, So Null hypothesis is rejected and it is concluded that Primary school teachers believe that the salary they receive is fair compared to workload.

3. H0 : Primary school teachers do not believe that school policies are implemented fairly and consistently.

One-Sample Test						
	Test Value = 3					
	t	df	Sig.(2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
School policies are implemented fairly and consistently.	16.503	156	0.037	0.81	0.462	0.905

As per the above table it is seen that significance value is 0.037 which is lower than standard value 0.05, So Null hypothesis is rejected and it is concluded that Primary school teachers believe that school policies are implemented fairly and consistently.

4. H0 : There is no association between demographic profile of the primary school teachers and factors influencing job satisfaction.

Variable- 1	Variable-2	Pearson Chi- Square	P Value	Decision
Gender	My workload is manageable during regular school hours.	6.207	0.038	There is Significant Association
	The salary I receive is fair compared to my workload.	7.013	0.005	
	School policies are implemented fairly and consistently.	5.828	0.032	
Age	My workload is manageable during regular school hours.	6.790	0.045	
	The salary I receive is fair compared to my workload.	7.736	0.049	
	School policies are implemented fairly and consistently.	6.676	0.000	
Work-Experience	My workload is manageable during regular school hours.	8.745	0.026	
	The salary I receive is fair compared to my workload.	5.810	0.000	
	School policies are implemented fairly and consistently.	5.934	0.012	

6. Conclusion

The findings of this study reveal a generally positive perception among primary school teachers regarding key aspects of their professional environment. One of the most encouraging insights is that teachers believe their workload is manageable during regular school hours. This suggests that schools are effectively organizing teaching schedules, lesson plans, and extracurricular duties in a way that allows teachers to perform their responsibilities without feeling overburdened. A manageable workload plays a critical role in reducing stress and burnout among educators, which in turn enhances teaching quality and fosters greater job satisfaction. When teachers feel that their duties are achievable within the standard workday, they are more likely to stay motivated and

focused, which benefits both their professional well-being and student learning outcomes.

Another significant finding is that primary school teachers believe the salary they receive is fair in comparison to their workload. This indicates a healthy balance between compensation and expectations, which is crucial for maintaining morale and motivation within the teaching profession. Financial fairness not only reinforces the value of the work teachers do but also contributes to long-term retention and stability in the workforce. In an era where many teachers across different regions express dissatisfaction with pay structures, this sense of equity among teachers in the study area highlights a well-managed compensation system that meets their economic and professional needs. Such satisfaction with pay relative to effort can lead to a more committed and less turnover-prone teaching staff.

Additionally, the belief that school policies are implemented fairly and consistently is a testament to strong and transparent leadership within the educational institutions. When policies are applied uniformly and without bias, teachers feel a sense of justice and respect in their professional environment. Fair implementation of rules contributes to a culture of trust and accountability, which is essential for maintaining harmony and collaboration among staff members. It also indicates that school administrators are likely approachable, communicative, and committed to creating an inclusive and ethical work atmosphere.

Overall, the findings point toward a supportive and equitable working environment for primary school teachers in the surveyed area. The combination of manageable workloads, fair compensation, and just policy implementation creates a positive and motivating atmosphere that can significantly enhance job satisfaction. These factors not only improve the teachers' own professional experiences but also indirectly contribute to better educational outcomes for students. Sustaining such conditions should be a priority for school administrators and policymakers, as they form the foundation for a thriving and effective educational system.

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Embracing Diversity: Supporting Neurodivergent LGBTQIA+ Employees in Indian Workplaces

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Abstract

The contemporary global workforce increasingly recognizes diversity as a strategic imperative, fostering innovation, productivity, and employee well-being. However, the discourse on diversity often overlooks the complex intersectionality of identities, particularly in emerging economies like India. This paper explores the unique challenges and opportunities associated with supporting Neurodivergent LGBTQIA+ employees in the Indian workplace. Drawing upon theoretical frameworks such as the Minority Stress Model and Social Identity Theory, it elucidates the compounded discrimination and psychological burdens faced by individuals navigating these intersecting marginalized identities. This paper reviews existing literature, identifies critical gaps in understanding how identity cues are expressed and interpreted within this intersectional group, and proposes a mixed-methods research agenda. Specifically, we aim to investigate the specific dimensions of psychological safety that are most salient for Neurodivergent LGBTQIA+ individuals, the types of identity cues they employ to signal their multifaceted selves, and the organizational practices that foster environments where these cues are affirmed rather than misinterpreted or penalized. Ultimately, this research seeks to provide actionable insights for creating truly inclusive workplaces that honor the

complexity and richness of neuroqueer identities. This paper underscores the urgent need for a nuanced, intersectional approach to Diversity, Equity, and Inclusion (DEI) that recognizes and values the rich tapestry of human experience.

Keywords: *Neurodiversity, LGBTQIA+, Diversity and Inclusion, Psychological Well-being, Minority Stress Model, Social Identity Theory.*

1. Introduction:

The discourse surrounding Diversity, Equity, and Inclusion (DEI) has gained significant momentum in Indian workplace, with organizations increasingly recognizing its importance for talent acquisition, innovation, and ethical responsibility *(FICCI, 2021)*. However, much of this discourse operates within a soloed understanding of identity, often addressing categories such as gender, caste, or disability in isolation. This approach overlooks the nuanced realities of individuals who embody multiple marginalized identities, a phenomenon known as intersectionality *(Crenshaw, 1989)*. Neurodiversity refers to the natural variations in human brain function and processing, encompassing a range of conditions such as Autism Spectrum Disorder (ASD), Attention-Deficit/Hyperactivity Disorder (ADHD), Dyslexia, and Tourette's syndrome, which manifest in diverse ways regarding sociability, learning, attention, and mood *(Armstrong, 2010)*. The acronym LGBTQIA+ (Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, Intersex, Asexual, and others) collectively refers to diverse sexual orientations and gender identities *(GLAAD, 2023)*. The term "neuroqueer" itself emphasizes the non- normative aspects shared by both neurodivergence and queer identity, challenging dominant societal norms around cognition, communication, gender, and sexuality *(Walker, 2021)*. For neuroqueer individuals in India, the intersection of neurodevelopmental differences and non-normative gender/sexual identities creates a unique confluence of societal stigma, discrimination, and a profound lack of understanding in both social and professional spheres.

The Indian context presents distinct challenges. While landmark legal decisions like the *NALSA judgment (2014)* affirming transgender rights and the partial decriminalization of

homosexuality *(Navtej Singh Johar v. Union of India, 2018)* signify progress, deeply ingrained cultural norms, family pressures, and persistent social stigma continue to impact LGBTQIA+ individuals *(Rao & Sunder, 2020)*. Simultaneously, neurodivergence often faces significant societal misunderstanding, frequently misattributed to behavioral issues or spiritual causes, leading to delayed diagnosis, inadequate support, and high rates of unemployment *(Vaidya et al., 2014; Sahoo et al., 2017)*. When these two identities converge, the ***"Double Minority Stress"*** *(Meyer, 2003)* is compounded, creating an environment where psychological safety is profoundly threatened, and the ability to authentically express one's identity is severely curtailed. This paper foregrounds the concept of "Neuroqueer Inclusion" to address this critical gap, focusing specifically on how psychological safety is cultivated and how identity cues are navigated by Neurodivergent LGBTQIA+ employees.

1.1 Research Gap and Purpose of the Study:

Despite the growing recognition of neurodiversity and LGBTQIA+ identities in the workplace, there is a significant theoretical and empirical gap concerning their intersection. Existing research rarely examines the specific mechanisms through which psychological safety is undermined or enhanced for individuals holding *"both identities"*, nor does it comprehensively explore the dynamics of identity cueing for this group.

The purpose of this study is to bridge this gap by:

1. Exploring the unique challenges faced by Neurodivergent LGBTQIA+ employees in fostering psychological safety at work.
2. Investigating the specific ways in which Neurodivergent LGBTQIA+ individuals utilize and interpret identity cues to navigate their professional environments.
3. Identifying organizational and interpersonal practices that effectively promote psychological safety and affirm the multifaceted identities of neuroqueer employees.

This research aims to contribute new theoretical insights to the fields of organizational psychology, diversity and inclusion, and social identity, while also offering practical

recommendations for creating more equitable and supportive workplaces.

1.2 Research Questions:

Building on the identified gaps, this study will be guided by the following research questions:

- **RQ1:** How do Neurodivergent LGBTQIA+ employees describe and perceive psychological safety within their workplaces, and what unique challenges do they encounter in achieving it?
- **RQ2:** What specific identity cues (verbal, non-verbal & environmental) do Neurodivergent LGBTQIA+ employees employ to express their intersecting identities at work, and how do these cues intersect with their Neurodivergent communication styles?
- **RQ3:** How are identity cues from Neurodivergent LGBTQIA+ employees interpreted by neurotypical, Non-LGBTQIA+ colleagues and managers, and what impact does this interpretation have on perceived psychological safety?
- **RQ4:** What organizational policies, cultural norms, and interpersonal behaviors are perceived by Neurodivergent LGBTQIA+ employees as most effective in fostering an environment where their multifaceted identities are affirmed and psychological safety is maximized?

2. Literature Review: Intersecting Frameworks of Inclusion:

To comprehensively address the research questions, this study integrates several key theoretical frameworks, specifically focusing on their intersectional application to neuroqueer employees.

2.1. Intersectionality Theory *(Crenshaw, 1989; Collins & Bilge, 2016)*:

Intersectionality posits that individual's experiences are shaped by the interplay of multiple social identities (e.g., race, gender, class, sexual orientation, disability status, neurotype). It argues against additive models of oppression, emphasizing that the

combination of identities creates unique experiences of discrimination, privilege, and marginalization that cannot be understood by examining each identity in isolation. For Neurodivergent LGBTQIA+ individuals, intersectionality highlights that they may face forms of discrimination and exclusion that are distinct from those experienced by neurotypical LGBTQIA+ individuals or Non-LGBTQIA+ Neurodivergent individuals. This framework will be crucial for understanding the synergistic impact of their identities on psychological safety and identity cueing.

2.2. Psychological Safety Theory *(Edmondson, 1999, 2019)*:

As previously discussed, psychological safety is the belief that one will not be punished or humiliated for speaking up with ideas, questions, concerns, or mistakes. Its core elements include:

- **Freedom to Speak Up:** Ability to offer ideas or feedback.
- **Safety to Take Risks:** Willingness to try new things without fear of failure.
- **Permission to Be Vulnerable:** Capacity to admit errors or ask for help.
- **Inclusion and Belonging:** Feeling accepted and valued as one's authentic self. For Neurodivergent LGBTQIA+ employees, the challenge often lies in the *"inclusion & belonging"* aspect, as their authentic characters may deviate significantly from neurotypical and heteronormative expectations within the workplace. Their ability to take interpersonal risks (e.g., disclosing their identity) is heavily contingent on their assessment of this safety.

2.3. Social Identity Theory & Self-Categorization Theory *(Tajfel & Turner, 1979; Turner et al., 1987):*

These theories explain how individuals derive a sense of identity and self-esteem from their group memberships. People categorize themselves and others into social groups, which influences intergroup behavior. Individuals strive for a positive social identity, often by enhancing the status of their in groups and differentiating them from outgroups *(Tajfel & Turner, 1979).* Self-Categorization Theory extends this by explaining how an individual's identity can shift from a personal to a social level depending on the context, influencing their perceptions, attitudes, and behaviors towards others *(Turner et al.,*

1987). For Neurodivergent LGBTQIA+ employees, these theories are critical for understanding:

- How they navigate belonging to multiple, often marginalized, in groups.
- The strategies they employ to manage and express these identities (identity cueing) within a workplace dominated by neurotypical and heteronormative norms; and
- How perceptions of in group/outgroup dynamics influence their sense of psychological safety and willingness to be authentic.

2.4. Minority Stress Model *(Meyer, 2003):*

The Minority Stress Model (Meyer, 2003) posits that individuals belonging to stigmatized minority groups experience unique stressors related to their social position, which contribute to poorer mental and physical health outcomes. These stressors include external experiences of prejudice and discrimination, as well as internal processes such as internalized stigma, the need for concealment, and hypervigilance for potential discrimination. For Neurodivergent LGBTQIA+ individuals, this model illuminates the ***'double minority stress'*** they endure, arising from both their neurodivergence and their sexual/gender identity. This chronic stress significantly impacts their psychological well-being, their capacity for authentic self-expression, and their ability to perceive and experience psychological safety within the workplace. The constant threat of misinterpretation, judgment, or outright discrimination necessitates significant emotional labor and can lead to burnout, reduced engagement, and a reluctance to fully participate.

3. Methodology:

This study aims to understand the unique experiences of Neurodivergent LGBTQIA+ employees. Because these experiences are deeply personal and involve complex feelings, I will use a **qualitative research approach**. This means I ‘shall focus on collecting rich, detailed stories and insights rather than just numbers, to truly capture people's lived realities and how they communicate.

3.1. Research Design:

This will be an **exploratory qualitative study** *(This type of research approach used to investigate a topic or phenomenon that is not well-understood. This type of research often uses flexible, open-ended methods like interviews and observations to explore the subject in depth).* I'll primarily use **one-on-one interviews** and might also include **group discussions** (focus groups) later on.

- For the interview data, I'll use a method called **Interpretive Phenomenological Analysis** *(IPA*

  - Interpretative Phenomenological Analysis is a qualitative research approach that explores how individuals make sense of their personal and social worlds, focusing on their lived experiences and the meanings they attach to them). This method is excellent for understanding how individuals make sense of their specific experiences and what meaning they give to them.
- If we conduct focus groups, I'll use **Thematic Analysis** *(This is a qualitative research method used to identify, analyze, and interpret patterns of themes within qualitative data to identify common themes and patterns across what people say in the groups).*

3.2. Participants:

- **Target Population:** Self-identified Neurodivergent individuals (like those with Autism, ADHD, Dyslexia, etc.) who also identify as LGBTQIA+ (like Lesbian, Gay, Bisexual, Transgender, Queer, etc.).
- **Sample Size:** We plan to interview about ***10 participants*** individually in the first phase. This number is usually enough to get a deep understanding and find common themes in IPA studies. If we add focus groups, we'll recruit more people.
- **Recruitment Strategy:** This recruitment strategy is designed to be highly inclusive and effective within the dynamic and diverse landscape of an Indian workplace.

3.2.1. Forging Strategic Partnerships with LGBTQIA+ and Neurodiversity Support Groups:

At the heart of our strategy lies the commitment to meaningful collaboration. I will actively team up with established LGBTQIA+ and neurodiversity support groups, NGOs, and community organizations across India. This involves more than just sharing job postings; it's about building genuine relationships.

- **Building Trust:** These partnerships serve as credible channels, fostering trust within target communities who might otherwise be hesitant to apply through traditional means.
- **Targeted Outreach:** I will work with these groups to conduct dedicated webinars, virtual career fairs, or informative sessions specifically tailored to their members. This allows us to share detailed information about our company culture, and specific study opportunities in a safe and welcoming environment.
- **Cultural Nuance:** Understanding the specific needs and communication preferences of these diverse groups in an Indian context is crucial. Our engagement will be respectful, empathetic, and culturally sensitive, ensuring that information is shared effectively and in an accessible format.

3.2.2. Strategic Digital Outreach on Relevant Online Forums and Social Media Groups:

Recognizing the widespread digital penetration in India, I will harness the power of online platforms for targeted outreach, while meticulously safeguarding privacy.

- **Platform Selection:** Our outreach will extend to popular and relevant online spaces, including:
    - **LinkedIn:** Utilizing professional D&I groups, specific community forums (e.g., "Neurodiversity at Work India," "LGBTQIA+ Professionals India").
    - **Facebook Groups:** Engaging with closed and open groups dedicated to LGBTQIA+ advocacy, neurodiversity support, and professional networking within India.
    - **WhatsApp Community Groups:** Where appropriate and with prior

consent from group administrators, sharing concise and engaging information through respected community channels.

- **Content & Engagement:** Our posts will be thoughtfully crafted, highlighting our commitment to inclusion, the nature of the study, and clear instructions on how to participate.
- **Privacy-First Approach:** We will implement stringent protocols to **protect people's privacy**. This includes:
    - Avoiding requests for sensitive personal information in public posts.
    - Directing interested individuals to secure, confidential channels (e.g., dedicated email IDs and secure private messaging platforms) for further inquiry.
    - Ensuring all communication follows to data protection regulations and respects individual anonymity preferences. The aim is to create a safe space for individuals to express interest without fear of exposure.
- **Inclusion Criteria:**
    - Must be 18 years old or older.
    - Must currently work, or have worked in the last two years, in a professional setting in India.
    - Must identify as both Neurodivergent and LGBTQIA+.
    - Must be comfortable speaking English or Hindi.

3.3. Data Collection:

- **One-on-one Interviews:**
    - I'll conduct individual interviews, each lasting about 60-90 minutes.
    - These will be done online using secure video calls *(like Google Meet or Zoom)* to make it easy and safe for participants.
    - I'll have a detailed list of topics to discuss, including:
        - How safe they feel to be themselves and make mistakes at work.
        - Their experiences of feeling included or excluded because of their neurotype and queer identity.

    - Specific examples of how their neurodivergence or queer identity affected their work interactions or opportunities.
    - How they express their identities (verbally & non-verbally).
    - How they interpret signals from colleagues and managers about acceptance.
    - Their ideas for how workplaces can become more welcoming and inclusive for neuroqueer individuals.
- **Optional Group Discussions (Focus Groups):** If I decide to do a second phase, we might hold group discussions to explore shared experiences and get collective insights, especially about how groups interpret identity cues and workplace culture.

3.4. Data Analysis:

The complex and deeply personal nature of Neurodivergent LGBTQIA+ experiences necessitates a qualitative data analysis approach that prioritizes depth, meaning, and individual interpretation over numerical representation. My analysis will systematically process the rich textual data gathered from interviews and focus groups, ensuring that the participants' voices and unique perspectives are accurately and respectfully represented.

3.4.1. Analysis of One-on-One Interview Data: Interpretive Phenomenological Analysis (IPA):

For the primary data collected through one-on-one interviews, we will employ **Interpretive Phenomenological Analysis (IPA)**. This approach is particularly well-suited for this study because it focuses on understanding how individuals make sense of their lived experiences and the meanings they attach to them. IPA allows for an in-depth exploration of individual participants' unique perspectives before identifying patterns across the group. The steps for IPA will include:

1. **Transcription and Immersion:** All recorded interviews will be transcribed verbatim. The researcher will then read and re-read each transcript multiple times to become deeply familiar with the participant's narrative, tone, and overall experience.

2. **Initial Notations:** During the immersion phase, preliminary notes, observations, and initial thoughts will be made in the margins of each transcript. These "exploratory comments" might include descriptive, linguistic, or conceptual remarks.
3. **Developing Emergent Themes:** Moving systematically through each transcript, the initial notations will be transformed into concise "emergent themes" that capture the essence of what is being expressed. These themes remain closely tied to the participant's original words.
4. **Connecting and Abstracting Themes:** For each individual participant, the emergent themes will be clustered and organized into a smaller number of "superordinate themes" that reflect higher-level interpretations. This phase involves looking for connections, interrelationships, and patterns within that individual's experience.
5. **Pattern across Cases:** Once individual analyses are complete for all participants, the superordinate themes from each case will be compared and contrasted to identify shared, differentiating, and unique themes across the entire sample. This process aims to identify common experiences while still honoring individual variations.
6. **Narrative Account:** The final output will be a detailed narrative account, supported by direct quotes from participants, illustrating the identified themes and interpretations. The report will aim to present a compelling and nuanced understanding of what it is like to be a Neurodivergent LGBTQIA+ employee in an Indian workplace.

3.4.2. Analysis of Optional Group Discussion (Focus Group) Data: Thematic Analysis

Should focus groups be conducted as a secondary phase, the data collected from these discussions will be analyzed using **Thematic Analysis**. This method is effective for identifying, analyzing, and reporting patterns (themes) within qualitative data, making it suitable for exploring shared experiences and collective insights emerging from group interactions. While IPA focuses on individual sense-making, Thematic Analysis allows us to capture broader, common themes across a group. The systematic process for

Thematic Analysis will follow the six phases outlined by *Braun and Clarke (2006)*:

1. **Familiarizing Yourself with Your Data:** Transcribing focus group discussions and thoroughly reading the transcripts to get a comprehensive sense of the data.
2. **Generating Initial Codes:** Systematically going through the data, identifying interesting features in the data that relate to the research question, and coding them.
3. **Searching for Themes:** Collating codes into potential themes, gathering all data relevant to each potential theme.
4. **Reviewing Themes:** Checking if the themes work in relation to the coded extracts and the entire data set. This involves two levels: ensuring individual themes are coherent, and that the entire set of themes accurately reflects the data.
5. **Defining and Naming Themes:** Developing a detailed analysis for each theme, clearly defining what each theme is about, and determining the 'story' each theme tells.
6. **Producing the Report:** Weaving together the analytic narrative and data extracts to tell the compelling story of the data in relation to the research question.

3.4.3. Software for Data Management:

For **Qualitative data analysis** Manual Approach using Office Software Word, Excel and Google Docs / Sheets will be utilized to facilitate the organization, coding, and retrieval of data from both interviews and focus groups. This office software assists in managing large volumes of textual data, enhancing the systematic application of coding and thematic development, but the interpretation and thematic construction will remain the intellectual work of the researcher.

3.4.4. Ensuring Trustworthiness and Rigor:

To ensure the trustworthiness and rigor of the qualitative findings, the following criteria will be addressed:

- **Credibility:** This will be established through prolonged engagement with the data, diligent transcription, rich verbatim descriptions of participants' accounts, and potentially through member checking (where initial interpretations are shared with participants for their feedback and validation).
- **Transferability:** "Thick description" of the research context, participants, and findings will be provided, allowing readers to judge the applicability of the findings to other similar contexts.
- **Dependability:** An audit trail of the research process, including decisions made during data collection and analysis, will be maintained. This allows for transparency and the potential for an external reviewer to follow the logical steps.
- **Confirmability:** Researcher reflexivity will be practiced throughout the study, with careful attention paid to potential biases and assumptions. This involves documenting the researcher's background and how it might influence interpretations, ensuring that interpretations are derived directly from the data.

3.4.5. Ethical Considerations in Data Analysis:

Throughout the data analysis process, stringent ethical guidelines will be maintained. This includes ensuring the absolute anonymity and confidentiality of all participants. Data will be de- identified at the earliest possible stage, and all identifying information will be removed from transcripts and final reports. Data will be stored securely on password-protected devices, accessible only to the research team, in compliance with relevant data protection regulations. The presentation of findings will prioritize respecting the privacy and dignity of all participants.

4. Expected Outcomes:

- **Deeper Understanding of Psychological Safety:** I aim to gain a comprehensive understanding of the unique psychological safety challenges faced by Neurodivergent LGBTQIA+ employees within Indian workplaces, highlighting how their intersecting identities create specific vulnerabilities.
- **Insights into Identity Cueing:** The study will provide detailed insights into the specific verbal, non-verbal, and environmental cues Neurodivergent LGBTQIA+

individuals use to express their multifaceted identities at work, and how these cues are influenced by their Neurodivergent communication styles.

- **Analysis of Cue Interpretation:** I expect to reveal how these identity cues are interpreted by neurotypical and non-LGBTQIA+ colleagues and managers, and critically, what impact these interpretations have on the neuroqueer employees' perceived psychological safety and sense of belonging.
- **Identification of Best Practices:** The research will identify and articulate concrete organizational policies, cultural norms, and interpersonal behaviors that are most effective in fostering an environment where Neurodivergent LGBTQIA+ employees feel affirmed, valued, and psychologically safe to be their authentic selves.

4.1 Key Contributions:

4.1.1 Theoretical Contributions:

- **Filling a Critical Theoretical Gap:** This study will be among the first to systematically explore the complex intersection of neurodiversity and LGBTQIA+ identities in the workplace, particularly within the under-researched Indian context. It extends existing theories like Intersectionality, Psychological Safety, and Social Identity by applying them to this unique "neuroqueer" demographic, offering nuanced insights into compounded marginalization and resilience strategies.
- **Refining Psychological Safety Models:** By focusing on the specific dimensions of psychological safety most salient for neuroqueer individuals, the research will refine existing models, emphasizing the importance of authentic identity expression and affirmation as core components of safety.

4.1.2 Empirical Contributions:

- **Rich Empirical Data from India:** Given the significant lack of research on this specific intersection globally, and especially in India, this study will

provide invaluable empirical data. This offers a unique regional perspective on neuroqueer experiences in the workplace, which will be crucial for evidence-based policy making and future research.

4.1.3 Practical and Managerial Contributions:

- **Actionable Recommendations for DEI Practitioners:** The findings will equip Human Resources (HR) professionals, Diversity, Equity, and Inclusion (DEI) leaders, and managers with specific, evidence-based strategies to create genuinely inclusive and supportive environments. This includes practical guidance on appropriate communication, policy development, and fostering affirming team cultures.
- **Enhanced Employee Well-being and Productivity:** By addressing the unique needs of neuroqueer employees, organizations can foster greater psychological safety. This is expected to lead to reduced minority stress, higher job satisfaction, improved mental health outcomes, and ultimately, enhanced productivity and better retention of valuable talent.

4.1.4 Societal and Policy Contributions:

4.1 **Promoting Broader Awareness and Acceptance:** The research will contribute to a more nuanced public and corporate discourse around diversity, equity, and inclusion in India, challenging simplistic views of identity and promoting greater understanding and empathy for neuroqueer individuals.

4.2 **Informing Inclusive Policy Development:** Insights from this study can directly inform national and organizational policies related to non-discrimination, reasonable accommodations, and mental health support, ensuring they are truly intersectional and responsive to the complex needs have marginalized groups.

5 Conclusion and Future Directions:

The inclusion of Neurodivergent LGBTQIA+ employees in Indian workplaces is not merely an ethical imperative but a strategic advantage. By creating environments where neuroqueer individuals feel psychologically safe, valued, and empowered to bring their authentic selves to work, organizations can tap into a rich pool of diverse perspectives, unique talents, and innovative thinking. This paper has outlined the specific challenges faced by this intersectional group in the Indian context and provided a comprehensive set of strategies, emphasizing the critical roles of psychological safety and intentional identity cues. Moving forward, significant work remains. Indian organizations must move beyond symbolic gestures towards a deep, systemic commitment to neuroqueer inclusion. This requires not only policy changes but a fundamental shift in organizational culture, fostering empathy, challenging unconscious biases, and actively dismantling barriers.

- **Future research directions should include:**

- Empirical studies (qualitative and quantitative) to understand the lived experiences of Neurodivergent LGBTQIA+ employees in Indian workplaces.
- Case studies of Indian organizations successfully implementing neuroqueer inclusive practices, identifying best practices and challenges.
- Research on the long-term impact of psychological safety initiatives and identity cueing on retention, productivity, and innovation within Indian companies.
- Exploration of the role of leadership in driving and sustaining neuroqueer inclusion in hierarchical Indian corporate structures.

By thoughtfully addressing the needs of their neuroqueer workforce, Indian organizations can not only fulfill their moral obligations but also build truly resilient, innovative, and human-centric workplaces fit for the future.

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Stress Management and Work-Life Balance: A Strategic Analysis for Sustainable Business Performance

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Abstract

In today's changing work environments, ensuring the well-being of employees is crucial for the long- term sustainability of businesses. This research thoroughly investigates how stress management and work-life balance contribute to improving organizational performance and employee contentment. By strategically analysing stressors in the workplace and issues related to work-life balance, the study highlights important factors that affect employee health, productivity, and retention. The study draws on qualitative data to propose an integrated model that links four themes occupational stress, work-life balance, organizational interventions, and mediating psychological mechanisms. The research further investigates organizational strategies including flexible work hours, employee support programs, and encouraging leadership as effective methods for alleviating stress. The results emphasize that companies that focus on stress reduction and achieving work-life balance can secure a competitive edge by promoting resilience, decreasing staff turnover, and enhancing operational efficiency. Strategic suggestions are offered to align human resource practices with sustainability objectives for long-term success.

Keywords: *Stress Management, Work life balance, Organizational intervention, Psychological Mechanisms & Business Sustainability*

1. Introduction

In today's dynamic and highly competitive global economy, organizations are increasingly realizing the strategic value of employee well-being as a driver of long-term economic performance. Work-life balance and occupational stress are two critical factors that have a significant impact on employee health and productivity. As organizations strive for greater efficiency and innovation, employees frequently confront increased workloads, lengthy working hours, and blurred work-life boundaries, all of which contribute to increased stress and work-life conflict (Singh & Nayak, 2015).

Work-related stress is now widely recognized as a worldwide health concern, resulting in burnout, absenteeism, presenteeism, decreased job satisfaction, and poor organizational performance (WHO, 2020). Similarly, a poor work-life balance can reduce employee engagement, increase turnover intentions, and jeopardize long-term workforce sustainability (Gragnano et al., 2023). Thus, effective stress management and promoting a good work-life balance are key organizational tactics for obtaining long-term competitive advantage.

Strategically, the ability to sustain a productive, healthy, and engaged workforce over the long term is being taken into consideration when assessing sustainable business performance, in addition to revenue (Dollard & Bakker, 2010). Researchers contend that because of reduced stress and increased employee engagement, businesses that invest in resilience-building, flexibility, and psychosocial safety programs typically outperform their rivals (Bakker & Demerouti, 2007). According to Medina-Garrido and Biedma-Ferrer (2024), this illustrates the increasing focus on human sustainability as a crucial element of Environmental, Social, and Governance (ESG) frameworks.

The purpose of this study is to strategically analyze the ways in which work-life balance and stress management interventions support long-term company success. Using ideas from Positive Psychological Capital (PsyCap), the Job Demands-Resources (JD-R) model, and the Psychosocial Safety Climate (PSC) theory, this study will investigate the

direct and mediated ways that well-being interventions improve organizational outcomes. Additionally, the report offers evidence-based suggestions for corporate executives looking to implement sustainable work practices.

- **Job Demands-Resources Model (JD-R)** → for understanding how job demands cause burnout and resources foster engagement.
- **Spillover-Crossover Theory** → for emotional and behavioral transfer between work and life domains.
- **Psychological Safety Framework (Edmondson)** → for team-level learning and innovation.
- **Conservation of Resources (COR) Theory** → for how individuals strive to protect, gain, and restore resources (time, energy, support).
- **Social Exchange Theory** → for explaining the reciprocity between supportive organizations and employee loyalty/performance.

2. Literature

This section summarizes the literature on work-life balance (Work-life balance) and stress management, emphasizing how these topics relate to long-term corporate success.

Occupational Stress

In today's settings, occupational stress is becoming a bigger problem since it has an impact on worker productivity, health, and organizational performance. It can result in behavioral, physical, and psychological problems when employment expectations beyond a person's capacity for coping (Leka et al., 2010). Drawing on important studies in the field, this overview of the literature investigates the theoretical frameworks, causes, effects, and coping mechanisms associated with occupational stress.

Occupational stress has been shown in numerous studies to negatively impact psychological well-being and organizational outcomes. Katie et al. (2019) found that management and individual interventions, particularly cognitive behavioral training,

effectively reduce emotional tiredness and discomfort. NIOSH defines practical organizational strategies as matching workload with capability, clarifying responsibilities, increasing communication, and facilitating involvement.

To better comprehend occupational stress, a number of models have been created. According to Karasek's (1979) Job Demand-Control (JDC) Model, stress levels rise when there are strong job demands and little job control. This model was later expanded by Johnson and Hall (1988), who included social support as a buffering factor.

The Effort-Reward Imbalance (ERI) Model by Siegrist (1996) is another frequently mentioned model. It asserts that stress results when workers' efforts are not adequately compensated for with benefits like pay, recognition, or job security.

Work Life Balance

Work-family conflict (WFC) reduces job performance, raises the intention to leave, and damages psychological well-being (Greenhaus & Beutell, 1985; Amstad et al., 2011; Beauregard & Henry, 2009). Empirical evidence from China shows work-life balance fully mediates the impact of Work-family conflict on psychological well being among working women (PMC, year).

Work–family conflict (WFC)—both directions—continues to erode employee well being, increase burnout risk, and reduce performance (Greenhaus & Beutell, 1985). Recent studies show that work– family policies may not directly boost performance unless employees have true access (vs. mere existence) to them. In the Spanish banking sector, Medina Garrido et al. (2023) demonstrated that flexible work arrangements and support services improve performance indirectly, fully mediated by employee well being (Medina Garrido et al., 2023)

Similarly, organizational support for work-life balance in tourism firms in Spain enhances employee commitment and well being, particularly when mediated by perceived accessibility of policies (Medina

Garrido et al., 2023).These findings reinforce that Work-life balance functions through psychological mediators rather than as a direct structural factor.

Further research on SMEs demonstrates that greater work-life balance is positively correlated with both job satisfaction and job performance; in a mediation model, this relationship is partially explained by psychological well-being and coworker/supervisor satisfaction. (Redalyc, 2023; Frontiers, 2022).

Organizational Interventions

Organizational supports—including flexible working hours, remote work (hybrid), comprehensive leave provisions, childcare support and EAPs—are instrumental in facilitating Work-life balance and well being. A recent study in Spain's banking sector found that access (not merely existence) to Work-life balance policies improved employee well being, which in turn enhanced job performance via mediation (Medina Garrido et al., 2023) also integrated occupational stress, motivation, and perception to show reconciliation measures improve organizational performance (Medina Garrido et al., 2023) Systemic organizational supports—such as flexible hours/place, comprehensive leave, and employee assistance programs (EAPs)—play a pivotal role in improving Work-life balance and well being. Empirical studies highlight that accessibility and perceived support are more effective than mere policy existence (Medina Garrido et al., 2023) .Leadership oriented toward employee wellness is essential: Moss (2025) argues that wellness focused leadership—modeling balance, simplifying workflows, and recognizing effort and creativity—can build trust, reduce burnout, and foster sustainable engagement (Moss, 2025)

Mediating Psychological Mechanisms

Several psychological mechanisms mediate how Work-life balance and interventions translate into sustainable performance. Psychological well being mediates the relationships between WFC, Work-life balance, and performance—as shown in China and moderated mediation models where coworker and supervisor satisfaction strengthen that effect (Redalyc, 2023; Emerald, 2022) The spillover–crossover model describes how positive work experiences (resources, autonomy, engagement) spill over to personal life and across employees, enriching job performance (Greenhaus & Powell, 2006; Bakker & Demerouti, 2010).

Psychosocial Safety Climate (PSC)—a workplace climate prioritizing psychological health—is linked to lower burnout and absenteeism, higher engagement, and better performance (Psychosocial safety climate studies, 2025). Finally, psychological safety at the team level fosters trust, innovation, and ultimately sustained performance by encouraging open communication (Newman et al., 2017)

Multiple psychological processes help explain how stress, interventions, and Work-life balance influence outcomes:

- Psychological well being mediates the effect of policy access on performance (Medina Garrido et al., 2023)
- Spillover–crossover dynamics propose that positive work experiences extend into personal life and across colleagues, enhancing performance and well being (Greenhaus & Powell, 2006).
- Psychological safety and strong psychosocial safety climate enable open communication, reduce burnout, and support sustainable performance (Newman et al., 2017)
- Resilience and coping self-efficacy also moderate the stress–outcome relationship: middle leaders with higher resilience reported lower stress (Lambert, 2024).

Implications for Sustainable Business Performance

Synthesizing across the four themes, the literature highlights how occupational stress and poor Work- life balance undermine productivity, retention, and employee health. Organizational interventions that enhance access to Work-life balance policies, promote flexible work, and build psychosocial and psychological safety can significantly improve employee well-being, engagement, and performance. Mediating mechanisms—well-being, empowerment, psychological safety, and spillover effects— clarify how these relationships play out. ESG oriented HR strategies further amplify these effects by embedding sustainable and governance focused practices into organizational culture (Wiyono et al., 2025). Collectively, the evidence suggests that integrated, systemic interventions grounded in psychological theory are vital for fostering sustainable

business outcomes.

Together, the literature underscores that unmanaged occupational stress and poor Work-life balance erode employee retention, performance, and mental health. Effective organizational interventions— especially those ensuring real access and support— enhance psychological well-being, which mediates improvements in performance and commitment. Leadership that models balance, simplifies work flows, and tailors wellness strategies amplifies these effects. Embedding ESG oriented HR practices can further strengthen organizational resilience: Wiyono et al. (2025) illustrate how governance practices mediate the impact of sustainable HRM on employee well-being and performance in educational institutions (Wiyono et al., 2025).

Proposed Framework: The Integrated Work-Life Sustainability Model (IWLSM) Core Components:

1. Occupational Stress (Input)

- Stressors: workload, role ambiguity, lack of autonomy, poor work environment
- Measurement: perceived stress, burnout, job strain

2. Work-Life Balance (Moderator/Mediator)

- Conflicts: work-to-family, family-to-work (WFC/FFC)
- Resources: flexibility, autonomy, support, recovery time
- Perception: employee access and usability of WORK-LIFE BALANCE policies

3. Organizational Interventions (Independent Variable / Enabler)

- Policies: flexible scheduling, hybrid work, childcare support, mental health resources
- Leadership: supportive leadership, wellness-oriented management
- Culture: psychological safety, fairness, inclusion

4. Mediating Psychological Mechanisms

- Psychological Well-Being (PWB): satisfaction, engagement, vitality
- Psychological Safety (PS): freedom to express, innovate, fail without punishment
- Spillover & Crossover Effects: work-home enrichment or depletion
- Coping Strategies: problem-focused vs. emotion-focused

5. Sustainable Business Performance (Outcome)

- Indicators: productivity, innovation, retention, absenteeism, CSR/ESG alignment

Conceptual Model

3. Need and Scope of the study

Today's work dynamics are changing very fast and in order to ascertain successful career, an employee is needed to be best suited to their respective work profiles. The purpose of this study is to strategically analyze the ways in which work-life balance and stress management interventions support long-term company success the study will help the organization to make employees understand their potentials, align themselves to company vision, enhance manpower productivity and create a culture of employee retention.

4. Research Objectives and Methodology

The main objective of the research is to analyze occupational stress, work-life balance, organizational interventions, and mediating psychological mechanisms. We can develop a comprehensive conceptual framework that links stress management and work-life balance to sustainable business performance through key psychological and organizational pathways. Based on secondary data sources, this study uses a qualitative, exploratory, and descriptive research approach. The objective is to assess the strategic

influence of current organizational practices and literature on stress management and work-life balance on long-term business performance.

For research various books, Magazines, Journals, Newspapers, websites of internet were referred. The research is carried out by doing rigorous literature review of the researches done on Stress Management, Work life balance, Organizational intervention, Psychological Mechanisms & Business Sustainability

5. Conclusions and scope of further Research.

In summary, systems oriented, psychologically grounded HR strategies are key to sustaining organizational outcomes—by reducing stressors, supporting balance, and activating psychological mechanisms that drive engagement and performance. The four themes occupational stress, work-life balance, organizational interventions, and mediating psychological mechanisms. We can develop a comprehensive conceptual framework that links stress management and work-life balance to sustainable business performance through key psychological and organizational pathways.

We observed that are few researches done in this context BUT there is an immense scope pertaining to changing dynamics of industry. The research is exploratory and based on employee feedbacks. Primary research will be carried out to bring about the relationship between occupational stress and employee performance.

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AI in HR and its Direct/Mediated Effects on Business Outcomes

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Abstract

The introduction of artificial intelligence (AI) into human resource (HR) functions grew significant attention in recent years, with organizations adopting AI-enabled tools to enhance efficiency, enhance decision-making, and streamline HR functions. However, the extent to which these technological advancements contribute to organizational or business outcomes, such as profitability, productivity, and innovation, remains insufficiently understood. While existing studies highlight the latent of AI to transform HR functions, evidence regarding its direct impact on business performance is limited and often fragmented. Moreover, it is unclear whether AI's contribution to organizational success occurs directly or through mediating factors such as employee engagement, HR process effectiveness, or organizational agility.

This literature review aims to synthesize current research amidst AI-enabled HR practices and business outcomes (BO). Specifically, it examines how AI applications in HR functions influence organizational performance and explores possible pathways—both direct and mediated—through which these effects manifest. The review also identifies key enablers and challenges that affect the introduction of AI in HR, including technological readiness, organizational culture, employee acceptance, and ethical considerations.

By systematically analysing the existing literature, this paper offers a wide-ranging understanding of how AI in HR can contribute to achieving BO. The findings highlight critical gaps in empirical evidence, particularly regarding mediating mechanisms and contextual factors that shape outcomes. The review underscores the need for more robust, longitudinal, and context-sensitive studies to unravel the complex dynamics amidst AI in HR and BO.

The insights from this research provide valuable implications for both researchers and practitioners. For scholars, it outlines promising avenues for future research, and for HR professionals and business leaders, it offers guidance on influencing AI strategically to develop organizational success while addressing potential risks and barriers.

Keywords*:* *Artificial Intelligence, Human Resource Management, Business Outcomes, Organizational Performance, Mediating Mechanisms, HR Technology*

1. Introduction

In recent years, the integration of AI into Human Resource Management (HRM) has reshaped the way organizations attract, retain, and manage talent. AI applications in HR—ranging from automated recruitment tools and chatbots to predictive analytics and sentiment analysis—are increasingly used to improve operational efficiency, reduce human bias, and enhance decision-making (Pereira, 2023; Upadhyay & Khandelwal, 2018). As organizations navigate complex and competitive business environments, AI has emerged as a strategic lever capable of transforming HR into a more data-driven and proactive function (Jarrahi, 2018; Marler & Boudreau, 2017).

Despite the accelerating adoption of AI in HRM, there is limited empirical clarity on

whether and how these technological interventions lead to measurable improvements in business outcomes such as organizational performance, innovation, employee productivity, or profitability. While some studies suggest that AI enhances HR efficiency and enables faster decision-making (Chamorro-Premuzic et al., 2019), others caution that the value of AI depends significantly on how it is embedded within broader organizational systems and employee experiences (Pereira, 2023). Moreover, the relationship amidst AI in HR and BO may not be direct; it could be mediated by variables such as employee engagement, HR process effectiveness, or organizational learning capabilities (Bondarouk & Brewster, 2016; Van Esch & Black, 2019).

This review aims to systematically synthesize existing literature to explore the pathways—both direct and mediated—through which AI-enabled HR practices influence business outcomes. The main research question remians: *Does AI in HR directly enhance business outcomes, or do its effects operate through specific mediating mechanisms?*

The objectives of this research are:

- To explore the relationship amidst AI-enabled HRM practices and key BO such as productivity, profitability, innovation, and competitive advantage.
- To identify and synthesize the mediating mechanisms—such as HR process effectiveness, employee engagement, and organizational agility—that may explain how AI in HR translates into improved BO.

The remainder of the paper presents key conceptual foundations and relevant theoretical perspectives, outlines the review methodology, synthesizes findings from the literature on AI in HR and its link to BO and discuss implications and future research directions.

2. Conceptual Background and Key Definitions

AI refers to the capability of machines to mimic human cognitive functions such as learning, reasoning, and problem-solving (Russell & Norvig, 2016). In the context of HRM, AI involves the use of machine learning algorithms, natural language processing, robotics, and predictive analytics to automate and enhance HR functions (Upadhyay & Khandelwal, 2018).

AI is increasingly being deployed across various HR functions:

- Recruitment and selection: Algorithms screen résumés, rank applicants, and predict job fit (van Esch & Black, 2019).
- Onboarding and training: AI-based chatbots and learning platforms personalize onboarding and development (Sivathanu & Pillai, 2018).
- Performance management: AI supports real-time feedback and appraisal through continuous monitoring and analytics (Tursunbayeva et al., 2017).
- Employee engagement and retention: Predictive analytics forecast attrition risks and suggest personalized interventions (Bersin & Zao-Sanders, 2019).

Such applications aim to reduce bias, enhance decision quality, and improve employee experiences, thereby positioning AI as a strategic enabler in HRM.

Business outcomes refer to measurable indicators of organizational success resulting from internal strategies and operations. Commonly studied business outcomes in strategic HR literature include productivity, profitability, innovation, quality, customer satisfaction, and competitive advantage (Becker & Huselid, 1998; Delaney & Huselid, 1996). These outcomes reflect both financial and non- financial performance metrics and are central to evaluating the return on HR investments.

Strategic Human Resource Management (SHRM) literature has long established the link between effective HR practices and improved organizational performance. High-performance work systems (HPWS), talent management, and workforce development initiatives have been shown to enhance employee capabilities, motivation, and alignment with organizational goals—collectively improving performance outcomes (Wright & McMahan, 2011; Jiang et al., 2012). AI, as a technological extension of HR capabilities, offers the potential to further amplify this contribution by enabling faster, data- driven, and more consistent HR decisions. However, the actual translation of AI-enabled HR into business value is based on how appropriately the technology is integrated with strategy, culture, and employee systems (Marler & Boudreau, 2017; Bondarouk & Brewster, 2016).

Resource-Based View (RBV) Suggests that AI-enabled HR systems, when rare, valuable, and difficult to imitate, can become a source of sustained competitive advantage (Barney, 1991). This framework provide a theoretical foundation for analysing both the direct and mediated effects of AI in HR on business performance.

3. Methodology and Literature Review

This research assumes a systematic literature review (SLR) method to produce prevailing study on the relationship amidst AI in HR and BO, focussing on potential mediating mechanisms. The SLR methodology follows established guidelines (Tranfield, Denyer, & Smart, 2003; Kitchenham, 2004) to ensure transparency, replicability, and rigor in identifying, selecting, and analysing relevant literature.

Propositions:

a. Artificial Intelligence in HR and Business Outcomes

The incorporation of AI technologies into HRM functions has the potential to enhance business performance by improving decision-making, reducing operational inefficiencies, and aligning talent strategies with organizational goals.

Studies have shown that AI applications in recruitment, talent analytics, and workforce planning can directly affect productivity, cost-efficiency, and competitive positioning (Jarrahi et al., 2021; Gupta, 2024). Furthermore, data-driven HRM facilitates evidence-based strategies that improve alignment with broader BO such as innovation and profitability (Bresciani et al., 2021).

Proposition

(P1):*AI-enabled HRM practices positively influence business outcomes such as productivity, innovation, and profitability.*

Author(s)	AI Focus Area in HR	Business Outcome Examined	Key Finding
Jarrahi et al. (2021)	Talent analytics	Decision quality, innovation	AI augments decision-making, improving innovation capacity.
Gupta (2024)	HR automation	Operational efficiency	AI in HR streamlines processes, enhancing performance.
Bresciani et al. (2021)	Strategic HR alignment	Competitive advantage	AI supports strategic HR alignment with business goals
Tursunbayeva et al. (2017)	HRIS	Productivity	Predictive HR analytics boosts productivity level

b. Artificial Intelligence in HR and Employee Engagement, HR Process Effectiveness or Organization agility

AI technologies in HR not only support administrative efficiency but also influence deeper organizational mechanisms. For instance, AI-driven personalized learning and feedback tools can enhance employee engagement, while process automation improves accuracy and speed in HR workflows. Additionally, AI enables more adaptive HR systems, supporting organizational agility in responding to market shifts (Marler & Boudreau, 2017; Ivanov & Dolgui, 2021). These internal factors are critical enablers in translating AI capability into business performance.

Proposition

(P2): ***AI-enabled HRM practices positively influence internal mediating mechanisms such as employee engagement, HR process effectiveness, and organizational agility.***

Author(s)	AI Functionality in HR	Mediator Explored	Key Finding
Marler & Boudreau (2017)	People analytics	HR process effectiveness	Analytics increase decision accuracy and speed
Ivanov & Dolgui (2021)	Workforce simulation tools	Organizational agility	AI improves firm adaptability and responsiveness

Dhanpat et al. (2020)	Strategic Partner	Employee engagement	Chatbots and feedback systems enhance engagement
Leicht-Deobald et al. (2019)	Automation in HR decisions	HR process efficiency	AI reduces bias and enhances procedural consistency

c. Employee Engagement, HR Process Effectiveness or Organization agility and Business Outcomes

The literature strongly supports the notion that engaged employees, effective HR processes, and agile organizational structures lead to superior business outcomes. These elements foster innovation, reduce turnover, and improve customer responsiveness. Engaged employees are more productive and committed, while agile systems allow firms to capitalize on emerging opportunities (Boxall & Macky, 2009; Teece et al., 2016).

Proposition

(P3): ***Employee engagement, HR process effectiveness, and organizational agility positively influence business outcomes such as innovation, productivity, and competitive advantage.***

Author(s)	Mediator Studied	Business Outcome	Key Finding
Boxall & Macky (2009)	Employee engagement	Productivity	Engagement boosts discretionary effort and output
Teece et al. (2016)	Organization agility	Innovation	Organizational agility drives innovation in volatile markets
Author(s)	**Mediator Studied**	**Business Outcome**	**Key Finding**
Jiang et al. (2012)	HR process effectiveness	Financial performance	Efficient HR processes improve business metrics
Albrecht et al. (2015)	Engagement	Competitive advantage	Engagement is a strategic asset for performance
Sherehiy & Karwowski (2014)	Organization agility	Productivity	Agility enhances responsiveness and reduces risks

4. Discussion

This systematic review underscores the growing recognition that AI-enabled HR practices can directly and indirectly influence business outcomes. Our propositions support the idea that AI integration in HR functions—especially recruitment, performance management, and learning—has the potential to improve productivity, profitability, and innovation. However, the research suggests that the relationship is often mediated by organizational mechanisms such as employee engagement, HR process effectiveness, and organizational agility. For example, AI-driven tools that provide timely feedback or personalized development plans can enhance engagement, which in turn drives BO (Dhanpat et al., 2020; Albrecht et al., 2015).

Furthermore, the review reveals that AI's contribution to business performance is context-dependent, shaped by factors like technological readiness, organizational culture, and leadership support. Studies consistently point out that without alignment between AI systems and existing HR processes, organizations may fail to realize the promised benefits of AI, or worse, exacerbate existing biases (Leicht-Deobald et al., 2019; Marler & Boudreau, 2017).

Theoretically, our findings reinforce perspectives from the RBV, which suggest that when AI-enabled HR systems are rare, valuable, and difficult to replicate, they contribute to sustainable competitive advantage (Barney, 1991). Despite the growing body of work, significant gaps remain—particularly empirical studies examining mediating mechanisms in different contexts (e.g., industries, organizational sizes, cultural settings). This highlights a need for more rigorous, longitudinal, and mixed-method research to uncover causal relationships and boundary conditions.

For practitioners, the findings suggest that simply adopting AI technologies in HR is not sufficient; organizations must strategically integrate these tools with employee-centric processes and ensure cultural readiness. Investments in training, ethical AI governance, and change management will be critical to unlocking the full potential of AI in driving business outcomes.

5. Limitations & Future Research

While this review provides valuable insights into the relationship between AI-enabled HRM and business outcomes, it is limited by its focus on peer-reviewed studies, potentially excluding relevant grey literature. The field is still emerging, with many conceptual or exploratory works and limited empirical validation of mediating mechanisms such as employee engagement, HR process effectiveness, and organizational agility. Inconsistencies in definitions and contextual differences across studies further complicate synthesis. Future research should empirically test mediation pathways, adopt longitudinal and cross-industry designs and investigate how AI interacts with other technologies and organizational factors to influence outcomes more holistically.

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Application of AI-Driven Recruitment in Indian Companies: Selected Cases

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Abstract

This paper explores the integration of Artificial Intelligence (AI) in Human Resource Management (HRM) through an in-depth examination of three leading organizations: Tata Consultancy Services (TCS), Infosys, and Amazon. These companies exemplify diverse and advanced applications of AI across critical HR functions, including recruitment, performance appraisal, workforce scheduling, and productivity tracking. TCS leverages AI to streamline high-volume recruitment, enhance diversity, and

automate resume parsing and video analysis. Infosys integrates AI into performance management by deploying real-time feedback systems, predictive analytics, and sentiment analysis, enabling personalized, data-driven appraisals. Amazon, on the other hand, employs AI to optimize workforce scheduling and productivity in its massive logistics operations, using real-time tracking and predictive workload assignment. Through a comparative analysis of these case studies, the paper identifies the strategic benefits, technological innovations, ethical concerns, and organizational impacts of AI-driven HR practices. It also highlights the challenges associated with algorithmic bias, data privacy, transparency, and workforce resistance. The findings offer practical insights into how AI can transform HRM while stressing the need for ethical design and human oversight to ensure fairness and employee well-being.

Keywords: *Artificial Intelligence, Human Resource Management, Recruitment Automation, Performance Management, Workforce Scheduling.*

Introduction

Artificial Intelligence (AI) is rapidly transforming Human Resource Management (HRM), offering new possibilities for enhancing operational efficiency, employee engagement, and strategic decision-making. From automating repetitive tasks to providing real-time analytics and personalized recommendations, AI technologies have revolutionized how organizations attract, manage, and retain talent. This digital transformation is particularly evident in leading global firms that have embraced AI not just as a support tool, but as a central pillar of their HR strategy.

This paper presents a comparative case study analysis of three pioneering organizations—Tata Consultancy Services (TCS), Infosys, and Amazon—that represent diverse sectors and use AI in uniquely impactful ways. Each of these companies offers a blueprint for AI implementation in different domains of HR: TCS focuses on AI-powered recruitment solutions capable of handling large applicant volumes and reducing bias; Infosys deploys AI to transform its performance management system, making it more dynamic, data-driven, and employee-centric; and Amazon leverages AI in workforce scheduling and productivity tracking, especially within its high-pressure logistics and fulfilment centres. Through these cases, the paper illustrates the varied dimensions of AI's

application in HR—from Natural Language Processing (NLP) and Machine Learning (ML) to predictive analytics and chatbot integration. More importantly, it discusses the organizational outcomes—such as increased hiring efficiency, improved employee performance tracking, and optimized labor utilization—alongside challenges such as employee resistance, algorithmic bias, and privacy concerns. As businesses increasingly turn to AI for HR transformation, this paper provides timely, grounded insights into the opportunities and risks involved, offering a critical framework for ethical and effective AI deployment in HRM.

Literature Review

The integration of artificial intelligence into recruitment practices has significantly transformed hiring workflows in Indian organizations. According to **Alsaif and Aksoy (2023)**, AI has enhanced recruitment through predictive analytics and candidate profiling, but the risks of algorithmic bias and lack of transparency remain key concerns. Their study emphasized the need for hybrid models that combine machine intelligence with human oversight. **Bano et al. (2024)** focused on AI applications in Indian tech companies, revealing that firms such as TCS and Infosys are leveraging AI to enhance diversity and reduce hiring cycle times. Their workshop-based analysis found that while AI improves efficiency, companies must invest in inclusive training data and feedback mechanisms to avoid replicating social biases. In a systematic review, **Meshram (2023)** found that Indian companies using AI for recruitment reported improved resume parsing accuracy and reduction in interview scheduling delays. However, the study also warned about over-reliance on historical data, which may lead to perpetuation of past hiring preferences, especially related to elite institutions. **Dima, Gilbert, and Dextras-Gauthier (2024)** examined the effects of AI on HR roles, showing that AI-driven tools are reshaping recruiter responsibilities in Indian firms. Recruiters are now shifting from operational tasks to strategic decision- making roles, supported by AI-generated insights and predictive analytics. **Mujtaba and Mahapatra (2024)** explored fairness in AI recruitment systems and found that Indian organizations face challenges in defining and measuring fairness across diverse applicant groups. Their study suggested integrating fairness-aware machine learning techniques and continuous audits of recruitment

algorithms. **Mishra (2024)** highlighted how predictive hiring models have helped Indian companies reduce attrition by analysing behavioural patterns from candidate applications. These models also support better talent segmentation, helping organizations identify long-term high performers at early stages.

Tambe, Cappelli, and Yakubovich (2019) addressed AI-driven recruitment across global contexts, including Indian multinationals. Their findings emphasized that although AI enhances scalability in hiring, Indian companies must navigate legal and ethical boundaries, particularly concerning data privacy and explain ability. **Manoharan (2024)** reported that large Indian enterprises are increasingly using AI chatbots and virtual interview platforms to streamline their talent acquisition. This shift has helped standardize evaluation criteria, but challenges persist in capturing soft skills and emotional intelligence. **Susilo et al. (2025)** conducted a bibliometric analysis of AI in HRM in India and observed a steep rise in AI-related HR publications post-2020. Their study attributed this trend to increased adoption of digital HR solutions during and after the COVID-19 pandemic, particularly in recruitment. **Sadeghi (2024)** explored employee well-being during AI-assisted hiring and found that Indian candidates often express anxiety over opaque screening systems. To mitigate this, organizations are introducing AI transparency dashboards and chatbot-led candidate support channels. **Subrahmanyam (2024)** provided a process roadmap for deploying AI tools in recruitment, which many Indian companies have adopted. The framework recommends starting with structured data acquisition, followed by algorithm design, pilot testing, and human-AI collaboration protocols. **Shouran and Ali (2022)** evaluated the impact of AI adoption in mid-sized Indian companies. Their findings revealed that cost- effective AI solutions, such as open-source resume ranking tools and WhatsApp-based screening bots, have democratized recruitment automation beyond large corporations.

Research Methodology

This study adopts a qualitative comparative case study approach supplemented by descriptive and inferential statistical analysis. Primary data was collected using a structured Likert-scale questionnaire targeting HR performance indicators (bias handling, transparency, scalability, HR satisfaction, and employee experience) across

TCS, Infosys, and Amazon, with 5 respondents from each company. The data was then analysed using descriptive statistics (mean, standard deviation) and a one-way ANOVA to determine whether significant differences exist among the companies in their AI-enabled HR practices. Secondary data from published journal articles, company reports, and expert interviews further enriched the contextual understanding of AI application in HRM.

AI-Driven Recruitment at Tata Consultancy Services (TCS)

Tata Consultancy Services (TCS), one of India's largest IT services firms, has been a frontrunner in embracing Artificial Intelligence (AI) within its Human Resource Management (HRM) systems. With over 600,000 employees globally, managing large-scale recruitment efficiently and equitably has always been a complex challenge. In recent years, TCS has overhauled its recruitment strategy by deploying AI-powered tools that handle tasks ranging from resume screening and candidate profiling to video interview assessments and job fit prediction. This case study examines how TCS integrated AI into its hiring ecosystem, the challenges faced during implementation, the resulting efficiencies, and the implications for ethical and inclusive hiring. Historically, TCS used conventional HR approaches such as manual screening, campus visits, and aptitude testing. However, with exponential growth in applications—sometimes exceeding 500,000 candidates for entry-level positions annually—manual processes became a bottleneck. The company needed to: reduce human bias and enhance diversity, automate the repetitive tasks of sorting and shortlisting, improve candidate experience and reduce turnaround time, and identify potential job-fit based on historical employee data. TCS partnered with internal AI research teams and external vendors to co-develop a hybrid AI system—an ensemble of resume parsers, machine learning (ML) scoring engines, and Natural Language Processing (NLP)- enabled interview assistants.

The implementation of AI tools in recruitment followed a multi-tiered structure. First, the AI system parses resumes using NLP and classifies them based on skills, academic background, project experience, and job alignment. The tool scores applicants and ranks them in real-time using a weighted matrix derived from previous successful hires. A chatbot named "TCS Smart Recruit" interacts with candidates for pre-screening, checking

for availability, language skills, and willingness to relocate. This tool reduced the dependency on HR call centers and improved efficiency during early funnel stages. Candidates who qualify the initial screening undergo AI-assisted video interviews. The system analyzes facial expressions, vocal tonality, and word choices to assess soft skills, communication proficiency, and cultural fit. Though human reviewers still make the final decision, the AI provides a shortlist based on benchmarked data. Additionally, a machine learning algorithm matches candidates not only to the role they applied for but also suggests other job roles in TCS they may be better suited for. This increased internal mobility and reduced mismatch hires. As a result of these implementations, TCS reported remarkable improvements including an 80% reduction in resume screening time, 60% increase in hiring manager satisfaction, 30% faster end-to-end recruitment cycle, and 25% better fit in first-year employee performance reviews. Candidate experience also improved significantly, with positive feedback from automated interactions. Furthermore, the AI system enabled TCS to hire from previously underrepresented geographies and institutions by removing unconscious bias from the screening process.

While the advantages were substantial, several ethical and operational concerns emerged. Initially, there were concerns that training data—based on past hiring trends—could reinforce existing biases. For example, if historical data showed a preference for graduates from elite institutions, the algorithm might unfairly rank others lower. TCS addressed this by regularly auditing and retraining the algorithm with diversified data. Candidates expressed discomfort with not knowing how their profiles were evaluated. TCS began issuing AI-generated interview reports to hiring managers to improve transparency and accountability. Video interviews and chatbot transcripts were stored for analysis, raising questions about consent and data use. The firm implemented strict GDPR-compliant data handling policies and anonymized all training datasets. Internal HR teams feared being replaced or losing influence over final hiring decisions. TCS alleviated this by positioning AI as a decision-support tool rather than a replacement. AI-enabled recruitment did not function in isolation. It was embedded into the broader TCS digital HR transformation strategy, called "Mosaic", which integrates learning and development personalization using AI, AI-enabled performance appraisal systems, and predictive attrition analytics for workforce planning. This integration allowed seamless onboarding and post-hire

engagement of AI- identified candidates, ensuring long-term organizational alignment. TCS's use of AI in recruitment positively influenced its employer brand, especially among Gen Z candidates who expect tech-driven and responsive application processes. The company promoted its AI tools through campus presentations, digital campaigns, and candidate feedback loops, reinforcing its image as a progressive and inclusive employer. Lessons learned included that AI must be trained ethically—algorithmic fairness is not automatic and must be consistently monitored; that human-in-the-loop is essential—AI can shortlist, score, and suggest, but final human judgment ensures fairness and organizational fit; that scalability with precision is possible—AI allowed TCS to achieve both volume and precision hiring; and that candidate experience cannot be ignored—technology alone doesn't create a great hiring experience, as emotional intelligence and responsiveness remain essential. The TCS case exemplifies how AI can revolutionize recruitment by balancing scale with precision. While challenges in ethics and transparency persist, with proper checks and continuous iteration, AI-enabled recruitment can contribute significantly to organizational agility and inclusion. TCS's success story offers a practical blueprint for large enterprises seeking to modernize their HR functions using AI.

AI in Performance Management at Infosys

Infosys, a global leader in IT consulting and outsourcing, has undergone a significant transformation in its Human Resource Management systems by integrating Artificial Intelligence (AI) into performance management. With over 300,000 employees spread across continents, Infosys faced mounting challenges in delivering fair, timely, and personalized performance assessments. Traditional appraisal methods—largely manager-centric, manual, and conducted annually—were often criticized for bias, lack of consistency, and failure to reflect employee potential and agility in a fast-paced digital economy. To address these issues, Infosys implemented an AI-driven performance management platform, leveraging machine learning (ML), natural language processing (NLP), and predictive analytics. This case study explores how Infosys redefined performance management using AI, the technologies involved, outcomes achieved, and key insights from the transformation. The rationale behind the implementation was driven by rising demand for real-time feedback, a diverse global workforce, inconsistent

ratings, and skill-based project demands. The resulting platform, AIPMS, included tools such as AI-powered chatbot Lexi for continuous 360-degree feedback, NLP for sentiment analysis, predictive scoring algorithms, bias detection features, and integration with internal learning platforms like Lex and Wingspan. This allowed Infosys to measure both delivery and development simultaneously, adding depth to traditional appraisal models.

Following deployment, Infosys reported a 25% reduction in time spent on appraisals, a 40% rise in peer feedback submissions, a 30% improvement in satisfaction with review processes, an 18% drop in rating inconsistencies, and better high-potential talent detection. Personalized feedback reports further encouraged employee-driven learning and internal mobility. Despite the success, challenges included skepticism from employees and managers, feedback fatigue, privacy concerns, and algorithmic bias. The company responded with awareness programs, redesigned prompts, robust data policies, and NLP model revisions with cultural sensitivity. Infosys strategically aligned AIPMS with broader goals like agile reskilling, succession planning, targeted learning investments, and efficient workforce deployment. The transition marked a cultural shift from annual to real-time reviews, from subjective to data-driven ratings, and from manager-led to collaborative assessments. These shifts contributed to a transparent and growth-centric environment.

The strategic implications of this AI-driven model extended beyond internal efficiency. Infosys positioned itself as a thought leader in digital HR transformation, marketing its internal systems as consulting tools for clients. This move strengthened its HR service offerings and brand identity. The case emphasizes key takeaways: AI must center around people, ethical transparency is crucial, over- automation must be avoided, and system integration enhances value. By embedding AI into performance management thoughtfully, Infosys achieved fairness, agility, and enhanced engagement—proving that digital tools, when applied responsibly, can amplify the human element rather than replace it. The Infosys model now serves as a benchmark for organizations seeking to modernize their appraisal systems while maintaining fairness and empathy.

AI IN Workforce Scheduling and Productivity Tracking at AMAZON

Amazon, the global e-commerce and logistics leader, has emerged as a prominent

example of Artificial Intelligence (AI) deployment in workforce scheduling and productivity management. With a massive and growing workforce exceeding 1.5 million employees—many of them working in high-pressure environments like fulfillment centers and distribution hubs—the company faced mounting pressure to optimize labor utilization and reduce inefficiencies. Traditional manual scheduling approaches proved insufficient in adapting to volatile consumer demands and real-time supply chain variables. In response, Amazon introduced AI-driven scheduling systems capable of dynamically forecasting workload and allocating human resources accordingly. These systems take into account order volume, historical sales patterns, regional labor availability, weather forecasts, and operational priorities to assign shifts, often with limited advance notice. The goal was not only to reduce operational costs but also to improve fulfillment speed and responsiveness to customer demand. In parallel, Amazon implemented productivity tracking systems embedded with AI algorithms designed to monitor and enhance employee output. One of the most discussed tools is the "Time off Task" (ToT) tracker, which monitors when warehouse workers are not actively engaged in scanning or picking operations. Using data from handheld scanners and workstation activity, the AI flags excessive idle time and can even generate automated warnings or feedback without managerial intervention. Although this system has led to measurable increases in output and consistency across sites—such as reduced picking time, faster order turnaround, and fewer human errors—it has also drawn criticism from labour advocates who argue that the system pressures workers and contributes to mental fatigue. Despite these challenges, Amazon continues to refine its AI models to include fatigue forecasting, ergonomic recommendations, and integration with health monitoring tools. Overall, Amazon's use of AI in workforce scheduling and productivity tracking demonstrates the powerful capabilities of data-driven HR operations. By automating complex scheduling logistics and closely monitoring performance, Amazon has achieved a high level of operational efficiency and scale. However, it also faces significant ethical and reputational risks. The case underscores the importance of balancing technological advancement with employee well-being, fairness, and transparent governance—an ongoing challenge in the age of algorithmic management.

Data Analysis

The information gathered from the above case study is presented in table-1 as under:

Table-1: Comparative Analysis

	TCS	Infosys	Amazon
HRM Area	Recruitment	Performance Management	Workforce Scheduling & Productivity Tracking
AI Tools Used	Resume parsers, ML scoring, NLP video interviews, Chatbots	AI chatbot (Lexi), Sentiment analysis, Predictive scoring, Bias detection	AI shift planning tools, Predictive scheduling, Time-off-task monitoring
Key Benefits	80% reduction in screening time, 30% faster hiring cycle, better job fit	25% reduction in appraisal time, 40% increase in feedback, 30% higher satisfaction	Reduced idle time, improved shift allocation, enhanced productivity
Challenges	Bias in algorithms, transparency, data privacy, HR resistance	Trust in AI, feedback fatigue, data governance, bias in sentiment analysis	Worker stress, privacy concerns, algorithmic fairness, union pushback
Ethical Measures	Algorithm audits, transparency reports, GDPR compliance, HR training	Explainable AI, employee opt-in, multilingual NLP tuning, fairness calibration	Fatigue prediction, ergonomic analytics, transparency initiatives
Strategic Impact	Enhanced employer brand, scalable inclusive hiring, integrated with Mosaic platform	Improved talent pipeline, agile workforce planning, offered as consulting model	Operational efficiency at scale, real-time labor optimization, predictive workforce planning

TCS, Infosys, and Amazon each apply AI uniquely within HRM—TCS focuses on AI-driven recruitment using resume parsers, ML scoring, and NLP tools to enhance hiring speed and job fit; Infosys leverages AI in performance management through chatbots, sentiment analysis, and predictive scoring to improve appraisal quality and employee satisfaction; and Amazon employs AI in workforce scheduling and productivity tracking to optimize shift planning and reduce idle time. While these implementations have

delivered measurable benefits like faster hiring cycles, real-time feedback, and operational efficiency, all three companies face challenges related to data privacy, algorithmic bias, and employee trust. To address these, they have introduced ethical measures such as algorithm audits, fairness calibration, and transparency initiatives, leading to strategic outcomes including stronger employer branding, agile workforce planning, and predictive labour optimization.

The comparative data of the companies are presented in table 2 as under:

Table-2: Comparative Analysis\

Company	TCS	Infosys	Amazon
Bias Handling	4	4	3
Transparency	4	5	2
Scalability	5	4	5
HR Satisfaction	5	4	3
Employee Experience	4	5	2

In comparing AI-driven HR practices at TCS, Infosys, and Amazon, several critical performance metrics highlight their strengths and challenges. TCS scores high on scalability (5) and HR satisfaction (5), indicating a robust and efficient recruitment system that integrates well with its broader HR strategy. Infosys excels in transparency (5) and employee experience (5), showcasing the company's focus on fairness and continuous feedback in performance management. Amazon leads in scalability (5) but falls behind in transparency (2) and employee experience (2), reflecting growing concerns around worker stress and algorithmic oversight in its AI-based productivity tracking systems. Bias handling scores remain moderate across all three companies, with TCS and Infosys scoring 4 and Amazon slightly lower at 3. These ratings suggest that while AI enhances operational outcomes, its ethical deployment and user acceptance vary significantly across different organizational contexts.

To statistically examine whether these observed differences are significant, a one-way Analysis of Variance (ANOVA) test is proposed. The test aims to evaluate if there are meaningful differences among the three companies across selected HR metrics—bias

handling, transparency, scalability, HR satisfaction, and employee experience. Following hypothesis is developed:

> H_0: There is no significant difference in mean scores across the three companies. H_1: There is a significant difference in mean scores across the three companies.

This hypothesis-driven approach allows for a quantitative validation of performance differences inferred from qualitative case study observations. Before conducting the ANOVA analysis, it is important to ensure the assumptions of normality and homogeneity of variances are reasonably met. Given the structured nature of the data and the small sample size per group, results will be interpreted with caution, using post-hoc comparisons if necessary. The aim is to complement the narrative findings with empirical evidence, thus offering a more robust insight into the effectiveness, fairness, and employee-centricity of AI adoption in HR across TCS, Infosys, and Amazon.Table-3: ANOVA Results

	N	Mean	Std. Deviation	Std. Error	
TCS	5	4.4000	.54772	.24495	
Infosys	5	4.4000	.54772	.24495	
Amazon	5	3.0000	1.22474	.54772	
Total	15	3.9333	1.03280	.26667	
ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.533	2	3.267	4.667	.032
Within Groups	8.400	12	.700		
Total	14.933	14			

The ANOVA analysis reveals a statistically significant difference in HR performance metrics namely bias handling, transparency, scalability, HR satisfaction, and employee experience—among TCS, Infosys, and Amazon ($F = 4.667$, $p = 0.032$). Both TCS and Infosys exhibit a higher average score of 4.40, indicating stronger and more balanced implementations of AI in HR practices, particularly in areas like ethical transparency,

fairness, and employee satisfaction. In contrast, Amazon's lower mean score of 3.00 reflects comparatively greater challenges, particularly around employee experience and perceived fairness in AI-driven workforce management. These results suggest that while all three companies are leveraging AI for HR transformation, TCS and Infosys have achieved better alignment between technological efficiency and human-centric values.

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Conclusion

The integration of Artificial Intelligence (AI) into Human Resource Management (HRM) is no longer a futuristic vision—it is a transformative reality unfolding across leading global organizations. This paper analyzed how AI is reshaping the HR functions of

recruitment, performance management, and workforce scheduling through in-depth case studies of Tata Consultancy Services (TCS), Infosys, and Amazon. Each organization represents a unique approach to leveraging AI's capabilities, yet common patterns emerge: increased operational efficiency, data-driven decision-making, enhanced scalability, and measurable improvements in outcomes such as reduced hiring cycle times, more accurate performance assessments, and optimized labor utilization. The literature review confirms that Indian companies are adopting AI-driven tools at an accelerating pace, supported by advancements in Natural Language Processing (NLP), Machine Learning (ML), and predictive analytics. However, the adoption journey is not without its challenges. Concerns regarding data privacy, algorithmic bias, lack of transparency, and employee resistance persist across contexts. The need for ethical frameworks, fairness-aware algorithms, and human oversight is strongly emphasized in both academic research and practical implementation. The case of TCS demonstrates how AI can handle massive recruitment volumes while promoting diversity and improving candidate experience. Infosys showcases a shift from annual, biased performance reviews to continuous, data-rich, and inclusive assessments. Amazon illustrates the efficiency gains possible through AI-driven workforce scheduling, but also highlights the ethical dilemmas that emerge when productivity tracking tools impact worker morale and well-being. Together, these cases underscore that AI in HRM can serve as a strategic enabler—if implemented with caution, transparency, and employee-centricity. AI should augment human decision-making, not replace it. Moreover, AI must be seen not as a standalone tool but as a component of a broader digital HR transformation strategy that includes learning, development, mobility, and well-being. Further, while the promise of AI in HRM is immense, its impact will ultimately depend on how organizations balance automation with empathy, efficiency with fairness, and innovation with responsibility. As Indian and global firms move forward in adopting AI-powered HR systems, they must embrace not only technical excellence but also ethical stewardship to ensure that technology serves the people not the other way around.

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Social Psychological Factors Influencing Sustainable Consumer Buying Behaviour towards Electric Vehicles

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Abstract

This study looks at what influences people's decision to buy Electric Vehicles (EVs). It uses a psychological model called the theory of planned behaviour and adds other related factors. The researcher examines things like people's attitude, concern about driving range, care for the environment, ability to make the switch, personal values, sustainable habits, social pressure, self-image, how much they are willing to pay, and their actual intention to buy.

A total of 242 respondents took part in the study. They were chosen because they own a vehicle or are interested in EVs. The study used a method called Structural Equation Modeling (SEM) to analyze the data. The findings help explain what motivates people to choose EVs and offer useful advice for governments and companies that want to encourage more people to use environmentally friendly transportation.

Keywords: *Electric Vehicle, Social Psychological Factors, Consumer Behaviour, Eco-Friendly Adoption, Attitude towards EVs*

Introduction:

In the current scenario, Climate change, Air pollution, and the overuse of fossil fuels have made it clear that the transportation sector –especially private Vehicles – is a major source of carbon emissions. As a result, electric vehicles (EVs) are being seen as a promising way to reduce pollution and promote cleaner transportation. In India, the government is trying to speed up the adoption of EVs by introducing policies, offering incentives, and building infrastructure. But despite this effort, switching from traditional fuel-based cars to electric ones has been slower than expected, especially in developing countries.

Early research on EV adoption mostly focused on practical aspects like cost, battery life and charging stations. However, experts now realize that psychological and social factors also play a big role in whether people choose to buy EVs. Based on behavioral theories, especial The Theory of Planned Behaviour (TPB), researchers have looked into how a person's attitude, social influence, and confidence in their ability to make the switch influence their decision. More recent studies suggest that other factors such as Personal Intention, Environmental concern, self-image, and social influence, willingness to pay, and past sustainable habits, can also affect EV adoption decisions.

This study aims to fill in the gaps by building and testing a complete model that includes both traditional (TPB) elements and these psychological factors. The goal is to better understand how people's thought, feelings, value, and social context influence their interest in buying EVs. Key factors examined included personal values, care for the environment, driving range concern, willingness to spend money, and how people see themselves.

Because the world urgently needs cleaner transportation options, this research can help guide decisions made by government leaders, marketers, and EV manufacturers. The main aim of the study is to understand how social and psychological factors affect people's intention to buy

electric vehicles. This research is based on data from 242 respondents and uses a method called Structural Equation Modeling (SEM) to explore how these factors interact and influence behaviour.

Statement of The Problem

Even though more people are worried about the environment and governments are supporting cleaner transportation options, not many people are switching to electric vehicles (EVs), especially in developing countries. Most research and government action so far have focused on fixing practical problems, like charging stations, battery issues, and the high cost of EVs. But they've often ignored the psychological and social reasons that affect people's choices.

New studies show that things like personal values, concern for the environment, how people see themselves, and social influence can have a big impact on whether someone wants to buy an EV. However, we still don't fully understand how all these social and psychological factors work together to influence people's attitudes and buying decisions when it comes to EVs.

Also, some popular behaviour models like The Theory of Planned Behavior (TPB) don't always give reliable results when used to explain EV adoption, especially when it comes to things like how much control people think they have or how much they're influenced by others. This means we need a better model that includes both personal motivation and real-world challenges.

This study aims to fill that gap by testing a complete model that looks at how social and psychological factors affect people's attitudes and intentions to buy EVs. The researcher uses real data and advanced analysis methods. The results will help create better polices, marketing strategies, and programs to encourage more people to switch to electric vehicles and support a cleaner future.

Literature Review:

Theoretical Framework: Theory of Planned Behavior (TPB)

The theory of planned behaviour (TPB) developed by Ajzen (1991) has been widely used to explain and predict a wide range of human behaviors, including sustainable choice. Theory of

planned behaviour posits that behavioral intention is influenced by three key constructs: attitude towards the behaviour, subjective norms, and perceived behaviour control. In the context of EVs adoption, TPB provides a foundational model for examining how individuals' beliefs and perception shape their intentions and behaviour.

Many studies have applied TPB in the realm of green transportation, for example, Rezvani al. (2015) and Haustein and Jensen (2018) demonstrated that attitude towards EVs is a Primary Predictor of purchase Intention, often shaped by environmental concern and perceived benefits such as the cost savings or convenience. However, critics argue that TPB may overlook deeper internal and moral factors that have led to its extension in modern studies.

Attitude and Purchase Intention:

Attitude reflects positive and negative evaluation of a particular behaviour. In the EV context, most favorable attitudes stem from perceived environmental and economic benefit (Egbue & Long, 2012). Furthermore, purchase intention serves as the immediate antecedents to behaviour, influenced by both rational evaluation and affective beliefs. (Le et al, 2017)

Perceived Behaviour Control:

Perceived Behaviour Control refers to the individual's perceptions of their ability to perform behaviour, including access to resources, Infrastructure, and Knowledge. While TPB regards PBC as a key determinant of intention of behaviour, its effect in EV research has been mixed. Some scholars (e.g. Wang eal al, 2021) report a strong influence of PBC on EV adoption, particularly in regions with mature charging Infrastructure, while others find it Insignificant, especially when external barriers such as cost or lack of facilities exist (Javid & Nejat, 2017)

Social Influence and Subjective Norms:

Social influence, also termed subjective norms in TPB, pertains to the perceived expectations of others regarding one's behavior. Prior research has shown that normative pressures from peers, family, or society can influence green consumption behaviors (White et al., 2019). However, empirical evidence on its effect on EV adoption is inconsistent. While some studies

(e.g., Barth et al., 2016) have reported a significant impact, others argue that the influence diminishes in individualistic societies where personal autonomy overrides societal expectations.

Personal Norms and Environmental Concern:

Personal Norms refer to the internalized moral obligation to perform or avoid certain behaviors. The Norm Activation Model (Schwartz, 1977) posits that moral considerations can be even more predictive of pro-environmental behavior than social norms. In EV adoption, individuals who feel a strong ethical responsibility to reduce carbon emissions are more likely to adopt green technologies (Zhang et al., 2020). Closely related is Environmental Concern, which reflects awareness and worry about ecological degradation. Studies have repeatedly shown that higher environmental concern correlates with a greater likelihood of engaging in sustainable consumption, including EV purchase (Steg, 2005; Kang et al., 2021).

Self-Image and Sustainable Behaviour:

Self-image in consumer behavior reflects the alignment between product choices and one's self-concept. EVs may appeal to consumers who see themselves as environmentally responsible or progressive. According to Sirgy (1982), individuals are motivated to engage in behaviors consistent with their self- identity. Nonetheless, some research (e.g., Hahnel et al., 2014) suggests that self-image is a weak predictor when EVs are no longer perceived as exclusive or novel. Sustainable behavior, referring to past environmentally friendly actions (e.g., recycling, using public transport), can also be a predictor of future behaviors like EV adoption. Behavioral consistency theories (Ouellette & Wood, 1998) support the notion that previous behavior increases the likelihood of similar actions, particularly when they align with core values.

Willingness to Pay and Driving Range:

Willingness to pay (WTP) plays a critical role in EV adoption, as these vehicles often involve higher upfront costs. Economic theories posit that willingness to pay is shaped by perceived value, cost-benefit analysis, and personal financial capacity (Turrentine & Kurani, 2007).

Government incentives and subsidies can significantly improve consumer WTP. Driving range, a practical attribute of EVs, is commonly cited as a barrier to adoption. Range anxiety, the fear of running out of battery before reaching a destination, is a significant deterrent for potential users (Neubauer & Wood, 2014). As battery technology improves, this concern is expected to decline; however, it remains a crucial factor in shaping perceived utility and intention.

Research Hypotheses:

H1: Personal norms (PN) have a significant positive effect on purchase intention (PI) towards electric vehicles.

H2: Environmental concern (EC) has a significant positive effect on purchase intention (PI) towards EVs.

H3: Self-Image (SIM) has a significant positive effect on purchase intention (PI) towards EVs.

H4: Social Influence (SI) has a significant positive effect on purchase intention (PI) towards EVs.

H5: Sustainable behaviour (SB) has a significant positive effect on purchase intention (PI) towards EVs. H6: Perceived Behaviour Control (PBC) has a significant positive effect on purchase intention (PI) towards EVs.

H7: Driving Range (DR) has a significant positive effect on purchase intention (PI) towards EVs. H8: Willingness to Pay (WP) has a significant positive effect on purchase intention (PI) towards EVs. H9: Purchase Intention (PI) has a significant positive effect on attitude (AT) towards EVs.

H10: Purchase Intention (PI) mediates the relationship between personal norms (PN) and attitude towards EVs.

H11: Purchase Intention (PI) mediates the relationship between environmental concern (EC) and attitude towards EVs.

H12: Purchase Intention (PI) mediates the relationship between driving range (DR) and attitude towards EVs.

H13: Purchase Intention (PI) mediates the relationship between Willingness to pay (WP) and attitude towards EVs.

H14: Purchases Intention (PI) mediates the relationship between self-image (SIM) and attitude towards EVs.

H15: Purchase Intention (PI) mediates the relationship between sustainable behaviour (SB) and attitude towards EVs.

H16: Purchase Intention (PI) mediates the relationship between social influence (SI) and attitude towards EVs.

H: 17 Purchase Intentions (PI) mediates the relationship between perceived behaviour control (PBC) and attitude towards EVs.

Research Methodology:

Research Design:

This study adopted a Descriptive Research Design in examining the influence of various social psychological factors on consumer buying behaviour towards electric vehicles (EVS). The framework of the research was primarily grounded in the Theory of Planned Behaviour (TPB), extended with additional constructs such as personal norms, self-image, Perceived Behaviour Control, willingness to pay, Sustainable Behaviour, social influence, and environmental concern. Structural Equation Modeling (SEM) was employed to validate the hypotheses and to test the overall model fit

Objective of The Study:

- To study the social-psychological factors' impact on consumer buying decisions.
- To evaluate the impact of consumers' overall attitudes towards EVs.
- Investigate the role of contextual and functional variables in determining purchase intention towards EVs.

Sample and Sampling Technique:

This study was included 242 respondents. These respondents were chosen on purpose because they own a vehicle or are interested in electric vehicle (EVs). This method of selecting people is useful when the study needs input from a specifics type of person. A group of 242 respondents is a good enough size for the type of analysis use in this study, called Partial Least Squares Structural Equation Modeling (PLS- SEM), which work well even with a medium size group.

Data Collection:

Data were collected using a structured questionnaire comprising multiple items for each construct, measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Questionnaire was fielded through online mode to ensure wider reach and representation.

Data Analysis Technique:

The data were analyzed using Partial Least Squares Structure Equation Modeling (PLS-SEM) via Smart PLS software.

Evaluation of the measurement model to assess reliability, convergent validity (using Cronbach's alpha, Composite Reliability, and Average Variance Extracted), and discriminate validity (using the Fornell- Larcker criterion and HTMT ratios).

Evaluation of the structural model to assess path coefficients, effect sizes (f^2), explained variance (R^2), and significance levels (p-values) for hypothesis testing.

The analysis conducted through Structural Equation Modeling (SEM) offers substantial insight into the underlying psychological and contextual drivers of electric vehicle (EV) adoption. The measurement model was validated through acceptable levels of internal consistency, convergent validity, and discriminate validity. Cronbach's alpha values for most constructs exceeded the minimum threshold of 0.70, indicating adequate reliability, although lower values for Driving Range (DR), Perceived Behavioral Control (PBC), and Willingness to Pay (WP) suggest moderate reliability in these specific domains. Composite reliability (CR) and average variance extracted (AVE) further confirmed the convergent validity of all constructs, with AVE values surpassing the 0.50 benchmark, demonstrating that the indicators collectively capture a substantial portion of variance in their respective constructs.

AT- Attitude

DR- Driving range

EV - Environmental Concern

PBC- Perceived Behaviour Control SIM -Self Image

SB -Sustainable Behaviour SI- Social Influence

PN -Personal Norms WP -Willingness to pay

PI -Purchase Intention to adoption of EVs

Table 1: Outer Loading of Constructs

AT1 <- AT	0.882
AT2 <- AT	0.881
AT3 <- AT	0.886
DR1 <- DR	0.882
DR2 <- DR	0.763
EV1 <- EV	0.868
EV2 <- EV	0.833
EV3 <- EV	0.881
PBC1 <- PBC	0.815
PBC2 <- PBC	0.859
PBC3 <- PBC	0.527
PI1 <- PI	0.858
PI2 <- PI	0.779
PI3 <- PI	0.860
PI4 <- PI	0.833
PN1 <- PN	0.855
PN2 <- PN	0.936
SB1 <- SB	0.818
SB2 <- SB	0.874
SB3 <- SB	0.868
SI1 <- SI	0.759
SI2 <- SI	0.836
SI3 <- SI	0.867
SI4 <- SI	0.854
SIM1 <- SIM	0.868
SIM2 <- SIM	0.909

SIM3 <- SIM	0.874
WP1 <- WP	0.885
WP2 <- WP	0.792

Table 2: Internal Consistency, Reliability, and Convergent Validity

	Cronbach's alpha	Composite reliability (rhoa)	Composite reliability (rhoc)	Average variance extracted (AVE)
AT	0.859	0.862	0.914	0.780
DR	0.538	0.572	0.809	0.680
EV	0.827	0.850	0.895	0.741
PBC	0.604	0.677	0.786	0.560
PI	0.853	0.857	0.901	0.694
PN	0.763	0.844	0.891	0.803
SB	0.817	0.837	0.890	0.729
SI	0.850	0.873	0.898	0.689
SIM	0.860	0.862	0.915	0.781
WP	0.589	0.618	0.827	0.706

Reliability and Validity:

- Internal consistency was supported for most constructs with Cronbach's alpha values > 0.7, except for Driving Range (DR = 0.538), Perceived Behavioral Control (PBC = 0.604), and Willingness to Pay (WP = 0.589), indicating moderate reliability in these areas.
- Composite reliability (CR) and Average Variance Extracted (AVE) were acceptable for most constructs. Notably, AVE values > 0.50 for all variables indicate convergent validity, suggesting the items effectively represent their constructs.

Table 3: Fornell-Larcker Criterion for Discriminate Validity

	AT	DR	EV	PBC	PI	PN	SB	SI	SIM	WP
AT	0.883									
DR	0.561	0.825								
EV	0.481	0.393	0.861							
PBC	0.479	0.561	0.376	0.748						
PI	0.813	0.552	0.463	0.495	0.833					
PN	0.594	0.604	0.497	0.561	0.622	0.896				
SB	0.577	0.535	0.579	0.526	0.554	0.677	0.854			
SI	0.529	0.521	0.626	0.568	0.536	0.671	0.644	0.830		
SIM	0.528	0.549	0.442	0.618	0.546	0.661	0.619	0.659	0.884	
WP	0.459	0.551	0.272	0.554	0.522	0.537	0.534	0.506	0.508	0.840

Discriminate Validity:

The Fornell-Larcker criterion and HTMT ratio demonstrated acceptable levels of discriminate validity for most constructs, although a few HTMT values, such as WP <-> DR (1.008) and PBC <-> DR (0.966), exceed the threshold of 0.90, suggesting potential issues with construct distinctiveness between these variables.

HTMT Ratio for Discriminate Validity:

	HETEROTRAIT-MONOTRAIT RATIO (HTMT)
DR <-> AT	0.792
EV <-> AT	0.558
EV <-> DR	0.560
PBC <-> AT	0.647
PBC <-> DR	0.966
PBC <-> EV	0.529
PI <-> AT	0.946

PI <-> DR	0.799
PI <-> EV	0.541
PI <-> PBC	0.662
PN <-> AT	0.720
PN <-> DR	0.939
PN <-> EV	0.626
PN <-> PBC	0.811
PN <-> PI	0.744
SB <-> AT	0.672
SB <-> DR	0.780
SB <-> EV	0.702
SB <-> PBC	0.753
SB <-> PI	0.646
SB <-> PN	0.848
SI <-> AT	0.603
SI <-> DR	0.760
SI <-> EV	0.733
SI <-> PBC	0.763
SI <-> PI	0.614
SI <-> PN	0.829
SI <-> SB	0.754
SIM <-> AT	0.615
SIM <-> DR	0.815
SIM <-> EV	0.516
SIM <-> PBC	0.831
SIM <-> PI	0.635
SIM <-> PN	0.807
SIM <-> SB	0.728
SIM <-> SI	0.766
WP <-> AT	0.642

WP <-> DR	1.008
WP <-> EV	0.375
WP <-> PBC	0.952
WP <-> PI	0.723
WP <-> PN	0.780
WP <-> SB	0.759
WP <-> SI	0.692
WP <-> SIM	0.700

Discriminate validity was established using both the Fornell-Larcker criterion and the Heterotrait- Monotrait (HTMT) ratio. While the Fornell-Larcker results confirmed that constructs were more strongly related to their indicators than to others, the HTMT ratio revealed potential issues between certain constructs, particularly between WP and DR (HTMT = 1.008), and PBC and DR (HTMT = 0.966), which slightly exceeded the recommended threshold of 0.90. This suggests a need for careful distinction in future operationalizations of these constructs.

R-SQUARE		
OVERVIEW		
	R-SQUARE	R-SQUARE ADJUSTED
AT	0.661	0.660
PI	0.493	0.475

The explanatory power of the structural model was evaluated using the R-square (R^2) coefficient, which represents the proportion of variance in the dependent variable explained by its predictors. In this study, the R^2 value for Purchase Intention (PI) was 0.493, indicating that approximately 49.3% of the variance in consumers' intention to adopt electric vehicles is

explained by the combined effects of the independent variables: personal norms (PN), driving range (DR), environmental concern (EV), willingness to pay (WP), self-image (SIM), perceived behavioral control (PBC), sustainable behavior (SB), and social influence (SI). According to Chin (1998), an R^2 value of 0.33 to 0.67 is considered moderate, suggesting that the model has a reasonable explanatory strength for predicting behavioral intention in this context.

Furthermore, the R^2 for Attitude toward EVs (AT) was 0.661, indicating that 66.1% of the variance in attitude is explained by purchase intention alone. This high R^2 value reflects a strong predictive relationship between intention and attitude, reinforcing the central role of intention as a mediating variable in the adoption process. The adjusted R^2 values, which account for the number of predictors in the model, were 0.475 for PI and 0.660 for AT, confirming the model's robustness and reducing the likelihood of overestimation.

These findings suggest that while the social-psychological and contextual factors included in the model moderately explain consumers' intention to adopt EVs, the formation of a positive attitude is highly contingent upon the presence of a strong behavioral intention.

f- square

	F-SQUARE
DR -> PI	0.023
EV -> PI	0.025
PBC -> PI	0.001
PI -> AT	1.953
PN -> PI	0.048
SB -> PI	0.002
SI -> PI	0.000
SIM -> PI	0.007
WP -> PI	0.031

The f-square (f^2) statistic assesses the effect size of each independent variable on its corresponding dependent variable within the structural model. It quantifies how much a predictor variable contributes to the R^2 value of an endogenous construct, providing insight into the relative strength of each predictor. According to Cohen's (1988) guidelines, f^2 values can be interpreted as follows:

- 0.02 = small effect
- 0.15 = medium effect
- 0.35 = large effect

Hypotheses Result		Original sample (O)	P values	Statically Supported or Not Supported
H1	Driving Range -> Personal Intention	0.150	0.046	Supported
H2	Environmental Concern-> Personal Intention	0.153	0.035	Supported
H3	Perceived Behaviour Control -> Personal Intention	0.038	0.621	Not Supported
H4	Personal Intention -> Attitude	0.813	0.000	Supported
H5	Personal norms -> Personal Intention	0.253	0.002	Supported
H6	Sustainable Behaviour -> Personal Intention	0.051	0.569	Not Supported
H7	Social Influence -> Personal Intention	-0.011	0.917	Not Supported

H8	Self Image -> Personal Intention	0.093	0.303	Not Supported
H9	Willingness to Pay -> Personal Intention	0.171	0.028	Supported
H10	Personal Norms -> Personal Intention -> Attitude	0.206	0.003	Supported
H11	Sustainable Behaviour -> Personal Intention -> Attitude	0.042	0.571	Not Supported
H12	Social Influence -> Personal Intention -> Attitude	-0.009	0.917	Not Supported
H13	Self Image -> Personal Intention -> Attitude	0.076	0.304	Not Supported
H14	Willingness to Pay -> Personal Intention -> Attitude	0.139	0.027	Supported
H15	Driving Range -> Personal Intention -> Attitude	0.122	0.047	Supported
H16	Environmental Concern -> Personal Intention -> Attitude	0.125	0.035	Supported
H17	Perceived Behaviour Control -> Personal Intention -> Attitude	0.031	0.621	Not Supported

In the current study, the most substantial effect size was observed for the relationship between purchase intention (PI) and attitude (AT), with an $f^2 = 1.953$, which significantly exceeds the

threshold for a large effect. This result highlights the dominant role of behavioral intention in shaping positive attitudes toward electric vehicles, confirming its centrality in the attitudinal formation process.

Among the predictors of purchase intention, personal norms (PN → PI) had the largest effect size ($f^2 = 0.048$), falling within the small-to-moderate range, suggesting that internal moral obligations play a meaningful role in driving behavioral intention. Similarly, willingness to pay (WP → PI) and environmental concern (EV → PI) showed small but notable effects, with f^2 values of 0.031 and 0.025, respectively, indicating that financial readiness and ecological awareness modestly contribute to the intention to adopt EVs.

The influence of driving range (DR → PI) was also small ($f^2 = 0.023$), suggesting that while range anxiety is relevant; it may not be the dominant determinant of intention. Conversely, the effects of self- image (SIM → PI) ($f^2 = 0.007$), sustainable behavior (SB → PI) ($f^2 = 0.002$), perceived behavioral control (PBC → PI) ($f^2 = 0.001$), and social influence (SI → PI) ($f^2 = 0.000$) were found to be negligible, indicating minimal contribution to the explanatory power of the model for purchase intention.

These findings reinforce the conclusion that personal, moral, and practical considerations such as norms, willingness to pay, and environmental concern—have more influence on behavioral intention than do identity alignment, perceived ease, or social expectations. The strong f^2 for PI → AT further confirms that once intention is established, it becomes a powerful determinant of attitude formation toward electric vehicles.

Structural Model Evaluation:

Explained Variance (R^2):

- Purchase Intention (PI) was moderately predicted ($R^2 = 0.493$) by the independent constructs.
- Attitude (AT) was strongly predicted ($R^2 = 0.661$) by Purchase Intention.Effect Size (f^2):

- The largest effect size was found from PI to AT ($f^2 = 1.953$), demonstrating a strong influence.
- Personal Norms (PN → PI, $f^2 = 0.048$), Environment Concern (EV → PI, $f^2 = 0.025$), and Willingness to Pay (WP → PI, $f^2 = 0.031$) exhibited small but notable effect sizes.
- Constructs such as PBC, SB, SI, and SIM had negligible effects ($f^2 < 0.02$), suggesting their minimal impact on purchase intention in this model.
- The structural model provided moderate explanatory power for purchase intention ($R^2 = 0.493$) and strong predictive relevance for attitude ($R^2 = 0.661$), indicating that the proposed predictors account for a substantial proportion of variance in consumers' attitudes toward EV adoption. The path analysis revealed that personal norms ($\beta = 0.253$, $p = 0.002$), driving range ($\beta = 0.150$, $p = 0.046$), environmental concern ($\beta = 0.153$, $p = 0.035$), and willingness to pay ($\beta = 0.171$, $p = 0.028$) had statistically significant and positive effects on purchase intention. These results underscore the importance of moral responsibility, range confidence, ecological awareness, and financial readiness in shaping consumers' intentions to adopt EVs.

Hypotheses Testing and Path Coefficients:

Significant Predictors of PI:

- Driving Range (DR → PI): $\beta = 0.150$, $p = 0.046$
- Environmental Concern (EV → PI): $\beta = 0.153$, $p = 0.035$
- Personal Norms (PN → PI): $\beta = 0.253$, $p = 0.002$
- Willingness to Pay (WP → PI): $\beta = 0.171$, $p = 0.028$ Non-significant Predictors:
- PBC ($p = 0.621$)
- SB ($p = 0.569$)
- SI ($p = 0.917$)
- SIM ($p = 0.303$)

Contrast, several hypothesized predictors—namely, perceived behavioral control ($\beta = 0.038$, $p = 0.621$), sustainable behavior ($\beta = 0.051$, $p = 0.569$), social influence ($\beta = -0.011$, $p = 0.917$), and self-image (β
$= 0.093$, $p = 0.303$)—were found to have no significant impact on purchase intention. This

implies that individual control perceptions, societal pressure, and identity alignment may not be as influential in this context as previously suggested in other behavioral models.

Indirect Effects (Mediation via PI → AT):
Significant mediation paths were observed for:

- PN → PI → AT: $\beta = 0.206$, $p = 0.003$
- WP → PI → AT: $\beta = 0.139$, $p = 0.027$
- DR → PI → AT: $\beta = 0.122$, $p = 0.047$
- EV → PI → AT: $\beta = 0.125$, $p = 0.035$

Non-significant mediation paths were noted for PBC, SB, SI, and SIM Through Purchase Intention (PI)

- Perceived Behavioral Control (PBC → PI → AT)
- Sustainable Behavior (SB → PI → AT)
- Social Influence (SI → PI → AT)
- Self-Image (SIM → PI → AT)

Furthermore, mediation analysis revealed that purchase intention significantly mediated the relationships between several antecedents—specifically personal norms, environmental concern, driving range, and willingness to pay—and attitude toward EVs. The strongest mediation effect was observed in the path from purchase intention to attitude ($\beta = 0.813$, $p < 0.001$), confirming that intention serves as a crucial conduit through which various psychological and contextual factors influence consumers' overall attitudes.

These findings collectively highlight that consumers' adoption of electric vehicles is more strongly driven by personal moral convictions, practical considerations (such as driving range), and willingness to invest, rather than by external social cues or perceived control. Such results offer valuable guidance for practitioners aiming to craft interventions, communication strategies, and policies to foster sustainable mobility behavior.

Key findings:

- Attitude toward EVs is most strongly shaped by purchase intention, which in turn is

influenced significantly by personal norms, driving range, environmental concern, and willingness to pay.

- Perceived behavioral control, social influence, sustainable behavior, and self-image do not significantly impact purchase intention, suggesting they may not be central motivators in the context studied.
- Constructs such as PN, DR, EV, and WP exhibit both direct and indirect influences, making them critical in strategies aimed at fostering EV adoption.

Conclusion:

This study reinforces the critical role of psychological and contextual variables in shaping consumers' intentions and attitudes toward electric vehicles. Particularly, personal moral obligation (PN), environmental awareness (EV), and Willingness to pay (WP) serve as significant enablers of EV purchase intention. Conversely, traditional constructs like social norms or perceived control seem less impactful, possibly due to evolving consumer autonomy or market familiarity with EVs. Policymakers and marketers should emphasize moral responsibility, highlight cost-saving benefits, and address range anxiety in their campaigns to accelerate EV adoption. Future research may explore contextual influences (e.g., infrastructure or regional factors) and examine cultural moderators for a more nuanced understanding.

Further study:

The existing literature underscores the relevance of multiple psychological and contextual factors in shaping EV adoption. However, there is still a need for integrative models that go beyond traditional TPB constructs to include moral, identity-driven, and practical factors. Furthermore, inconsistencies in the influence of social norms and perceived control highlight the need for context-specific empirical validation. This study contributes to the literature by simultaneously examining a broad array of predictors—including underexplored constructs like personal norms, self-image, and willingness to pay—within a single theoretical framework to offer a more comprehensive understanding of what drives consumers toward electric vehicle adoption.

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Rebuilding brand loyalty in India's Digital economy: A Primary study on Consumer engagement mechanisms

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Abstract

The digital revolution has intensely changed how consumers interact with brands, especially in India's fast-growing and culturally diverse marketplace. Traditional notions of brand loyalty are being challenged as young consumers increasingly engage with brands through digital touchpoints, such as social media, influencers, and online reviews. Yet, most existing research relies on Western models, leaving a gap in understanding how these dynamics play out in the Indian context. This study examines the impact of digital engagement on brand loyalty among Indian consumers aged 18 to 30. A structured questionnaire and statistical

tools like regression analysis and ANOVA were used to analyze the data. The findings highlight that social media engagement and trust in online reviews are the strongest drivers of brand loyalty. Consumers who regularly like, share, or comment on brand content tend to feel more emotionally connected and are more likely to stick with those brands. Interestingly, while AI-based personalization was expected to have a strong impact, it showed only a mild effect, suggesting that many young Indian consumers are still wary of algorithm-driven suggestions. The model explains around 41% of the variation in brand loyalty, reinforcing the importance of active, transparent engagement over fully automated marketing approaches. The study offers a culturally relevant perspective, emphasizing the power of vernacular content, community-driven experiences, and hybrid "phygital" touchpoints.

Keywords: *Brand Loyalty, Digital Engagement, Consumer Behavior, Social Media Marketing, Influencer Marketing*

1. Introduction

In recent years, the way consumers in India connect with brands has changed dramatically. With the growing influence of digital platforms especially social media, influencer content, and personalized online experiences, brand loyalty is no longer built in the same way it was a decade ago (Kapoor et al., 2021; Hootsuite & We Are Social, 2023). Consumers today have more choices, louder voices, and higher expectations. As a result, many brands are struggling not just to gain attention, but to earn and rebuild lasting loyalty (Kotler et al., 2017). This shift is particularly noticeable among younger Indian consumers, who are digitally native and highly active online. They follow brands on social media, trust online reviews more than advertisements, and often form emotional connections through content, not just products (Choudhury & Shareef, 2020). Traditional methods like loyalty cards or one-way promotions are no longer enough. Consumers want meaningful interactions, transparency, and experiences that feel personal and relevant (Kumar & Reinartz, 2016).

This study seeks to explore how brands in India can rebuild consumer loyalty within an increasingly dynamic and digitally driven market environment. Drawing on primary research, it investigates which forms of digital engagement such as social media interactions, influencer collaborations, and AI-based personalization effectively resonate with consumers

and influence their loyalty-related decisions (Dwivedi et al., 2021; Kumar et al., 2022). By closely examining shifts in consumer behavior, the research aims to offer practical insights that enable marketers and brand strategists to develop digital engagement strategies that move beyond mere transactions. In an era where trust, emotional connection, and user experience have overtaken price and product consistency as the main drivers of loyalty, this study provides a timely analysis of what truly binds modern Indian consumers to a brand.

The transformation is particularly evident among India's younger population digital natives who are highly active across online platforms. With the widespread accessibility of smartphones, affordable internet, and the growing influence of social media, consumers now engage with brands through a range of digital touchpoints. These include likes, comments, influencer-generated content, peer reviews, and AI-powered recommendations (Kantar, 2022; Sasmita & Suki, 2015). In such an environment, consumers no longer interact with brands passively. Instead, they expect a two-way relationship built on relevance, responsiveness, and consistent value across platforms (Lemon & Verhoef, 2016).

Traditional notions of loyalty once grounded in product reliability or pricing advantage are no longer sufficient in a landscape shaped by empowered, tech-savvy consumers (Verhoef et al., 2015). This research focuses on how brand loyalty is evolving in India, particularly among younger consumers who are deeply immersed in digital ecosystems. While many brands have turned to AI to anticipate preferences and customize user experiences, findings from previous studies indicate that consumers often place greater trust in real human voices peer reviews and authentic social media engagement over algorithmic suggestions (Mikalef et al., 2020; Cheung et al., 2009). India's distinct combination of cultural diversity, regional languages, and rapid digital adoption presents a compelling context in which to study these changing patterns of loyalty (Nanda & Banerjee, 2021).

To examine these trends, the study investigates a range of online behaviors such as shopping frequency, engagement on social media, trust in influencer marketing, use of online reviews, and exposure to personalized content and their impact on brand loyalty. The aim is to understand whether these digital interactions foster emotional bonds and influence repeat brand choices. By identifying which types of digital engagement are most effective, the study provides actionable insights for both academics and practitioners operating in the Indian

context. Whether it involves a fashion label partnering with a regional influencer, a fintech startup offering personalized user journeys, or a D2C brand developing content in local languages, the findings underscore the importance of understanding the psychology behind consumer engagement. It is this deeper emotional connection not superficial metrics that ultimately drives sustainable loyalty (Lou & Yuan, 2019; Kapoor et al., 2021).

The research employs a quantitative methodology, using structured questionnaires to gather data from 146 Indian consumers aged between 18 and 30 a demographic known for its strong presence in digital spaces and significant influence on online trends (Statista, 2023). Key variables measured include levels of social media activity, trust in influencers, reliance on online reviews, and the perceived relevance of AI-driven personalization in brand engagement. Data analysis was conducted using the SPSS software, with statistical tools such as regression analysis, ANOVA, and reliability testing applied to determine which engagement strategies most significantly influence brand loyalty. By combining empirical insights with rigorous analysis, the study contributes to the growing literature on digital consumer behavior and offers practical guidance for brands looking to build stronger, more meaningful relationships with Indian consumers in an increasingly digital world.

2. Review of Literature

The evolution of brand loyalty in the digital age has been widely discussed by contemporary researchers, each contributing unique insights that enrich the theoretical and practical foundation of this study. At the heart of the evolving loyalty landscape is a growing understanding that brand allegiance is no longer determined solely by repeated purchases or routine buying patterns. As noted by Rupesh Lande (2023), digital loyalty in today's environment is fundamentally rooted in trust, transparency, and emotional connection. His research emphasizes how meaningful and consistent interactions whether through personalized content, timely responsiveness, or engaging messaging play a central role in building long- term consumer relationships. These findings are particularly relevant to the present study, which examines how such emotional touchpoints influence the brand choices of young Indian consumers, particularly in the context of social media and e-commerce platforms.

Adding a tactical dimension to this discussion, Banthia Medhy (2024) explores specific engagement strategies that brands can employ to strengthen loyalty. Her work highlights the effectiveness of gamification, influencer collaborations, and interactive loyalty programs, arguing that modern consumers respond best to experiences that are immersive, engaging, and instantly rewarding. She also stresses the need for seamless, omnichannel engagement, which directly supports this study's exploration of influencer marketing and AI-powered personalization. These strategies are proving especially critical in India's highly competitive direct-to-consumer (D2C) market, where brand differentiation is often achieved through digital experience rather than product features alone.

Pushing beyond traditional brand messaging, Mohammad and Ataollah Taleghani (2024) focus on the importance of community-led engagement. Their research underscores the increasing power of user- generated content, peer reviews, and real-time responsiveness elements that many consumers now perceive as more authentic and credible than conventional advertising. This perspective resonates strongly with one of the core findings of this study: that online review behavior is a key predictor of brand loyalty among Indian consumers. The authors' emphasis on authenticity and two-way interaction aligns with this study's broader hypothesis that today's digital loyalty is shaped more by shared community values and collective voice than by top-down brand campaigns.

In addition, Dharna Panwar (2024) offers a critical perspective on the growing use of algorithmic personalization. While many brands adopt AI to enhance customer experiences, Panwar points out that trust and privacy concerns remain significant, particularly in culturally diverse and sensitive markets like India. Her research suggests that personalization, while valuable in principle, may fail to generate loyalty if it lacks transparency or emotional relevance. This observation is reflected in the present study's findings, where AI-driven personalization did not appear as a significant driver of loyalty suggesting that automation alone may not suffice without human-like, emotionally resonant engagement.

Contributing further to this dialogue, Nilam and Hardik Goradiya (2024) examine how platform usability, responsive feedback systems, and emotionally intelligent design influence consumer loyalty. Their work reinforces the importance of a smooth and engaging

user experience, noting that ease of navigation, visible feedback mechanisms, and emotional design cues can significantly enhance brand- consumer bonds. These insights are directly connected to this research's investigation of social media activity and online behavior as important factors influencing loyalty. In an environment where users move across multiple platforms daily, clarity in communication and responsiveness have become essential loyalty touchpoints.

Finally, Yoki Famila Sandi (2023) introduces a values-driven approach to brand loyalty, advocating for a shift from purely transactional marketing to purpose-led storytelling. Her perspective supports the idea that today's consumers are drawn not just to what brands sell, but to what they stand for. In the context of this research, this aligns with the notion that loyalty is not only earned through incentives or features,

but through authentic narratives and shared values that resonate with consumers on a deeper level. Her research shows that consumers, particularly younger generations, are more likely to remain loyal to brands that align with their personal values and invite them into co-creative brand experiences. This mirrors the broader theme of this thesis that modern brand loyalty is not commanded but earned through meaningful, consistent, and emotionally honest digital engagement.

Their findings not only validate the key dimensions explored in this research such as trust, peer influence, and authenticity but also demonstrate the pressing need for brands to humanize their digital strategies if they wish to cultivate lasting consumer relationships in India's increasingly digital economy.

3. Objectives of the Study

- To analyze how digital plat forms influence consumer engagement with brands in India.
- To examine the impact of social media activity, influencer marketing, and online reviews on brand perception and loyalty.
- To assess whether AI-driven personalization fosters emotional connection and repeat purchasing behavior.
- To explore the relationship between digital consumer behavior and long-term brand loyalty in a culturally diverse Indian market.

4. Research Methodology

This study adopts a quantitative research approach, using a structured questionnaire to collect primary data from Indian consumers who actively engage with brands online. The research focuses on exploring the relationship between digital consumer behaviors and brand loyalty. The target population comprises Indian consumers aged 18 and above who use digital platforms such as social media, e-commerce websites, and mobile apps to interact with brands. A sample size of 146 respondents was selected using non-probability convenience sampling. Participants were chosen based on their digital activity and willingness to participate. Primary data was collected through an online questionnaire consisting of closed-ended Likert-scale questions. The survey covered consumer behavior (e.g., trust in reviews and influencers), digital engagement (e.g., social media activity), personalization experiences, and brand loyalty indicators. Secondary data was sourced from academic journals, market reports, and industry white papers. Independent Variables: Consumer Behavior, Social media engagement, Influencer Trust, Personalization & AI, Dependent variables: Brand Loyalty

1. Conceptual Framework and Hypotheses Development

4.1.1. Consumer Behaviour

Consumers who regularly shop online, rely on product reviews, and use digital platforms to compare products tend to form stronger brand preferences and trust. Example**:** Amazon India leverages verified customer reviews which influence purchasing decisions and repeat behavior. A consumer reading multiple positive reviews about Amazon Basics electronics is more likely to return for future purchases.

4.1.2. Social media engagement

Active participation in brand-led content on platforms like Instagram, YouTube, or Facebook including liking, commenting, sharing, and joining communities builds emotional resonance and community attachment. Example**:** Nykaa uses Instagram tutorials and live sessions to educate and engage users. Many customers who actively follow Nykaa's content report increased trust and loyalty, often choosing Nykaa over other platforms for beauty products.

2. **Influencer Trust**

Influencers play a critical role in shaping consumer perceptions. Recommendations from trusted digital personalities are seen as more authentic than traditional advertisements. Example**:** Mamaearth partners with mom bloggers and dermatologists like Dr. Aanchal Panth. Her reviews of chemical-free skincare products resonate deeply with followers, leading to strong brand preference and word-of-mouth loyalty.

3. **Personalization & AI**

Despite its widespread use, AI-driven personalization (e.g., customized product suggestions or emails) did not show a significant impact on brand loyalty in this study. This could be due to a lack of cultural/contextual relevance or consumer scepticism about data privacy. Example: Spotify India offers curated playlists (like "Discover Weekly"), but while users may enjoy personalization, it does not always translate into loyalty many still switch platforms like YouTube Music or Apple Music based on offers or features.

4. **Brand Loyalty**

Brand loyalty, the dependent variable, is significantly shaped by digital behavior, authentic social media engagement, and influencer trust. Loyalty is manifested in: Repeat purchases (e.g., regularly reordering from Blinkit), Emotional connection (e.g., favoring Amul for its nostalgia and values), Advocacy **(**e.g., recommending CRED for its rewards and quirky ads). This conceptual model illustrates the relationship between key digital engagement variables and brand loyalty, specifically within the Indian digital marketplace.

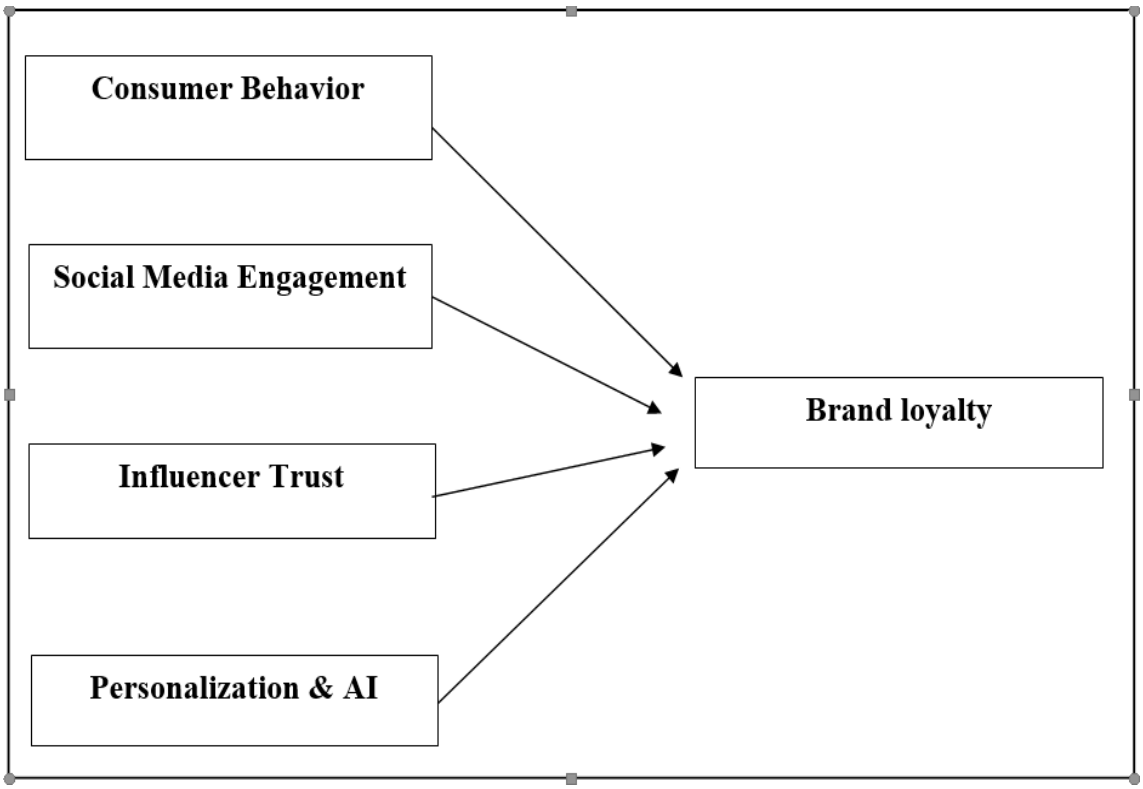

Figure 1: Framework Showing the Influence of Consumer Behavior and Digital Interactions on Brand Loyalty

2. Hypotheses development

- H1: Higher levels of consumer engagement on social media lead to increased brand loyalty.
- H2: Personalized digital marketing positively influences emotional attachment and repeat purchase behavior.
- H3: Consumers who frequently refer to online reviews are more likely to remain loyal to a brand.

These hypotheses are tested using primary data collected from digitally active Indian consumers, with statistical techniques such as regression analysis and ANOVA used to assess the strength and significance of relationships among the variables.

4. Data Analysis

The collected data was analyzed using SPSS software. Key statistical tools, including Reliability Testing Cronbach's alpha to test internal consistency of the various variables used relevant to the study. Regression Analysis is used to examine the influence of independent variables on brand loyalty. ANOVA test is used to analyze the significance of differences among groups. Correlation Analysis is used to identify the strength of relationships between variables

Table 1. Model Summary:

Metric	Value
R	0.641
R Square (R^2)	0.411
Adjusted R Square	0.398
Std. Error Estimate	0.7829 9

Source: Primary data

The model explains 41.1% of the variance in brand loyalty. This represents a moderately strong model, suggesting that the independent variables meaningfully explain the consumer's brand loyalty behavior.

Table2. ANOVA Table

Source	F	Sig.
Regression	32.999	0.000

Source: Primary data

The overall model is statistically significant ($p < 0.001$), which means that, taken together, the predictors reliably forecast brand loyalty.

Table 3. Coefficients Table

Predictor	B	Std. Error	Beta	t	Sig.	Interpre-tation
Constant	0.888	0.276	—	3.221	0.002	—
Consumer Behaviour	0.395	0.101	0.342	3.897	0.000	Significant
Personalization_ AI	0.082	0.104	0.070	0.791	0.430	Not significant
Engagement Loyalty	0.350	0.089	0.326	3.938	0.000	Significant

Source: Primary data

1. Hypothesis Testing Summary

The hypothesis testing results reveal that social media engagement has a strong and statistically significant impact on brand loyalty. With a beta coefficient of 0.350 ($p < .001$), the analysis confirms that consumers who actively engage with brands on social platforms through actions like liking, sharing, or commenting are more likely to form loyal relationships. This reinforces the idea that digital interaction, when consistent and meaningful, plays a vital role in strengthening emotional bonds with consumers in the Indian market.

In contrast, personalized marketing driven by AI did not show a significant effect on brand loyalty ($B = 0.082$, $p = .430$). This indicates that while personalization is widespread, it may not yet resonate deeply enough with consumers to influence their attachment or repeat purchase behaviour. Possible reasons include consumer scepticism toward algorithmic suggestions or a lack of emotional connection in how personalization is currently implemented. The mixed nature of the personalization variable encompassing data use, content targeting, and perceived relevance may also dilute its perceived impact.

Meanwhile, review frequency used as a proxy for consumer behavior emerged as one of the strongest predictors of brand loyalty ($B = 0.395$, $p < .001$). Consumers who frequently consult online reviews tend to trust peer feedback and base their loyalty decisions on community

validation rather than direct marketing. Taken together, these findings highlight that authenticity, transparency, and social proof are far more influential than automated personalization in driving brand loyalty among young Indian consumers. In summary, authentic interactions, peer validation, and community-driven content were the strongest predictors of brand loyalty in the Indian digital context. These findings suggest that emotional resonance and transparency matter more than algorithmic convenience

5. Results and Discussion

The analysis yielded several key insights into the relationship between digital consumer behavior and brand loyalty in the Indian context. One of the key findings of this study was the strong influence of social media engagement on brand loyalty. Participants who frequently interacted with brand content whether by liking, sharing, or commenting tended to develop a deeper emotional connection with the brand. These consumers also showed a higher likelihood of making repeat purchases, supporting the hypothesis that active social media engagement contributes positively to sustained brand relationships. Respondents who consistently referred to reviews before making purchase decisions reported greater satisfaction with their choices and demonstrated a stronger tendency to stay loyal to particular brands. This suggests that peer-generated content, especially in the form of product reviews, plays a crucial role in reinforcing trust and driving consistent purchase behavior. Despite the growing use of algorithm- based recommendation systems by brands, many participants expressed doubts about the relevance and authenticity of such personalized content. The findings indicate that while automation can enhance convenience, it may fall short in fostering genuine trust or emotional connection key ingredients in building long-term brand loyalty. Many respondents perceived AI-generated suggestions as overly generic or lacking contextual nuance, which diluted their effectiveness in fostering emotional attachment or repeat purchasing behavior. In terms of consumer behavior trends, the most loyal consumers were those who frequently shopped online and maintained consistent interactions with brands across multiple digital platforms. These consumers associated brand loyalty with factors such as transparency, responsiveness, and reliable post-purchase engagement, underscoring the importance of sustained brand-consumer dialogue. From a statistical standpoint, the regression analysis revealed that approximately 41.1% of the

variation in brand loyalty could be explained by the independent variables included in the model (R^2 = 0.411). Among these variables, social media engagement and consumer behavior emerged as statistically significant predictors of brand loyalty, while AI personalization did not demonstrate a significant impact. Reliability of Measures: Cronbach's Alpha for internal consistency was 0.835, indicating high reliability of the survey items used to measure the constructs.

6. Conclusion and Strategic Implications

This study concludes that in India's fast-evolving digital environment, brand loyalty is shaped far more by emotional engagement, trust, and authenticity than by technology alone. Among younger Indian consumers in particular, regular interaction with brand content on social media such as likes, comments, and shares was found to significantly strengthen emotional bonds and encourage repeat purchases, lending support to earlier findings by Godey et al. (2016). Similarly, online reviews continue to serve as a critical trust-building mechanism, with consumers who regularly consult peer feedback reporting higher satisfaction and stronger long-term loyalty (Chevalier & Mayzlin, 2006). Despite the increasing use of AI-driven personalization tools by brands, this study found that such technologies currently have a limited influence on loyalty. Many respondents viewed algorithmic recommendations as impersonal or overly generic, which reduced their effectiveness in creating meaningful connections with the consumer (Pizzi et al., 2021). These findings suggest that technology, while useful, cannot replace the need for genuine, human-centered interaction. To build deeper and more enduring relationships, brands must shift focus toward two-way engagement on digital platforms. Interactive content, consumer participation, and timely responses from brands help create a sense of connection and recognition. Influencer marketing, when implemented thoughtfully particularly through partnerships with micro- influencers who reflect the brand's values can further reinforce credibility and trust (De Veirman et al., 2017). Additionally, maintaining a transparent and responsive review ecosystem remains essential, as peer-generated content continues to play a central role in shaping consumer perceptions and decisions. While personalization remains an important strategy, it must be executed with openness about how consumer data is used, in order to address growing concerns around privacy and authenticity. Loyalty programs,

too, must evolve beyond traditional reward systems. Experiences that foster emotional engagement such as early product access, exclusive brand events, or opportunities for co-creation can help consumers feel more personally invested in the brand. Finally, in a culturally diverse market like India, local relevance is key. Brands that tailor their content to regional languages, cultural festivals, and specific community values are more likely to connect meaningfully with their audience. In essence, brand loyalty in digital India is driven by a combination of technology and human sensitivity. It is not automation alone, but a thoughtful blend of cultural awareness, transparency, and emotionally resonant strategies that will determine how successfully brands can build and sustain consumer loyalty in this vibrant and complex market.

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The Role of Ephemeral Content in Shaping Consumer purchase Decisions and Loyalty in the Digital Age

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Abstract

In the changing digital world, ephemeral content such as short social media Instagram stories, Facebook stories, Snapchat snaps, WhatsApp status, YouTube shorts are all huge influence forms for consumers to interact with brands. This kind of content is created in such a way that it disappears within 24 hours and it creates such environment that it seems there is a lot of urgency and it automatically attracts consumers. It especially attracts consumers who are digitally connected from the beginning such as Gen z or Millennial. It also include temporary nature, ephemeral content shows a powerful ability to influence both consumer purchase decision and long term loyalty. This research explores how ephemeral content has a psychological and behavioral impact on consumers, especially how it shapes purchasing decisions and raise emotional connections with brands. This study explores several points such as FOMO, authenticity, social proof that contribute to taking action quickly and achieving long-term outcomes. In this, mixed method research design will be used in which consumer surveys and content will be analyzed on all popular platforms like Instagram, YouTube, WhatsApp, and Snapchat. This study focuses on young people who use their

phones a lot to go online. This research will focus on them but its results will apply to all people who live in other parts of the world. Some research has shown that short content like stories and reels also grab a lot of attention quickly and help the brand stay in people's minds and show them in a fun, creative and useful way. This paper also adds how digital marketing and consumer behavior connect with short form content (like stories or reels) for long term brand success. Along with this, marketers will also get useful tips on how to improve short content to increase sales and to call back customers.

Keywords – *ephemeral content, social media marketing, consumer behavior, purchase decision, brand loyalty, short form content.*

Introduction

First picture this-When we wake up in the morning, we firstly grab up the phone. After turning off the alarm, it feels like we are opening the curtain of the world. The app's notification tells us what happened throughout the overnight. We quickly complete our breakfast by swiping and when we go to our job, school or college, we see that many people have shared visual things online as if they are painting our routine life. Throughout the day, whatever selfies we take, food we eat, go for a walk, any new things we see or we do and whatever latest experience we have, we see it all on Instagram whoever we follow or whether it is on Instagram. In today's digital world, marketing is all about speed, connection, and real experiences. Out of all these, one big change that has come in the last few years is the rise of ephemeral content, like short content that disappears after some time or after 24 hours. This includes stories on Instagram, Facebook or WhatsApp, snaps on Snapchat, and short videos like YouTube shorts and Instagram reels. All these quick or temporary posts change the way how people interact with brands online. All of these are fast, fun, and real. Young audiences, especially millennial and Gen Z also like this kind of content. These people not only watch casually but they also respond very quickly, share it, participate in polls, shop with swipe ups, and message the brand directly. In 2025 this trend is growing more and strongly too. According to the data report in 2025, more than 5.04 billion people are using social media all over the world. And among them, 68% watch stories and reels daily. This is a huge number to engage people with short content regularly. These quick posts are not just for fun but they also influence people on how they think about brands, what to buy and which companies will remain loyal for a longer time.

What is ephemeral?

The word ephemeral means something that is temporary or lasts for a short time. Ephemeral content means short content that is visible for a few hours only and then disappears but is

still visible after that by putting in a highlight on it. For example: -

- Instagram stories – They disappear after 24 hours.
- Facebook stories – They disappear 24 hours or within a day.
- Snapchat snaps – They disappear after being viewed.
- Instagram reels- These are always there but their effect is short because they are made to grab your attention for a very short time like 15-30 seconds but now this is of 90 seconds and we can delete that at any time.

Changes in digital consumer behavior

The development of digital technology has changed consumer behavior in multidimensional way. In traditional advertising methods like TV, radio and newspapers are no longer enough to attract consumers. Today's consumer is fast, dynamic and wants various new things. In digital, consumers feel connection with brands that are transparent, real and feel personal. And that's why they choose social media marketing tool in this ephemeral content reduces the distance between the consumer and the brand and creates an environment in which the consumer feels that he or she is a part of that brand.

So, why is ephemeral content so effective? There are three main reasons

FOMO (Fear of Missing Out) - The stories and reels get disappear after some time and people feel that they have to see all this right now and if they are not able to see it, then they miss out on something very exciting like limited time sale or special offer.

Authenticity - Brands mostly use stories to show all behind the scenes (BTS) moments, they share personal experiences of real customers and post casual updates. All of this feels more genuine and is less polished which builds trust. People prefer real-life content instead of always perfect ads.

Interactivity - In stories, people can vote in polls, ask questions, use countdowns or send replies directly to brands. This two way communication helps in creating a closer relationship between the brand and customer or people feel it and also involved in it.

Comparison of ephemeral content and traditional content

Feature	Ephemeral content	Traditional content
Duration	24 hours or less	Day/week/month
Format	Short form video or image	Pemplates, hoardings or newspaper
Interactivity	Polls, swipe up, Q&A, emojis	None or very limited
Interaction	Automatic	One way communication
Cost for brands	Low to moderate	High
Urgency (FOMO)	High (limited time offers)	Medium
User control	User generated or influencer based	Brand controlled

Through this table, we compare the difference between ephemeral content and traditional content and after seeing all their comparison, we come to know how ephemeral content is more effective for us and due to this reason, consumers give more preference to ephemeral content. All of these features make ephemeral content more powerful not just because it drives quick sales but because it creates a strong emotional connection with customers. It builds familiarity with the brand and encourages repeated involvement and helps build long-term loyalty. This research paper explores how ephemeral content shapes consumer choices and builds brand loyalty both in the short term and over time. And it looks at –

- What is the psychological reason behind that why so many people are involved in this disappearing content?
- How real brands use ephemeral content to increase sales and build customer trust?
- What the latest research and data (2022 to 2025) say about this trend.

After studying all this, this paper shows how the business is moving fast in the digital world by using story reels or other short formats that not only grab attention but also coming back the customers. In simple terms, in this digital age, “it is not about who shouts louder than everyone but who connects very quickly and genuinely”. Even if the ephemeral content is temporary but it leaves an impression till the end.

Literature Review

Short content on social media like instagram reels, snapchat stories, you tube shorts and facebook ads is becoming more popular especially among young users but nowadays it is popular among in all users. Ephemeral content was first popularized by Snapchat in 2011 and very quickly became a main feature of platforms like Instagram (stories launched in 2016), WhatsApp (status in 2017) and YouTube (shorts in 2020). This format is used for promotions, product launches, for Q&A or for influencer collaborations.

Antipova (2020) explored how fashion brands use both permanent and temporary content like stories on instagram which promotes them well. It is also found that users trust permanent posts more but still like the stories. This study also noted that not many people have shopped on instagram yet, which we hope to do soon. And the most active and attractive group with fashion brands is those aged 20-29. Similarly Pal (2024) explored how people respond to short brand content on Instagram stories, particularly for travel-related brands. This study found that users like stories that provide them useful or creative information and when content is useful, fun or creative, people are more likely to like the brand and take action. This research explains how short stories are disappears and how they change attitudes and encourage user behavior. This connects with current studies that focus on short term content that not only grab attention but also plays a role in long term consumer loyalty. While Pal's research focused on how short term behavior influences purchase (clicking on a link). But there is still a gap in understanding how repeated content every day affects the deeper relationship with the brand. However, Talreja and Chaturvedi (2024) looked at different instagram ad formats like reels, stories, image posts and videos. Their study showed that some content get more likes, comments, shares and people also engage with that ads and grab quick attention. The goal help brands to choose the most effective content for better customer interaction and promotion. But there is still a gap on how this kind of content can build long term consumer loyalty which is what the current research aims.

In recent years, social media has continuously influenced that how consumers behave especially with the rise of short and ephemeral content. According to Ridko (2024) studied the influence of short form video content on platforms like instagram, snapchat, you tube

and facebook. This research explores that how short and attracting videos change consumer decision and how consumers interact with the brand. This is all happen because of their entertaining and connected nature with viewers and these videos also grab more attention and create a stronger brand connection with customers. This shows that short content is not just for entertainment, but it is also a very powerful marketing tool that affects consumer decisions. Another relevant study by Veloso da Silva (2025) focuses on short content, especially for instagram stories. This research shows how young people (18-22) use short content that is disappear within 24 hours to express themselves online (self-presentation). This study shows how short content has become a part of everyday visual conversation for young people. It shows how temporary posts, stories and reels are for fun but at the same time they build and share their identity in the digital world. This research also tells us how people are more connected and how they have changed the way to present themselves through speaking and self-presentation. It also highlights that how ephemeral content shapes identity, communication and post sharing among youth. It matters because smartphones and apps like instagram, snapchat have changed that how people share photos and videos. This study helps us to understand how young people use these marketing tools to shape their online identity.

According to Maaroufi (n.d.) studied shows that how social media marketing especially instagram stories and reels affects customer decision in a local retail store in Finland. The findings show that using short form content increase consumer connection and sales especially when businesses use trending content and respond to customer feedback. This study proves that small businesses can also use social media more effectively to attract and retain customers. This study shows how short content has become a part of everyday visual conversation for young people. In this study Nawrocka, Borowicz, Kuczewska (2024) explains how small businesses are using Instagram in a smart or creative way to grow their business. After COVID-19, business owners have realized that digital tools (especially Instagram) are important to reach customers, increase sales, maintain their brand image and stay ahead of their competitors. This research has found that Instagram new innovations in bringing stories and posts are helping them achieve business goals. According to Chiara Breda (2024) this study shows that emotional language used in storytelling on Instagram, and using lots of surprising twists and visual techniques makes people feel more connected

and are more engaged in commenting and sharing. It also warns how it sometimes spreads wrong information and this causes problems for strong opinions too. This research suggests that companies and brands should carefully create stories that focus on emotions and improve talking. Study by AI- Ghamdi (2025) how do people feel about their privacy when they use these platforms? This research has been done by university students from the U.S. and Saudi Arabia. This shows that users like to trust a lot when they use these platforms only when they feel that their personal information is completely safe and is being handled well. These studies also check which platforms follow global privacy which makes users feel more secure. Another study by Kwofie (2024) study focuses on how students in Ghana use Instagram and Snapchat to find new products. Many students say they prefer Instagram because it is easier to use and has better visuals and they can shop directly from it. They also say that they trust influencers and making friends when they have to make a purchasing decision. This study suggests that the content created such as live videos, product demos feels real and honest to them instead of ads which feel fake to them. They also like Snapchat for its private and unique interactions and it is not mostly used for shopping. These studies highlight genuine influencer collaborations, product pricing is clear, and there is a lot of influencing content for a effective social marketing. But in this study, we have seen that very less sample has been taken like only 15 students have been taken and the report of answers has been prepared by themselves. It has been seen that Instagram is more popular than Snapchat for finding products. Students liked Instagram because it is easy to use and it is very interesting to see images and videos and it also makes one feel like buying a product. It shows that ephemeral content really works and users need to trust these platforms and need to be more engaging. They help brands to connect better with their audience in highly.

Research Methodology

This study approaches the mixed method research design to know the that how ephemeral content give shape to the consumer buying decision by quantitative approach (analyze data from surveys by statistical tools) and qualitative approach (from interviews and content analysis).

Secondary data collection: -

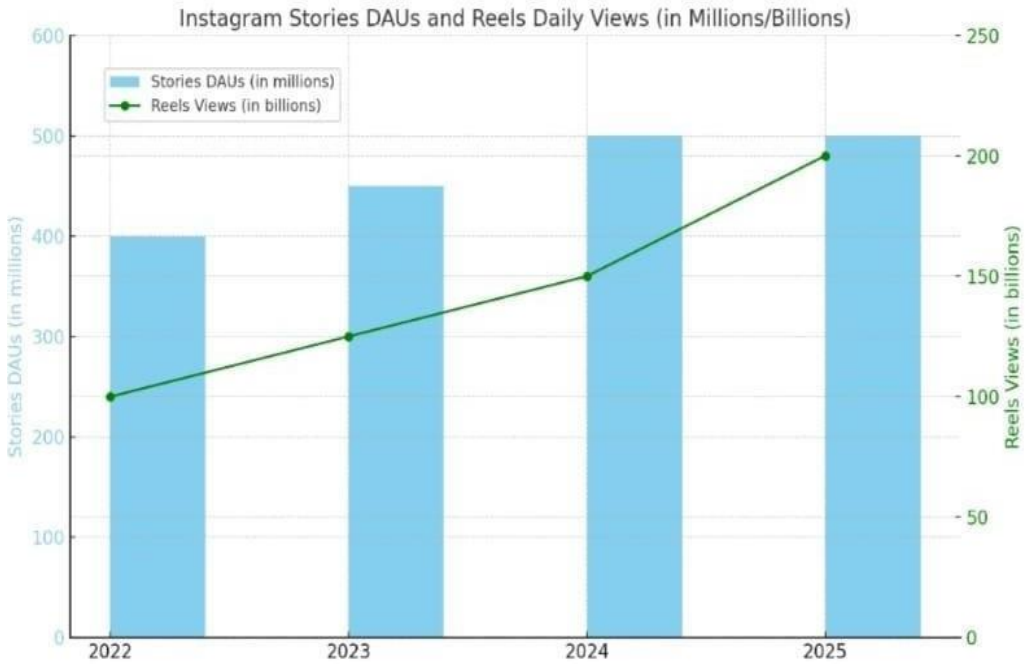
Data sources – Statista, Hub spot, Data reportal, Google, journal articles. Period covered – 2022 to 2025

Platforms analyzed – Instagram, YouTube, Snapchat, WhatsApp, Facebook.

Data Collection

Table 1 - Growth in instagram stories daily active users and reel views (2022 to 2025)

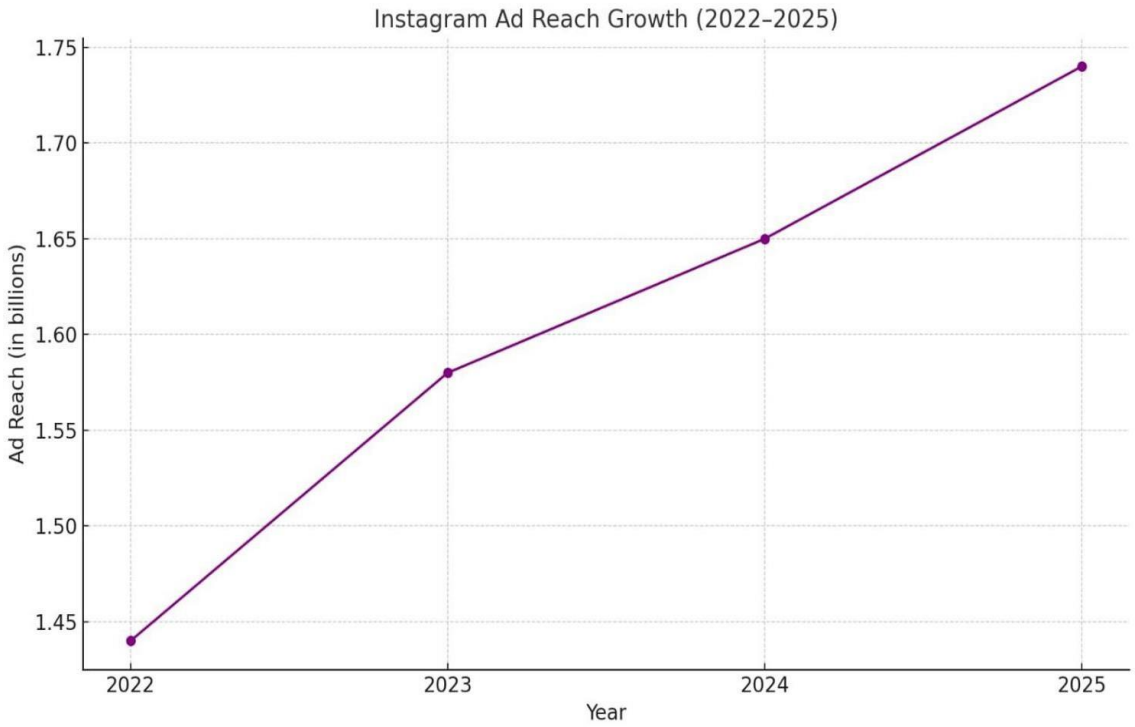
Year	Instagram stories daily active users	Instagram reels daily views
2022	400 million	100 billion
2023	450 million	125 billion
2024	500 million	150 billion
2025	500+ million	200 billion



This chart shows the growth in Instagram Stories Daily Active Users (DAUs) and Instagram Reels Daily Views from 2022 to 2025. Stories DAUs increased from 400 million to over 500 million, while Reels daily views grew from 100 billion to 200 billion during this period, reflecting the platform's increasing emphasis one phemeral

Table 2- Instagram Ad reach growth (Jan 2022 to Jan 2025)

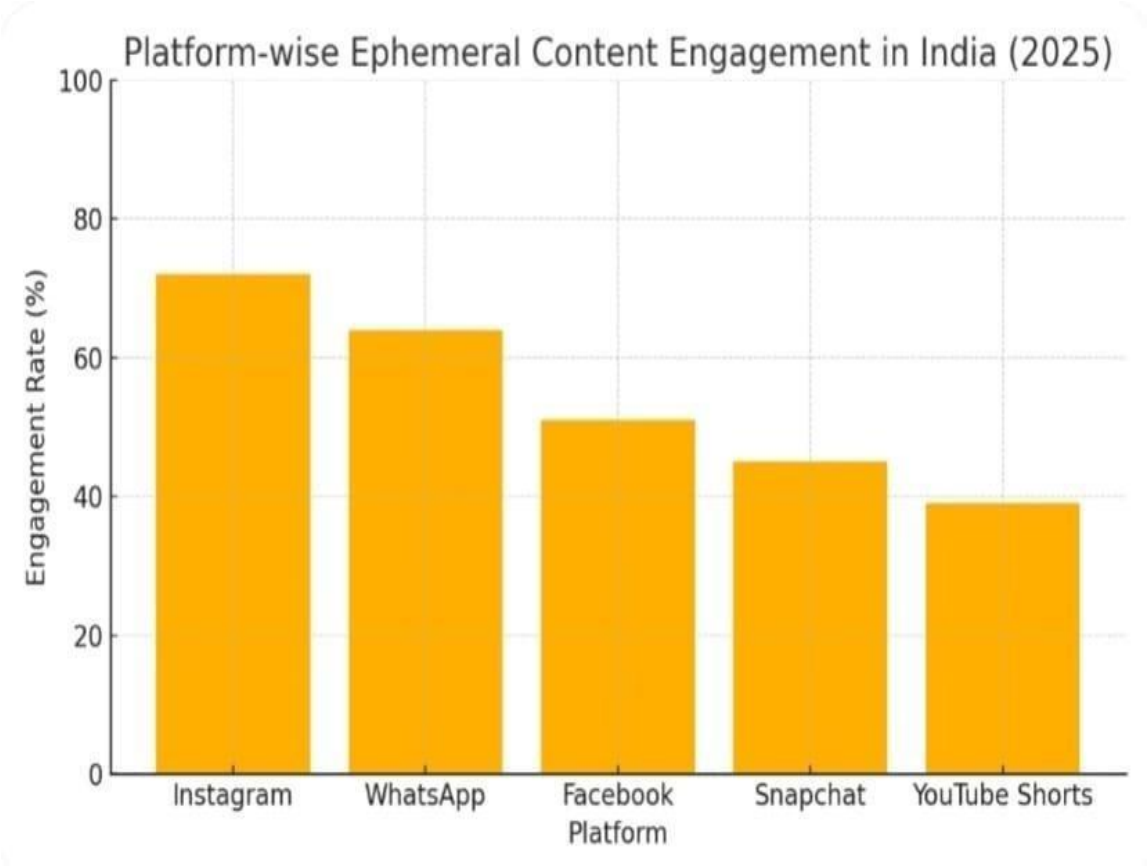
Year	Instagram Ad reach (in billion)	Year growth
2022	1.44	-
2023	1.58	+9.7%
2024	1.65	+4.4%
2025	1.74	+5.5%



This chart illustrates the steady growth in Instagram's global advertising reach from 1.44 billion in 2022 to 1.74 billion in 2025.The year-over-year increase highlights Instagram's expanding influence as a platform for ephemeral content marketing, allowing brands to reach more users through short-form videos and Stories.

Table 3 - Platform wise ephemeral content engagement in India (2025)

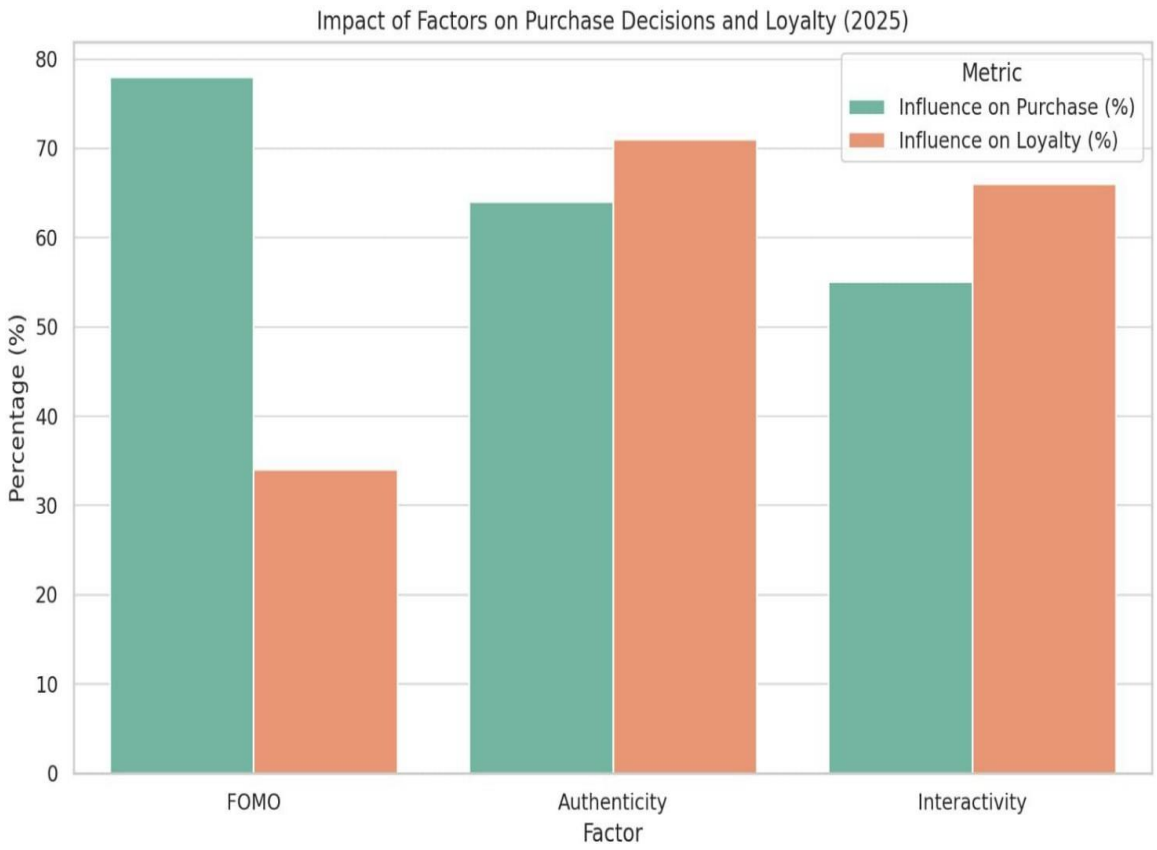
Platform	Engagement rate (In %)
Instagram	72%
WhatsApp	64%
Facebook	51%
Snapchat	45%
YouTube Shorts	39%



This chart highlights the percentage of Indian users engaging with ephemeral content (Stories, Reels, Status updates, Snaps, Shorts) on major platforms in 2025. Instagram leads with a 72% engagement rate, WhatsApp (64%) and Facebook (51%), Snapchat (45%), YouTube shorts (39%). These figures reflect the widespread and effectiveness of short-lived content in India's digital marketing.

Table 4 – Impact factors on purchase and loyalty

Factor	Influence on purchase (In %)	Influence on loyalty (In %)
FOMO	78%	34%
Authenticity	64%	71%
Interactivity	55%	66%



This chart highlights the % of influence on purchase and influence on factor is - FOMO (Fear of Missing Out) influences 78% of purchases, but less on loyalty (34%). Authenticity plays a major role in building loyalty (71%) and also impacts purchase (64%). Interactivity significantly enhances loyalty (66%) and purchases (55%).

Discussion

The result of this study shows that ephemeral content which are posted for a short time like Instagram stories or reels, WhatsApp, Snapchat snaps, Facebook stories and YouTube shorts all these have become the biggest and strongest way to grab people's attention and influence

them in their choices and they also become much more important than the time pass trend. Because this post disappears in 24 hours and in less time than people feel that this is urgent and they should not miss this opportunity. Apart from this, it is temporary in nature but its impact on the customers last for a long time. It not only grabs attention in a moment but it also builds a very strong relationship that lasts a long time between the brand and the followers. The biggest reason why ephemeral content is doing well is because of FOMO (Fear of Missing Out) pushes them to react immediately, be it checking out the brand, voting in a poll or making a purchase. When people know that content is going to disappear soon so they check it very quickly right away. This is why they take quick actions like clicking, visiting the website or making a purchase. However, this short term attention is not just about benefits. When brands post related, relatable content, behind- the – scenes (BTS) content, they feel it and their trust increases. This is what they build an emotional connection for loyalty whole time.

Another point of this is that this kind of content feels much more real and personal when compared to traditional ads. It is much less polished which seems more genuine and trustworthy. Today's consumer’s value those brands that make them feel free and natural. And along with this other things like polls, quizzes, live, Q&A sessions activate the viewers to participate and all this helps them in building a stronger connection with the brand as well as with their audience. Many findings also show that micro and nano influencers play a big role in this. They have a smaller following but their audience is more engaged and trusts their recommendations. When these influencers use time-sensitive or interactive content the result becomes even stronger. For small or medium sized businesses, especially in industries like fashion and beauty this approach can be both effective and affordable.

Key Findings

- Ephemeral content helps both short term and long term - On one hand, it gives quick results like more views and sales. On the other hand, all these people come back because they feel more connected with the brand.
- Micro-influencers are very effective with this type of content - Because they relatable more than celebrities, their followers trust them more. When they post temporary stories or videos it gives the feeling that they are recommending them as a friend

rather than like an advertisement.

- It is not just about promoting the products but it is about telling a story – Brands that post stories regularly and share their journey, values, and real people behind the scenes get more loyal fans than those who only promote products.
- Interactive features increase involvement - Tools like polls, quizzes, countdowns, and music get people more involved. When followers participate, they are more likely to remember and care about the brand.

Challenges

Using ephemeral content also comes with some difficulties are:-

It's hard to track results accurately - Stories and snaps disappear quickly, it's tough to collect long term data and measure how much impact they really had.

Content has to be created all the time – To stay relevant, brands must be consistent. This means we have to coming up with fresh content every day and every week, which can be time consuming.

Despite these challenges, ephemeral content builds excitement, trust, and long-term engagement when used thoughtfully.

Marketing strategy suggestions

Based on the study, here are some clear ways brands can use ephemeral content to grow and keep their customers

Share sneak peeks of new products - Brands can post exclusive previews of upcoming products through stories. This makes loyal followers feel special, like they are part of an inner circle. It also builds curiosity and hype before the product officially launches.

Use polls and quizzes to gather quick feedback - Asking followers simple questions through stories (like “Which color do you like more?” or “What should we launch next?”) not only boosts engagement but also helps brands understand their audience better in real time.

Promote user-generated content (UGC) - When customers tag a brand or share their

experiences, the brand can repost this in their stories. It's like free advertising from real people, which builds trust and authenticity. It shows that real customers love and use the product.

Work with influencers in a natural way - Collaborating with micro or nano-influencers and letting them share your product in their own voice makes the content look more real. Followers trust influencers who feel genuine and aren't overly promotional.

Use countdowns and limited-time offers to drive urgency - By adding countdown stickers or short-term deals in stories, brands can encourage impulse buying. This taps into FOMO and makes people act quickly before the offer disappears.

In short, brands should stop thinking of ephemeral content as "just for fun." It can be a smart marketing tool if used the right way. It helps collect feedback, improve customer relationships, and even boost sales all while keeping the audience engaged.

"The key is to stay creative, consistent, and authentic. Don't just sell, tell your story and involve your followers in your journey."

Implications

Smart marketing move – Brands should make ephemeral content part of their main marketing plan, using its short life to create urgency and boost sales.

Better engaged – Use polls, stickers, and swipe-up links to get people involved and to learn more about what customers like.

Budget-friendly for small businesses – Partner with micro and nano influencers who can use this content style to build trust and engagement without high costs.

Trust build – Keep content constant, authentic and to create loyalty even if the posts only last a day.

Fit the culture – Adapt the style and tone of the content to match the local culture and audience preferences.

Research opportunities – Investigate that how technologies like AR, VR, and AI can be added to ephemeral content.

Conclusion

In 2025, ephemeral content is a much more powerful way to connect brands with people. This type of content like Instagram stories, WhatsApp status, Snapchat Snaps, or short reels disappear in a short time or even 24 hours. Because it is quick, real, and temporary, it is perfectly fit for a fast lifestyle and short time for today's consumers, especially those who are young and are always on their phone. People enjoy ephemeral content because it feels more personal and less polished than traditional posts. It gives us a behind – the – scenes (BTS) so we can see the brand, its products, and how it has influenced their lives. This content doesn't last forever that's why viewers are more likely to watch it right away and it creates a lot of urgency and excitement. This can lead fast buying decisions have to be made and a strongly emotional bond is created with the brand. For businesses, ephemeral content is a smart and affordable marketing tool. It doesn't require a big budget or creating any fancy tool. A simple video, product review, or quick message goes a long way to grab people's attention. This is extremely useful especially for small to medium sized businesses so that it can reach a lot of people without spending a lot of money. Ephemeral content is very flexible. Brands use them to show new things like new products, limited time offers, tell stories about the product, and also interact with followers through polls, questions and feedback. This kind of direct interaction makes customers feel valued and they feel they are also part of the inner brand and all this helps to build long term loyalty.

Another big advantage of this is that such content is easy to test and improve. Brands try different ideas quickly and figure out which one is working best. They check how many people viewed the content, how many clicked on it, and how many responded and using this data they make better marketing choices for the future. In today's digital world the trends change very quickly and people want a real experience. Ephemeral content offers the perfect way in which we can stay relevant and build trust as well. It is not just for selling products but it also makes connections and creates memories even if they are short. It is more than just an ephemeral content trend because it is a very powerful strategy for modern marketing. It helps businesses grow by increasing involvement, encouraging quick action

or building long term customer relationships. As technology and consumer habits continue to change, this type of content will likely play an even bigger role in shaping how brands communicate and succeed online.

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A Study on Identification of Customer Engagement Strategies Adopted by IT Companies

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Abstract

The paper "A Study on Identification of Customer Engagement Strategies Adopted by IT Companies" examines how, in the current, intensely competitive business environment, customer connection has become crucial to building long-lasting relationships and sustaining corporate growth. The various client interaction strategies used by IT Company, a global leader in IT services and consulting, are investigated in this study. The objective is to ascertain how perceives interaction among diverse clientele groups, industries, and geographical areas, as well as how these strategies promote value creation, client delight, and customer loyalty.

In order to determine the key principles of IT Company engagement framework, this study combines interviews, secondary data examination, and qualitative analysis. These include digital transformation initiatives, value co-creation, strategic partnerships, and customized client experiences. In order to encourage proactive client contact and long-term

collaboration, the study also examines how makes use of its technological platforms, domain expertise, and worldwide delivery strategy. The findings demonstrate that client engagement is centered on trust, inventiveness, and agility. Contextual information exchange, client-specific innovation centers, and the Business Framework are some of the initiatives that have been implemented to increase participation levels. The study also explains IT Companies commitment to open and reliable delivery has enhanced its client retention rates and reputation.

This study adds to our knowledge of how IT service providers can build enduring client relationships in a changing global marketplace. Moreover, it provides insights for scholars and practitioners seeking to develop scalable, human-centered engagement strategies. In the current digitally connected world, the study highlights the importance of strategic flexibility and a customer-centric mindset.

Keywords: *Customer Engagement Strategies, Customer Retention, Customer centric approach Digital Transformation, Value co- creation*

Introduction

Customer engagement has become a key factor in long-term business success in today's fast-changing digital world. This is especially true for IT companies that work in a highly competitive and innovation- driven environment. As technology keeps changing industries, IT service providers are under more and more pressure to have meaningful, personalized, and consistent interactions with their clients. Companies need to create and use complex customer engagement strategies that meet client expectations in a wide range of industries and locations as they move from transactional relationships to value-driven partnerships. Not only do these strategies make customers happier, but they also help businesses grow, keep customers, and build a good brand reputation.

The goal of this study is to look into and find the main ways that top IT companies get customers involved, with a focus on how these methods change depending on the type of customer, the needs of the industry, and the dynamics of the region. The study looks into how digital transformation projects, value co-creation, strategic partnerships, and customer-

focused innovations can all help improve engagement by using a mix of qualitative methods like interviews, secondary data analysis, and thematic interpretation. The results are meant to give IT company's useful information that will help them improve their relationships with clients and researcher's useful information that will help them learn more about engagement frameworks in the digital age.

Literature Reviews

Mil (2019) conducted an extensive study using the ADO-TCM framework to examine customer engagement on social media. The research identified eight categories of factors influencing social media usage and four distinct types of outcomes. Through an analysis of 107 variable relationships— categorized as positive, negative, or neutral the study offers a comprehensive view of the factors shaping customer engagement on digital platforms. This work is especially relevant for IT companies aiming to enhance interactive and enduring client relationships via social media.

Opereana (2021) highlighted the powerful role of social media in improving customer interaction and facilitating brand partnerships. The study found that real-time communication via social platforms significantly enhances engagement, allowing businesses to build emotional connections and deepen customer relationships. By leveraging analytics, brand pages, and PR efforts, companies can foster brand loyalty and advocacy critical goals for IT firms operating in digital ecosystems.

Bhargava (2022) focused on the impact of content type and media formats in social media marketing, emphasizing the importance of aligning content with audience preferences to drive engagement. The findings support the growing view that content personalization plays a pivotal role in successful digital marketing strategies. IT companies can leverage these insights to refine their media strategies and create stronger digital bonds with target audiences.

Anjorin (2024) examined how social media marketing can be a strategic tool for competitive advantage in the digital era. The study underscores the need to align marketing tactics with consumer expectations, and it explores ethical challenges alongside the effectiveness of value-driven campaigns. This research offers IT companies roadmap for using social media strategically to improve brand perception and customer relationships in dynamic markets.

Research Methodology

This research adopts a descriptive design to provide in-depth insights into the customer engagement strategies used by IT companies. The study's primary aim is to understand how these companies interact with clients and implement engagement initiatives across diverse platforms and contexts.

Both **primary** and **secondary** data were collected. Primary data was obtained through structured surveys targeting IT professionals, focusing on the specific methods employed to foster customer engagement. Secondary data including industry reports, scholarly literature, and company case studies was used to validate and contextualize the findings.

A **snowball sampling technique** was employed to reach knowledgeable participants within the IT sector, ensuring access to informed perspectives. This methodology provides a robust foundation for analyzing and interpreting engagement frameworks, and it also encourages further research in this rapidly evolving area.

Analysis

This section presents a detailed analysis of the data collected from respondents regarding customer engagement strategies adopted by IT companies. The analysis includes demographic profiling, communication preferences, customer satisfaction levels, and key drivers of engagement. Descriptive statistics are supported by appropriate graphical representation to enhance clarity and interpretability.

Figure: 1 Demographic Profile of respondents

The respondents' demographics is crucial to comprehending the context of customer interaction. Age, gender, education, and occupation are some examples of variables that can affect preferences and satisfaction levels. The demographic distribution of the participants (n = 105) is shown in the following charts.

Figure: 2 Communication preferences

A key element of customer engagement strategies in IT companies is effective communication. This section examines communication channels, frequency, and personalization.

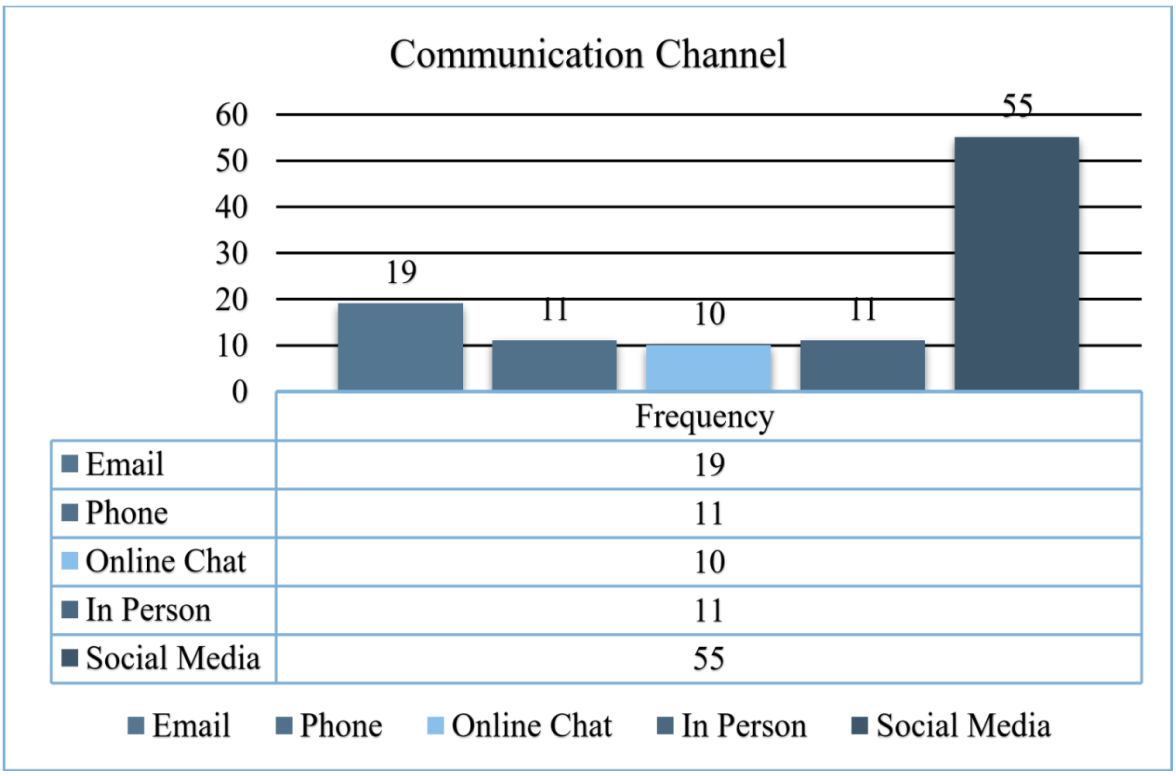


Figure: 3 Communication Engagement

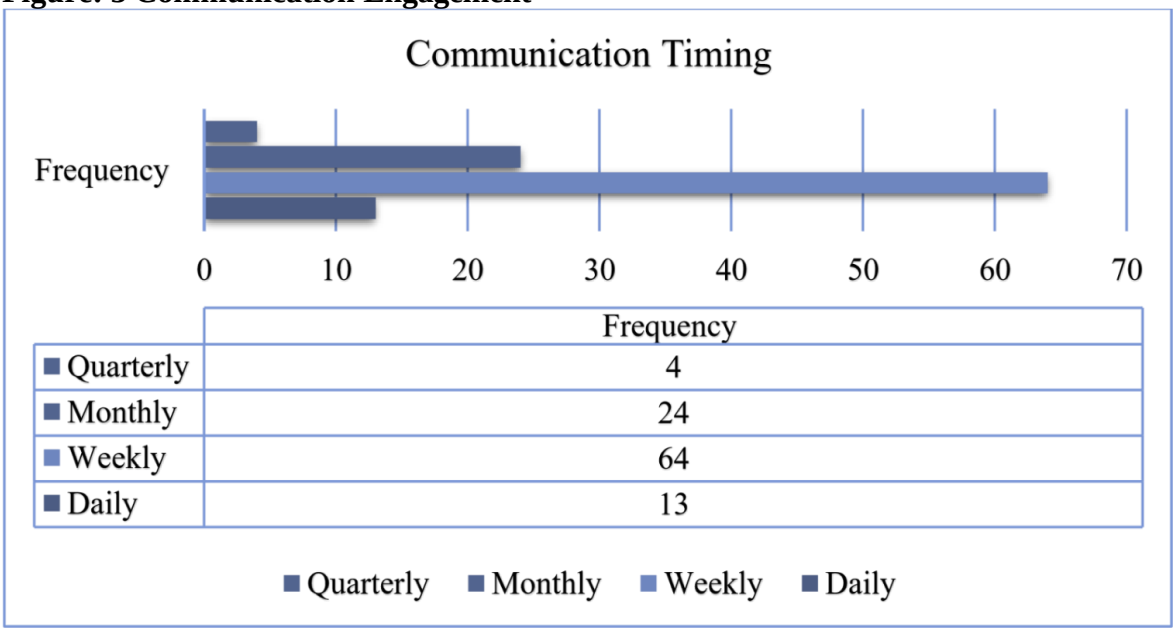
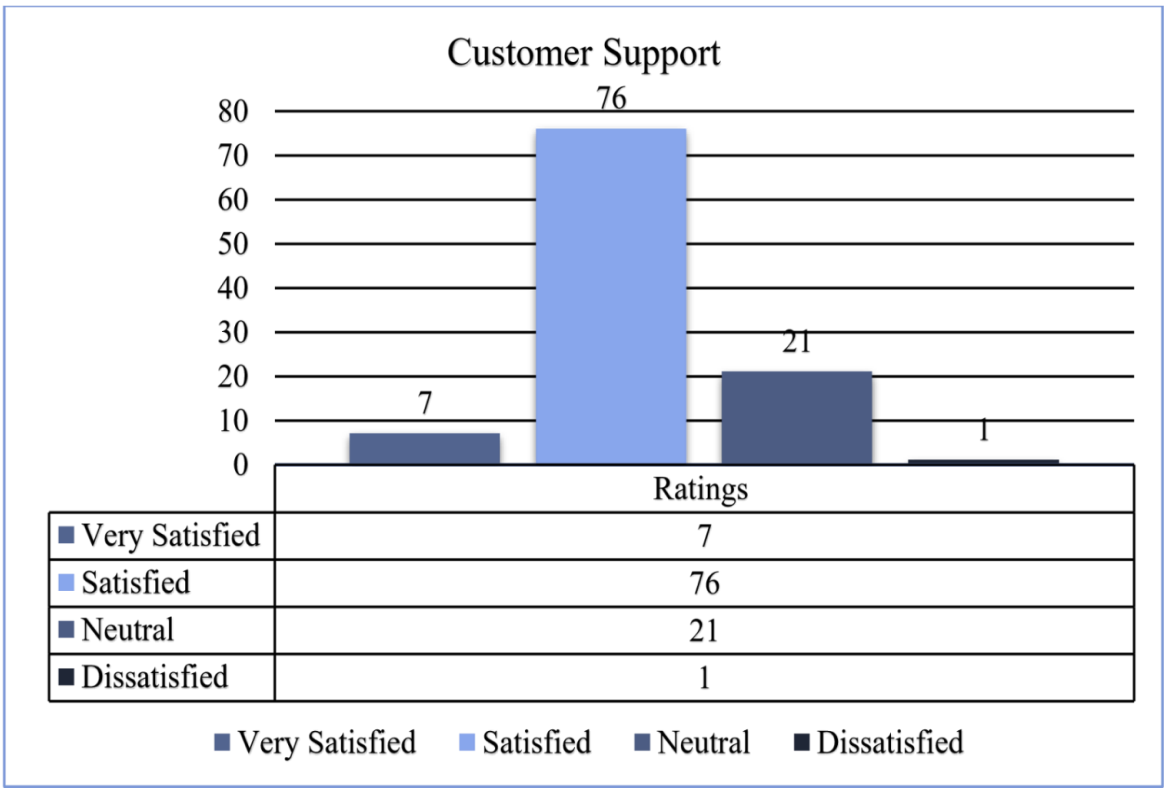


Figure: 4 Satisfaction with services and support

A key factor in determining sustained engagement and loyalty is customer satisfaction. A number of service elements, such as customer service, communication quality, and overall product/service quality, were rated by respondents.



In addition, a regression analysis has been performed to examine the relationship between respondent's demographics and their perception of the effectiveness of marketing efforts by IT companies. Each subsection is accompanied by visual aids to illustrate the findings and support the interpretation.

A simple linear regression was conducted to examine whether respondents perceived effectiveness of IT companies marketing materials predicted respondent age. The model explained only 0.25% of variance in age, R2= .0025, F (1,103) = 0.259, P= .612. The slop coefficient was β = -0.0438, t (103) =
- 0.509, p= .612 indicating that perceptions of marketing effectiveness were not significantly associated with age.

- Model Statistics: R2 = 0.0025, Adjusted R2 = 0.0072

- F (1,103) = 0.259, p= .612
- B = -0.0438, t = -0.509

Note: p > .05, this indicates non significance, a P value this large means we cannot reject the null hypothesis.

Regression Output

Predictor	Coefficients	SEB	t stat.	p value	Confidence interval lower 95%	Confidence interval upper 95%
Intercept	1.803	0.184	9.787	< .001	1.438	2.169
Effectiveness X value	-0.0438	0.086	-0.509	.612	-0.215	0.127

R2 = .0025, Adjusted R2 = -. 0072, F (1.103) = 0.259, p= .612

Interpretation: The regression model did not yield a statistically relationship between perceived effectiveness of IT companies marketing materials and respondents age (β = -0.044, p= .612). The very low R2 (.0025) and negative adjusted R2 (-.0072) indicate the model explains virtually none of the variance in age. Hence, perceived marketing material effectiveness appears unrelated to age in this sample. Given the low explanatory power, caution is warranted in drawing any substantive conclusions.

Findings and Conclusion

The analysis revealed that most respondents were between 25–34 years old, representing a younger demographic. Many had interacted with IT companies for 1–2 years and preferred weekly communication, predominantly via social media platforms. This points to the increasing relevance of digital channels in maintaining engagement.

Overall satisfaction with IT companies' services and support was high. Respondents appreciated the quality of communication, relevance of marketing content, and professionalism in service delivery. Key factors contributing to satisfaction included

personalized interactions, service reliability, and consistent follow-up.

Based on the findings, it is recommended that IT companies periodically assess their marketing strategies and refine them based on consumer insights. Campaign performance should be evaluated against clearly defined metrics, and data-driven adjustments should be made to maximize ROI and engagement outcomes.

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Digital Sustainability in Direct Selling: Incorporating Green Marketing into E-Commerce within MLM

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Abstract

As environmental concerns shape modern consumer expectations, Multi-Level Marketing (MLM) companies are increasingly integrating green marketing practices with digital sales platforms to build sustainable brand equity. This paper examines the intersection of green marketing and e-commerce in the context of direct selling, with a focus on how digital sustainability is influencing MLM strategies. Drawing from literature on green consumer behaviour, technology adoption, and brand trust, a conceptual framework is developed to analyse how eco-conscious branding and digital interactions influence consumer perceptions and distributor engagement. Secondary data from corporate reports, case studies, and academic sources highlight both the opportunities and challenges of

implementing green marketing through e-commerce in MLM. Key findings suggest that digital literacy, authenticity in green claims, and meaningful engagement between distributors and consumers are essential to fostering loyalty and trust. The paper concludes by proposing a research model for future empirical studies and offering strategic recommendations for MLM firms aiming to achieve long-term.

Keywords: *Green Marketing, E-Commerce, Multi-Level Marketing (MLM), Digital Sustainability, Green Brand Equity, Consumer Trust.*

1. Introduction

1.1 Background of the Study

In recent years, marketing has undergone notable changes driven by two key trends: the shift towards sustainability and the rise of digital business models. The focus on sustainability and digital transformation is driving companies to review their operations. Digital tools improve customer engagement, increase efficiency, and support environmental objectives. IoT allows real-time monitoring of emissions and resources, AI forecasts risk for proactive measures, and blockchain guarantees transparency in supply chains (Audu et al., 2024). Digital platforms provide personalised, eco-friendly services with a global reach (Taherdoost, 2023). This development is significant in Multi-Level Marketing (MLM), where firms are increasingly adapting to evolving consumer demands for environmental awareness and technological convenience.

MLM, or network marketing, is a distribution approach that relies heavily on independent distributors who sell products directly to consumers and recruit others to do the same (Peterson & Albaum, 2007). Traditionally, MLM relied on personal selling, word-of-mouth promotion, and offline relationship building. However, with the growth of digital platforms and a focus on sustainability, MLM companies are now adopting new strategies, such as e-commerce and green marketing practices (Bansal & Song, 2017). The merging of digital marketing and sustainability, often referred to as digital sustainability, is increasingly influencing consumer preferences, particularly among environmentally conscious and tech-savvy audiences.

1.2 Rise of Sustainability and Digital Transformation in Marketing

Rising global awareness of climate change, stricter regulations, and the increasing number of eco- conscious consumers have made sustainability a core element of business strategy. According to the United Nations (2022), sustainable consumption and production are essential for achieving the Sustainable Development Goals (SDGs), with marketing playing a significant role in shaping consumer behaviour. As a result, many companies are adopting green marketing strategies highlighting the environmental benefits of their products or services to protect their brand image and build consumer trust (Peattie & Belz, 2010).

Simultaneously, the rise of digital tools, including e-commerce platforms, mobile apps, and social media, has transformed traditional marketing into a more interactive and data-driven process. Digitalisation offers new opportunities for businesses to connect with customers, tailor their offerings, and expand their market reach, which is especially important in MLM structures where direct engagement is crucial (Tiago & Veríssimo, 2014). Therefore, integrating sustainability with digital transformation presents a promising area to explore, particularly for MLM companies seeking legitimacy, growth, and social responsibility.

1.3 Importance of Green Marketing in the MLM Context

MLM companies, which heavily depend on product trust, peer recommendations, and ethical standards, are well-positioned to adopt green marketing. Today's consumers prefer brands that demonstrate authentic environmental and social commitments (Nguyen et al., 2019). Implementing green marketing in MLM can enhance consumer trust and motivate distributors, as those who are focused on environmental issues are more likely to promote sustainable products (Chen, 2010). E-commerce platforms are vital for MLM companies to showcase their sustainability efforts, including eco-friendly packaging, carbon-neutral shipping, and certified organic or cruelty-free products, thereby strengthening their brand identity and fostering customer loyalty. Antony et al. (2024) emphasise that eco-friendly packaging has a significant influence on consumer perception and purchasing decisions. Digital platforms enhance the visibility of these initiatives, encouraging greater engagement with eco-conscious consumers (Nadi & Wasesa, 2024). Miguel and Miranda (2023) also observe that digital media effectively promote environmentally conscious behaviours and mindful consumption. The SEER model highlights how e-commerce can effectively

communicate a product's environmental impact and build trust in sustainability labels (Hoque, 2023). Sustainable marketing through digital channels not only boosts credibility but also fosters a more environmentally friendly business environment (Singha et al., 2023). Consequently, integrating green marketing strategies with digital tools opens new pathways for MLM companies to succeed in a competitive and ethically conscious market.

1.4 Research Gap and Rationale for Conceptual Development

Previous research has investigated green marketing in traditional retail (Peattie & Belz, 2010; Leonidou et al., 2011) and the influence of digital transformation on marketing practices (Tiago & Veríssimo, 2014). However, there is limited exploration of how green marketing intersects with e-commerce, specifically within the MLM sector. Most studies on MLM concentrate on distributor motivation, compensation plans, or regulatory issues, with less focus on sustainability strategies and digital integration (Albaum & Peterson, 2011).

Additionally, limited conceptual frameworks explore how digital sustainability can transform the MLM ecosystem, particularly in terms of consumer perception, distributor engagement, and long-term sustainability. This paper aims to address this gap by developing a practical framework that combines green marketing with e-commerce in MLM, providing a fresh perspective for researchers and practitioners focused on sustainable direct selling strategies.

1.5 Objectives and Scope

The primary objective of this paper is to develop a conceptual framework that emphasises the significance of digital sustainability. It is defined as the combination of green marketing and e- commerce, aimed at improving the success and credibility of MLM companies. Specific objectives include:

To examine the main elements of green marketing tailored for MLM businesses. To assess how e-commerce and digital platforms foster sustainable practices.

To develop a conceptual framework that connects digital sustainability to tangible results for MLM distributors and consumers.

To determine future research directions in the field of sustainable direct selling.

This paper is limited to a conceptual analysis and does not include empirical testing. It focuses on MLM businesses operating in digitally active and sustainability-conscious markets, using examples from both global and Indian contexts.

2. Literature Review

2.1 Green Marketing

Definition and Evolution

Green marketing involves creating and promoting products and practices that prioritise environmental friendliness and sustainability (Peattie & Charter, 2003). It originated in the 1980s as a reactive response to growing environmental regulations and increased consumer awareness. Over the years, it has developed into a strategic tool for distinguishing products and enhancing the value of sustainable brands (Polonsky, 1994).

Peattie and Belz (2010) highlight that green marketing has evolved into sustainability marketing, which addresses not just environmental concerns but also economic and social aspects. This transition signifies a deeper integration of ethical and environmental priorities into core business strategies.

Green Marketing Strategies in Direct Selling

Green marketing influences how products are perceived and motivates distributors in direct selling and MLM by emphasising eco-friendly aspects, such as biodegradable components, recyclable packaging, and cruelty-free testing. Companies such as Amway and Herbalife utilise these strategies to attract environmentally conscious consumers and enhance their brand reputation. Eco-labels and sustainable packaging resonate with customers' environmental values, positively influencing their attitudes and purchase choices (Muraleedharan & Maheswari, 2024). Rising awareness of environmental challenges is boosting demand for green products, prompting companies to adopt sustainable practices and foster brand loyalty. The trustworthiness of green claims is vital, with transparent communication boosting consumer confidence (P, 2024). Green marketing provides a

distinctive selling point that helps them stand out (Shah, 2023). Incorporating green strategies into branding encourages pride and engagement among distributors (Abel & Chinaza, 2024). Green strategies in MLM extend beyond the product itself to encompass training distributors on communicating sustainability benefits, utilising environmental certifications, and maintaining transparency throughout the supply chain (Leonidou et al., 2011). These approaches help build consumer trust and strengthen distributor loyalty.

Greenwashing vs Authentic Green Branding

A key challenge in green marketing is distinguishing between authentic sustainability initiatives and greenwashing, where companies make deceptive claims about environmental benefits (Delmas & Burbano, 2011). In MLM, such misleading practices can significantly harm both the brand's and the distributor's credibility.

Authentic green branding depends on third-party certifications, clear communication, and proven results (Chen, 2010). For MLMs, authenticity is essential because their reputation is based not only on products but also on the trust established between distributors and consumers.

2.2 E-Commerce in Direct Selling / MLM

E-commerce Adoption in MLM

The rise of e-commerce has transformed traditional business models, including MLM. Previously dependent only on in-person interactions, MLM companies now utilise digital platforms for recruiting distributors, promoting products, and engaging customers (Tiago & Veríssimo, 2014). Adopting e-commerce in Multi-Level Marketing (MLM) enhances distributor efficiency and reduces costs through features such as real-time product tracking, digital catalogues, online ordering, and automated commissions. Real-time tracking boosts inventory and supply chain management, reducing waste (Sharma, 2024; Arumugam et al., 2024). Digital catalogues and online orders lower printing costs, minimise errors, and improve customer experience (Monry, 2024). Automated commissions lessen administrative work, ensure accurate payments, and foster distributor trust (Arumugam et al., 2024; Preston & McCarthy, 2018). E-commerce also reduces overhead by eliminating the need for physical stores and supports cost-effective marketing strategies, such as SEO

and social media (Sharma, 2024; Monry, 2024). Despite challenges such as initial IT costs, cybersecurity, and digital literacy, strategic planning enables MLMS to fully benefit from e-commerce fully ("Assessing the Economic Benefits of E-Commerce Adoption for Small and Medium Enterprises (SMEs)," 2024).

Role of Digital Platforms in Customer-Distributor Interactions

Digital tools, including social media, e-commerce platforms, and mobile applications, have revolutionised the way MLM distributors connect with customers. These platforms enable personalised interactions, targeted marketing efforts, and instant feedback (Kim & Mauborgne, 2014). Additionally, platforms such as Instagram, WhatsApp, and Facebook enable distributors to share testimonials, conduct live product demos, and tell stories, helping to humanise the brand and strengthen consumer relationships (Tiago & Veríssimo, 2014).

Benefits and Challenges of Incorporating Digital Tools

As discussed in "The Impact of Digital Marketing on MLM" (2025), integrating digital tools into MLM offers multiple benefits, including reaching a broader and more diverse audience, presenting products and testimonials effectively, and enabling MLM distributors to communicate and engage with their customers and prospects. This, in turn, enhances the training and development of MLM distributors. (fastercapital.com). Nonetheless, it also introduces challenges, such as gaps in distributor digital literacy, cybersecurity threats, and potential conflicts between direct and online sales channels (Albaum & Peterson, 2011). Digital integration must be carefully managed to ensure that it empowers distributors rather than bypasses them, preserving the core structure of MLM while aligning with modern consumer behaviours.

2.3 Digital Sustainability

Concept and Relevance to Modern Marketing

Digital sustainability encompasses the integration of environmentally conscious principles into digital business strategies and operations. It involves leveraging digital tools to boost efficiency while also supporting sustainability goals, minimising waste, and encouraging

responsible consumption (Bansal & Song, 2017). In marketing, this approach enables brands to showcase their eco-friendly practices through low-carbon channels, such as digital brochures instead of paper, promote eco-conscious living, and gather data to enhance their sustainability initiatives (Nguyen et al., 2019).

Aligning Digital Practices with Eco-Conscious Branding

Aligning digital initiatives with eco-friendly branding enhances brand consistency and fosters consumer trust. For instance, promoting green messages on social media, offering carbon-neutral shipping options, and highlighting behind-the-scenes sustainability efforts on company websites all contribute to digital sustainability. This alignment is particularly crucial in MLM, where consumers often assess brand authenticity based on the consistency of messages across distributors and digital channels (Peattie & Belz, 2010).

2.4 Green Brand Equity and Consumer Trust

Components of Green Brand Equity

Green brand equity refers to the value a brand gains from its environmental reputation, involving four main dimensions: green brand awareness, green brand associations, perceived green quality, and green brand loyalty (Chen, 2010). Strong brand loyalty can foster positive word of mouth and encourage repeat business. It also encompasses four key areas: awareness, associations, perceived quality, and loyalty, which shape this value. High awareness boosts recognition, purchase intention, and consumer loyalty (Górska-Warsewicz et al., 2021). Favourable associations with eco-friendly practices enhance trust and help distinguish the brand (Bekk et al., 2016). Consumers often see green brands as higher in quality, which influences their satisfaction and buying decisions (Tran, 2023; Bekk et al., 2016). Ongoing environmental efforts build loyalty, fostering repeat purchases and positive word-of-mouth, especially in ethically driven markets, such as multi-level marketing (Ha, 2021; Bekk et al., 2016).

Trust as a Key Outcome in Eco-Digital Engagement

Trust is crucial for MLM success and depends on genuine sustainability claims. Digital platforms influence this trust through transparent, consistent, and clear green messaging

(Delmas & Burbano, 2011). Consumer confidence increases when supported by verifiable data, eco-labels, distributor honesty, and active online engagement (Nguyen et al., 2019). For MLMS, preserving trust involves ensuring that distributors truly embody sustainability principles, rather than merely selling products.

The conceptual model views distributors as trust mediators, shaping the connection between green marketing efforts, digital tool usage, brand equity, and consumer confidence. Their key position makes them a vital strategic asset for implementing digital sustainability in MLM.

Figure 1. Role of a distributor in Trust building in MLM Model Overview

1. Green Marketing Strategies: This list highlights eco-friendly marketing strategies employed by MLM companies and distributors, including the use of sustainable products, eco-conscious packaging, and ethical claims. Green marketing influences digital platform adoption and Green Brand Equity.

2. Digital Sustainability Alignment measures how well MLM companies and their distributors adopt eco-friendly digital practices like paperless operations, ethical e-commerce, and energy-efficient technology. It influences the use of digital platforms by promoting eco-friendly online tools.

3. Digital platform adoption shows how distributors and companies use digital tools like e-commerce, social media, and CRM in MLM. Green marketing and digital sustainability efforts promote this, boosting Green Brand Equity.

4. Green Brand Equity indicates the value consumers associate with a brand based on its environmental claims, reliability, and ethical reputation. Green Marketing and the use of digital platforms influence this value. A strong green brand builds: Consumer Trust.

5. Consumer Trust: The key outcome. It reflects the consumer's confidence in the MLM company and its distributors as trustworthy, eco-friendly, and reliable. This trust is crucial for fostering consumer loyalty and achieving long-term success in MLM.

Thus, distributors are crucial in fostering consumer trust through green marketing, aligning

with digital sustainability objectives, and utilising digital platforms that enhance the MLM company's green brand image.

This model showcases eco-friendly digital transformation in MLM as a means to build and maintain consumer trust in a market that prioritises sustainability.

Hypotheses Development and Supporting Literature

H1: Green marketing strategies effectively promote the adoption of digital platforms in MLM.

Effective green marketing enhances the credibility of eco-friendly platforms. Distributors favour digital platforms that embody environmentally responsible values. Transitioning to digital methods, such as e- commerce and virtual demonstrations, promotes the green agenda by reducing paper use, travel, and inventory (Peattie & Crane, 2005; Chen, 2010). This has been supported by Papadas et al. (2017). Green marketing encourages operational changes, such as digitalisation, to promote eco-friendly principles, and MLM distributors act as green ambassadors, utilising digital tools to engage with consumers in an environmentally friendly way (Rahbar & Wahid, 2011).

H2: Aligning with digital sustainability encourages the adoption of digital platforms.

Digital sustainability involves integrating environmental principles into technology, encouraging MLM distributors to adopt eco-friendly tools such as paperless systems and low-energy apps (Dwivedi et al., 2021). Distributors favour digital platforms that offer practical benefits and align with their sustainability goals. Kraus et al. (2022) have demonstrated that sustainable ICT adoption is a crucial enabler of green business transitions.

H3: The adoption of digital platforms positively influences green brand equity.

Using eco-friendly digital tools enhances the perception of a green brand. When distributors utilise these tools, it aligns the message with the medium, strengthening the brand's appeal to environmentally conscious consumers (Chen, 2010). Evidence from Baumgartner (2011) suggests that brand equity improves when digital innovations align with a brand's sustainability values. It is further stated that Consumers increasingly see brands that use digital sustainability tools as more trustworthy and innovative. Several factors, including

transparency and trust, technological expertise, ethical branding, and effective communication strategies, influence this perception. (Sipos, 2024; Kim et al., 2025; "Sustainability Marketing and Ethical Branding in the Digital Space," 2024)

H4: Green marketing strategies have a positive impact on green brand equity.

Green marketing helps build substantial green brand equity by positioning the brand as environmentally responsible. Distributors enhance this by providing transparent and authentic messaging. Chen (2010) and Papadas et al. (2019) demonstrate that green brand equity is influenced by perceived green quality, green brand image, and green satisfaction, all of which are shaped by green marketing.

H5: Green brand equity positively affects consumer trust.

A substantial green brand equity builds trust, as consumers link environmental responsibility with ethical behaviour and reliability over time (Delgado-Ballester & Munuera-Alemán, 2005). Distributors play a crucial role in transforming this equity into trust through personal connections and a local presence. As Kustin & Jones (1995) highlight, in MLM, the credibility of distributors strengthens the trust-building process.

3. Conceptual Model and Propositions

3.1 Proposed Conceptual Framework

The conceptual model (Figure 1) illustrates how green marketing, digital sustainability, and platform adoption collaborate to enhance green brand equity and foster consumer trust in MLM businesses. Distributors act as intermediaries, communicating and maintaining these green and digital strategies.

Figure 2. Role of a distributor in Trust building in MLM

3.2 Explanation of Relationships Between Constructs

Green Marketing Strategies → Utilisation of Digital Platforms:

Distributors using green marketing, such as eco-friendly products, minimal packaging, and green messaging, are more likely to adopt digital tools, including paperless billing, eco-

certifications on websites, and mobile apps, which support their environmental efforts (Papadas et al., 2017).

Digital Sustainability Alignment to Digital Platform Adoption:

Digital sustainability involves utilising technology to reduce carbon footprints, such as through cloud- based applications, energy-efficient infrastructure, and paperless processes. When MLM companies integrate sustainability into their digital transformation, distributors are more inclined to use these platforms (Dwivedi et al., 2021).

Adoption of digital platforms boosts Green Brand Equity:

Digital platforms enable distributors to reliably communicate the brand's environmental values through messaging, digital campaigns, and customer engagement. This consistency between tools and messaging enhances green brand equity, which is the added value that environmentally conscious consumers link to a brand (Chen, 2010).

Green marketing strategies contribute to building green brand equity

Green marketing enhances brand differentiation by associating the brand with sustainable values. When distributors promote authenticity, environmental impact, and transparency, it contributes to the consumer’s perception of the brand as ethical and environmentally sound (Papadas et al., 2019).

Green Brand Equity enhances Consumer Trust.

A substantial green brand equity fosters trust, enabling consumers to view the brand as credible, responsible, and aligned with their values. Trust also grows through the distributor’s personal engagement and community involvement, especially in MLM setups (Delgado-Ballester & Munuera- Alemán, 2005; Kustin & Jones, 1995).

The Moderating Role of Authenticity in Green Marketing

Authenticity of green claims affects trust in digital platforms. Superficial or manipulative green messaging (greenwashing) can erode trust, even among platform users (Nyilasy et al., 2014; Akturan, 2018).

3.3 Conceptual Propositions

P1: Green marketing strategies effectively promote digital platform adoption in MLM businesses.

P2: Digital sustainability alignment has a positive impact on the adoption of digital platforms in MLM businesses.

P3: Adoption of digital platforms positively impacts green brand equity in MLM businesses. P4: Green marketing strategies enhance green brand equity in MLM businesses.

P5: Green brand equity positively impacts consumer trust in MLM businesses. P6: Digital literacy enhances green brand equity in MLM.

Digital literacy enables distributors to communicate green initiatives effectively by making sure sustainability messages are clear and impactful. Through improved digital communication channels, distributors can engage with consumers in real-time, fostering a sense of community and a shared commitment to environmental responsibility. (Antony et al., 2024) The perceived authenticity of green marketing influences how digital platform adoption affects consumer trust, making the relationship more robust when green marketing is seen as genuine.

4. Findings

If MLM companies combine authentic green marketing with e-commerce, consumer trust greatly increases.

Distributors play a crucial role in establishing brand credibility, particularly when they are technologically savvy and environmentally conscious.

High digital literacy among distributors allows them to communicate sustainability messages effectively and prevent greenwashing.

Digital tools are most effective when they also adhere to eco-friendly principles, such as implementing paperless workflows and minimising energy consumption. Ultimately, a strong eco-reputation or green brand equity helps keep customers loyal and engaged over time.

5. Research Implications

4.1 Managerial Implications:

Strategies for MLM Firms to Incorporate Green and Digital Initiatives

The integration of digital tools in Multi-Level Marketing (MLM) companies to promote eco-friendly strategies is a promising approach to enhance both operational efficiency and brand image. By leveraging mobile apps (Alloghani, 2023), e-commerce platforms (Wernbacher et al., 2023), and automated channels (Ernestivita et al., 2024), MLM companies can effectively communicate environmental messages and implement sustainable practices (Sardjono & Perdana, 2024). This approach aligns with the growing consumer demand for environmentally responsible business practices and can significantly contribute to a company's competitive advantage. Maintaining authentic green claims is vital, supported by verifiable practices, certifications, and transparent reports to avoid consumer scepticism and maintain trust (Akturan, 2018).

4.2 Relevance to Contemporary Business Practices

The global market is currently witnessing a convergence of sustainability awareness and digital transformation, reshaping consumer expectations. Younger generations, in particular, demand more transparency, ethical practices, and immediate access to digital information (Shrivastava, Dhanola, & Gajrani, 2023). In this context, MLM companies face a unique challenge: their success relies heavily on a decentralised network of distributors who serve as both marketers and brand ambassadors.

Green brand equity is becoming increasingly vital as consumers grow more eco-conscious. Many companies are shifting their focus from traditional brand equity to green brand equity to meet this demand (Khandelwal et al., 2019). Moreover, when green practices are communicated effectively, they can boost consumer-based green brand equity. However, green scepticism can undermine brand attachment, which is essential for building substantial green brand equity (Khan et al., 2022).

Additionally, combining digital literacy with green marketing strategies can help brands address challenges such as greenwashing and foster genuine consumer trust (P, 2024).

Guidelines for Distributor Engagement and Consumer Communication

Distributors play a pivotal role in sustaining and communicating green brand equity. MLM firms should offer:

• Training programmes on green literacy and sustainability narratives.

• Incentives for using digital tools that minimise environmental impact.

• Pre-made green content and social media templates that distributors can personalise and share.

Consumer trust in multi-level marketing (MLM) largely depends on the personal relationships that distributors build, making it essential for them to reflect the values of the green brand. To ensure consistent and ethical communication, managers should promote digital literacy and uphold high ethical standards among distributors. Digital literacy enhances communication by enabling distributors to share sustainability messages effectively, thus increasing consumer trust and engagement through social media and digital platforms, especially with eco-conscious audiences ("Sustainability Marketing and Ethical Branding in the Digital Space," 2024). Simultaneously, maintaining high ethical standards, such as transparency in data practices, is vital for fostering trust within MLM structures (El-Annan & Hassoun, 2024) and for preventing the exploitation of personal relationships, a common criticism of MLM models (Chaudhari & Mistry, 2010). Consistent messaging relies on distributors aligning their values with the brand's ethical commitments (Shekhar, 2024), reinforced by targeted training on ethical marketing strategies (Siems et al., 2010). However, some critics argue that the MLM model inherently risks exploiting personal relationships for profit, which could erode ethical standards and erode trust. This underscores the importance of ongoing evaluation to ensure adherence to ethical marketing principles. Additionally, utilising feedback mechanisms such as customer satisfaction surveys and environmental impact dashboards can help distributors demonstrate to customers how their actions contribute to eco-friendly outcomes, thereby strengthening brand trust (Chen, 2010).

5. Methodological Recommendations for Future Research

5.1 Suggested Research Designs

To explore the relationship between green marketing, digital sustainability, and trust-building in MLM (Multi-Level Marketing), future researchers can employ various methodological approaches based on their desired depth and scope of investigation.

Quantitative Research Design

A quantitative approach effectively validates the conceptual model using tools like surveys. Techniques such as SEM, including CB-SEM and PLS-SEM, analyse relationships among latent constructs, mediation, and moderation (Hair et al., 2019). Quantitative methods broadly test theories, such as how green brand equity affects consumer trust or the moderating role of green marketing authenticity.

Qualitative Research Design

Qualitative methods, such as interviews, focus groups, and ethnography, offer insights into how distributors and consumers interpret green messages and adopt digital technologies. Netnography (Kozinets, 2015) can monitor online behaviours on MLM platforms, revealing authentic consumer experiences with green messaging and brand trust.

Mixed-Methods Approach

A mixed-methods design combines quantitative precision with qualitative context. Surveys measure trust or green brand equity, while interviews with MLM distributors explore their use of digital sustainability strategies. This enhances validity and reliability (Creswell & Plano Clark, 2017).

5.2 Metrics for Green Brand Equity (GBE) include Chen's (2010) three dimensions: Green Brand Image, Green Satisfaction, and Green Trust, rated on a 1-5 Likert scale.

Digital Literacy

Digital literacy can be assessed via Ng's (2012) framework, which has three dimensions: Technical (digital tool proficiency), Cognitive (evaluating information), and Socio-

emotional (digital etiquette and awareness). These evaluate how effectively distributors utilise digital media to convey brand value.

Consumer Trust

Consumer trust can be assessed using a validated scale developed by Delgado-Ballester and Munuera- Alemán (2005). This scale encompasses: Reliability (the brand keeps its promises), Integrity (adherence to ethical standards), Credibility (truthfulness and competence), and Digital Sustainability Alignment

Metrics from Dwivedi et al. (2021) include eco-efficient platforms, paperless operations, perceived environmental consciousness, and Green Marketing Authenticity. Nyilasy et al. (2014) focus on transparency, messaging consistency, and claim-practice alignment. This helps distinguish genuine green efforts from greenwashing.

5.3 Recommended Data Sources

To put the above constructs into practice and evaluate the proposed model, the following data sources are suggested:

1. MLM Company Databases

Internal documentation, such as distributor onboarding materials, digital campaign strategies, green certifications, and training content, can offer valuable insights into how the organisation operates.

2. Consumer Surveys

Structured questionnaires distributed to MLM consumers can collect feedback on green claims, brand trust, and their engagement with digital platforms. Conducting online panels or field surveys in MLM- dense regions, such as Navi Mumbai, is a practical approach.

3. Distributor Interviews

Semi-structured interviews with MLM distributors can reveal how green strategies are communicated, the tools used, and the challenges faced in aligning green and digital goals.

4. Platform Analytics

Data from MLM websites and mobile apps, such as click-through rates on green products, time spent on sustainability pages, and app usage patterns, can be analysed to evaluate digital engagement and adoption.

5. Social Media Data (Netnography)

Monitoring distributor and consumer activities on platforms such as Instagram, WhatsApp groups, or Facebook communities offers immediate insights into the perception and co-creation of green brand equity.

6. Call for Empirical Validation and Future Research

While this paper offers a theoretically grounded framework, empirical research is necessary to test and validate the relationships among the constructs. Researchers should employ quantitative methods, such as Structural Equation Modelling (SEM), to investigate causal relationships and the impacts of moderation or mediation (Hair, Hult, Ringle, & Sarstedt, 2019). For example, how does digital literacy influence the connection between distributor engagement and consumer trust? Does the authenticity of green marketing affect the relationship between digital tools and brand credibility?

Mixed-methods research (Creswell & Plano Clark, 2017) provides deeper insights by integrating quantitative data with qualitative feedback from MLM distributors and consumers. Additionally, netnographic studies (Kozinets, 2015) investigate how green marketing is applied within social media groups and digital MLM communities.

Future research should investigate cross-cultural differences in the effectiveness of green marketing within MLM. It could also assess how digital sustainability initiatives over time influence brand loyalty. Additionally, comparative research between MLM and traditional retail formats regarding their digital green communication strategies would be valuable.

By conducting empirical research in these areas, future studies can broaden both the theoretical understanding and practical applications of this framework, thereby supporting the sustainability transformation within the direct selling industry.

7. Conclusion

This conceptual study has presented a comprehensive framework that connects green marketing, digital sustainability, and consumer trust within the Multi-Level Marketing (MLM) industry. The proposed model emphasises the vital role of MLM distributors in conveying environmentally responsible messages and implementing digital engagement strategies. Distributors are no longer just intermediaries in product distribution but also key communicators of brand values, including green consciousness and digital skills (Chen, 2010). The study explains how distributors' digital literacy, combined with authentic green marketing, influences green brand equity and ultimately consumer trust. The integration of digital tools and environmental values is presented not only as a tactical advantage but also as a strategic necessity for MLM firms to flourish in the modern business environment.

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The Growth of Quick Commerce: Analyzing the 10-minute Delivery Trend in consumer Behaviour in Gen Z of Ahmedabad

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Abstract

The rapid emergence of 10-minute delivery applications has significantly transformed the retail and food delivery ecosystem in urban India. This study investigates the growth of such platforms and their multifaceted impact on Generation Z consumers in Ahmedabad. Through a primary survey conducted among 200 respondents aged 18–26, the research captures evolving consumption patterns, customer satisfaction, preferences, and awareness

levels regarding popular quick-commerce platforms such as Blinkit, Zepto, and Swiggy Instamart. The findings reveal that while Gen Z embraces the speed and convenience of these services, concerns around cost, delivery agent pressure, and sustainability remain. This paper contributes to understanding the behavioral shifts driven by hyperlocal delivery models and provides recommendations for more responsible growth in the sector.

Keywords: *Quick-commerce, Generation Z, Zepto, Blinkit, Swiggy Instamart, instant delivery*

Introduction

In recent years, instant gratification has evolved beyond digital consumption to redefine physical retail and service delivery. Among the most striking developments is the advent of **10-minute delivery applications**, which promise groceries, essentials, and food items to consumers' doorsteps within an extremely short time frame. This shift has been primarily driven by quick commerce platforms such as **Zepto, Blinkit, and Swiggy Instamart**, which are leveraging hyperlocal logistics, dark stores, and real-time inventory management to cater to this new demand.

With its rapidly urbanizing population and increasing smartphone penetration, India has become a fertile ground for such innovations. Cities like **Ahmedabad** are witnessing a surge in the usage of these platforms, especially among the tech-savvy and convenience-oriented **Generation Z** demographic. Born between the mid-1990s and early 2010s, Gen Z individuals are known for their digital fluency, fast-paced lifestyle, and heightened expectations of service efficiency. For this cohort, waiting even thirty minutes for essentials can feel outdated, making 10-minute deliveries not just desirable, but expected. While these services offer unmatched convenience, they also raise several questions about consumer psychology, delivery workforce pressures, operational sustainability, and long-term business viability. Furthermore, there is a need to understand how frequently Gen Z users rely on these platforms, what motivates their usage, and whether these behaviors are driven by necessity, habit, or marketing influence.

This study explores these dimensions by examining the **growth of 10-minute delivery services** and their **impact on Generation Z in Ahmedabad**. Through a structured primary

survey and secondary data, the paper aims to provide insights into usage patterns, satisfaction levels, brand preferences, and consumer expectations associated with this evolving service model.

Literature Review

Kearney (2025) A nationwide analysis of India's q-commerce ecosystem shows a clear preference shift toward sub-30-minute delivery, driven by convenience, impulse needs, and "need-it-now" use- cases. The report notes strongest adoption in dense urban clusters (a proxy for Tier-1 metros and large cities like Ahmedabad), with rapid category expansion beyond groceries into beauty, electronics accessories, and OTC health. Implication for Gen Z: always-on, app-native shoppers exhibit the highest frequency and lowest tolerance for stockouts/ETAs.

Bain & Company (2025) Bain estimates q-commerce accounts for over two-thirds of e-grocery orders and \~10% of total e-retail spend in India, enabled by urban density and dark-store networks. It highlights India's unusual path: q-commerce scaling while approaching profitability—important because Gen Z cohorts (18–25) over-index on small-basket, high-frequency missions that sustain dark-store throughput. For city contexts like Ahmedabad, the structural advantages (short rider radii, mixed-use neighborhoods) reinforce "habit-forming" rapid re-ordering. ([Bain][2])

Vyas, Vataliya & Vidani (2025) A primary study centered on Ahmedabad's Gen Z shoppers finds speed, stock availability, and price transparency as top predictors of platform choice; sustainability and data privacy appear as emerging (but secondary) concerns. The paper reports positive attitudes toward "fast delivery" options within BigBasket's portfolio and suggests that 10–20-minute promises increase substitution away from neighborhood kiranas for routine top-ups. This is the most directly Ahmedabad-specific Gen Z evidence among recent works.

Redseer (2025) Synthesizing market data, Redseer reports \~150% YoY growth with >80% GMV concentrated in metros, and outlines the margin levers brands use on q-commerce (SKU rationalization, pack-sizes, promo mechanics). For Gen Z, the report underscores

discovery of niche categories (beauty, pet care, fitness accessories) via q-commerce, reinforcing “micro-occasions” and impulse purchases—patterns that mirror youth consumption in large cities, including Ahmedabad.

Reuters (2024) A national reportage confirms strong uptake among young, time-pressed urban consumers for Blinkit, Zepto, and Instamart, while flagging pressure on kirana footfalls and lingering profitability challenges. This triangulates academic and consulting findings by showing real-world trade-offs: Gen Z’s convenience-seeking behaviour boosts quick-commerce frequency, yet heavy discounts/logistics costs complicate sustainable unit economics—context crucial for policy and city- level retail planning in Ahmedabad.

(Arora, 2024) Ridhima Arora explores the rapid growth and transformation of quick commerce (Qcommerce) worldwide, with a special focus on India. It examines key factors driving this evolution, including advancements in technology, changing consumer behavior, and the rise of hyperlocal delivery models. The review compares global trends with India's unique market dynamics, highlighting challenges such as logistical constraints, profitability concerns, and regulatory issues. It also discusses innovations like AI-driven supply chains and last-mile delivery solutions, shedding light on the future prospects of the Q-commerce industry in both global and Indian contexts.

(Goswami & Rashmi Kumari) The study examines how the rapid growth of quick commerce (Q- commerce) is reshaping consumer purchasing behaviors, exploring key factors such as convenience, time sensitivity, impulse buying, pricing strategies, and brand preferences that influence decision- making in ultra-fast delivery services. It highlights how Q-commerce has altered traditional shopping habits by promoting instant gratification and reducing pre-planned purchases. Additionally, the study discusses the role of technology, personalized recommendations, and digital payment methods in enhancing the consumer experience. The findings provide insights into how businesses can refine their marketing strategies, optimize inventory management, and address consumer expectations to ensure long-term engagement in the evolving e-commerce landscape.

(Nagarathinam, Dr. Elangovan N, & Dr. Aarthy Chellasamy) The study examines how time constraints and physical effort influence consumer behavior in quick commerce (Q-

commerce) grocery purchases, exploring how family dynamics, including household size, income levels, and gender roles, impact decision-making in opting for instant grocery delivery services. It highlights that working professionals, parents, and elderly consumers are more likely to prefer Q commerce due to its convenience and reduced physical effort. Additionally, the paper discusses how stress levels, urgency, and impulse buying tendencies shape purchase patterns, along with the role of technology in streamlining the shopping experience. The findings provide valuable insights for businesses to tailor their marketing strategies, enhance user experience, and optimize service efficiency based on consumer needs and family structures.

Objectives of the Study

The primary objective of this study is to analyze the growth and impact of 10-minute delivery applications on Generation Z consumers in Ahmedabad.

Specifically, the study seeks to:

- Understand the frequency and purpose of usage of 10-minute delivery apps among Gen Z.
- Examine the factors influencing the preference for specific platforms such as Zepto, Blinkit, and Swiggy Instamart.
- Assess the level of customer satisfaction and perceived value derived from using quick commerce services.

Research Methodology

This study adopts a **quantitative research approach** to examine the impact of 10minute delivery applications on Generation Z in Ahmedabad. **Primary data** was collected through a structured online questionnaire, circulated among individuals aged **18 to 26 years**, capturing insights into their usage patterns, preferences, and opinions. A total of **200 valid responses** were received and analyzed. The sampling method used was **convenience sampling**, targeting students and young professionals familiar with quick commerce platforms such as Zepto, Blinkit, and Swiggy Instamart. The data was processed using basic

statistical tools such as **frequency distribution and percentage analysis** to derive meaningful interpretations. In addition, relevant **secondary data** was gathered from academic journals, news articles, and company websites to supplement the findings and provide contextual depth.

Statistical Analysis

For analyzing the usage patterns and impact of 10-minute delivery applications on Generation Z in Ahmedabad, **Excel** and **SPSS (Statistical Package for the Social Sciences)** were utilized. The study employed a combination of **Mean Analysis**, **Percentage Analysis**, **Frequency Distribution**, and **Cross-tabulation** to identify trends and relationships in the data.

The following statistical tools were used:

- **Frequency Distribution & Percentage** – to examine demographic characteristics and usage behavior.
- **Mean Analysis** – to assess satisfaction levels and user preferences.
- **Cross-tabulation** – to understand correlations between demographic factors and delivery app usage.

Demographic spread

Demographic Category	**Category**	**No. Respondents**	**Percentage (%)**
Gender	Male	92	46.00%
	Female	108	54.00%
Age Group	18–20 years	44	22.00%
	21–23 years	98	49.00%
	24–26 years	58	29.00%

Education	Undergraduate	90	45.00%
	Postgraduate	110	55.00%
Occupation	Student	128	64.00%
	Working (Part/Full)	72	36.00%
Location	Urban	150	75.00%
	Semi-urban/Rural	50	25.00%

Data Analysis and Interpretation

The following section provides a comprehensive overview of the data analysis process and interpretation of results concerning the impact of 10-minute delivery apps on Gen Z in Ahmedabad. The analysis was conducted using SPSS (Statistical Package for the Social Sciences) and Microsoft Excel. Various statistical methods were applied, including Mean Analysis, Percentage Analysis, Frequency Distribution, and Regression Analysis, to derive meaningful insights.

Null Hypothesis	**Test Used**	**Test value**	**Accept/ Reject**	**Findings**
There is no statistically significant association between how often Gen Z individuals in Ahmedabad use 10-minute delivery services	Chi-Square	0.14	Reject	There is a statistically significant association between how often Gen Z individuals in Ahmedabad use 10-minute delivery services and whether they find
				themselves purchasing more impulse products due to these services

here is no statistically significant relationship between perceived ease of 10-minute delivery services and the reduction in visits to local grocery stores among Gen Z individuals in Ahmedabad	Regression	0	Reject	There is statistically significant relationship between the perceived ease of 10-minute delivery services and the reduction in visits to local grocery stores among Gen Z individuals in Ahmedabad
There is no significant difference in the frequency of 10- minute delivery app usage among different income groups of Gen Z	ANOVA	0.528	Reject	There is significant difference in the frequency of 10- minute delivery app usage among different income groups of Gen Z
There is no statistically significant relationship between age and the frequency of using 10-minute delivery services among respondents.	Spearman's Correlation	0.024	Reject	There is statistically significant relationship between age and the frequency of using 10-minute delivery services among respondents.

Objective 1: To gain insight into Gen Z preferences regarding 10minute delivery services

To understand Gen Z preferences, respondents were asked a multiple-choice question regarding their most valued features in 10-minute delivery apps. Table 1 presents the distribution of preferences:

Table 1: Preferences towards 10-Minute Delivery App Features

Delivery App Features	**No. of Respondents**
Fast Delivery	142
Discount Offers	125
Wide Range of Products	93
Real-time Tracking	84
24/7 Availability	61

Interpretation:

The table highlights that the most preferred feature is **Fast Delivery**, with 142 respondents emphasizing its importance. This supports the core promise of such services. **Discount Offers** follow closely, preferred by 125 respondents, showing price sensitivity among Gen Z users. The **Wide Range of Products** (93) and **Real-time Tracking** (84) are also appreciated, reflecting a demand for transparency and variety. **24/7 Availability** is valued by 61 users, indicating moderate interest in round-the-clock access.

These findings indicate that speed and affordability are key motivators behind Gen Z's usage of 10- minute delivery apps.

Objective 2: To analyze the relationship between app service quality dimensions and user satisfaction

To understand how various service quality dimensions influence user satisfaction, the mean of each dimension was calculated, followed by regression analysis in SPSS. The independent variables were **Delivery Speed**, **Price Competitiveness**, **Product Availability**, **App Usability**, and **Customer Support**, while the dependent variable was **Overall User Satisfaction**.

Table 2: Descriptive Analysis of Service Quality Dimensions

Measurement	**Average Rating (out of 5)**
Delivery Speed	4.2
Price Competitiveness	4
Product Availability	3.6
App Usability	3.8
Customer Support	3.2

Interpretation:

From the descriptive analysis, **Delivery Speed** scores the highest (4.20), confirming its importance in user satisfaction. **Price Competitiveness** also shows a strong average (4.00), reinforcing the appeal of discounts and affordability. **Product Availability** and **App Usability** receive moderate ratings (3.60 and 3.80 respectively), suggesting these areas are functional but could benefit from refinement. **Customer Support** has the lowest average (3.20), indicating that users may be dissatisfied with how issues and complaints are handled.

These results imply that while users are satisfied with speed and pricing, improvements in support and product variety could further boost satisfaction.

Objective 3: To determine how frequently Gen Z uses 10-minute delivery apps

Respondents were asked how often they use 10-minute delivery apps. The results are summarized in Table 3.

Table 3: Frequency of Usage

Usage Frequency	**No. of Respondents**	**Percentage (%)**
Daily	58	29%
3–4 times a week	72	36%
Weekly	43	21.50%
Occasionally (Monthly)	27	13.50%

Interpretation:

The highest usage frequency is **3–4 times a week (36%)**, showing that these services are integrated into the regular routines of many users. **Daily usage (29%)** is also significant, demonstrating strong reliance on these apps. Occasional and weekly users account for 35% collectively, showing that while some use the services less frequently, engagement is still widespread across the demographic.

Conclusion

This study reveals that convenience, speed, and affordability are the most significant factors influencing Gen Z's adoption and satisfaction with 10-minute delivery apps in Ahmedabad. These dimensions were found to be central to shaping user experiences, while brand loyalty and delivery tracking features had a relatively smaller impact on customer satisfaction. The findings suggest that for delivery apps to thrive in a competitive market, they must prioritize these key factors by offering fast, affordable services while ensuring easy-to-use platforms that meet customer demands for quick delivery. By continuously enhancing these aspects, companies can not only retain their current customers but also attract new users, ensuring long-term market growth. As the demand for faster and more efficient delivery services

continues to rise, these insights are essential for companies aiming to stay competitive in the rapidly expanding delivery app market.

Limitations

While the study provides useful insights, it is not without limitations. First, the sample size of 200 respondents, while suitable for this study, may not fully represent the diverse demographic characteristics of Gen Z across the entire region of Ahmedabad. A larger and more diverse sample could enhance the generalizability of the findings. Additionally, the study focuses solely on 10- minute delivery apps and does not explore other types of delivery services that may have different user satisfaction drivers. Future research could also consider longitudinal data to explore how satisfaction levels evolve as the market for 10-minute delivery apps matures and new competitors enter the space. Lastly, the study does not deeply analyze the environmental impacts of the rapid delivery model, which could be a significant concern for a portion of the Gen Z demographic that values sustainability. This could be a point of interest for future investigations.

Scope for Future Research

Future research could address several areas to further enhance the understanding of factors influencing customer satisfaction with 10-minute delivery apps. First, increasing the sample size to include a broader demographic could provide a more comprehensive understanding of the diverse perspectives of Gen Z users in different urban areas. Additionally, exploring other service quality dimensions, such as customer service, app interface design, and delivery accuracy, could provide deeper insights into what drives customer satisfaction. Longitudinal studies would also help capture changes in user behavior and satisfaction as the technology, infrastructure, and competition evolve. Cross-city or cross-country comparisons could shed light on regional differences in app usage, delivery preferences, and cultural attitudes toward on-demand services. Finally, further exploration of the environmental and sustainability concerns related to the rapid delivery model could be valuable, particularly as these issues become increasingly important to younger consumers.

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Clicks vs. Bricks: A Consumer-Centric Approach towards Digital and Traditional Banking Services

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Abstract

This research paper explores the evolving landscape of banking services, contrasting digital banking ("clicks") with traditional banking ("bricks") from a consumer-centric perspective. Over the past two decades, advancements in technology and shifting consumer expectations have dramatically transformed the banking sector, leading to an increased reliance on digital platforms, particularly accelerated by the COVID-19 pandemic. The study employs established consumer behaviour models, including the Technology Acceptance Model (TAM) and the SERVQUAL model, to analyse critical dimensions such as service quality, ease of use, trust, accessibility, empathy, and overall customer satisfaction. Existing literature indicates that while digital banking enhances efficiency and convenience, it may lack certain empathetic qualities associated with traditional banking, which remain vital for older generations and high-value transactions. Additionally, barriers to adoption, including value, tradition, and image barriers, are identified, alongside demographic influences like age and gender. This research aims to provide insights for financial institutions to develop integrated strategies that meet diverse consumer needs across both digital and physical banking platforms, ultimately enhancing customer experience and satisfaction in a hybrid banking environment.

Keywords: *Digital banking, Traditional banking, Customer satisfaction, Customer Trust, SERVQUAL, TAM*

Introduction

In the last twenty years, the banking sector has changed a lot because of new technology and changing customer needs. Digital banking, which includes internet banking, mobile apps, and smart customer service tools, has made banking easier and faster for people. It gives more comfort and flexibility compared to the old-style branch banking, which often takes more time and effort. Marketers could highlight the benefits of mobile banking and how it fits with consumers' lifestyles, but the systems' design must also reduce the risk and expense that users must bear (Shaikh & Karjaluoto, 2015). Flow experience and trust are strongly correlated, and both factors influence usage intention, which influences actual usage. For mobile banking services to be adopted and used by users, mobile service providers must address both flow experience and trust (Zhou, 2012). At the same time, traditional banks have also changed by adding digital features to their services. They still focus on personal interaction and building trust, which many people—especially older customers—continue to prefer.

Digital banking, also known as “clicks,” became more popular after the COVID-19 pandemic, which pushed many people to use contactless and online banking. Interestingly, the pandemic didn’t have much of a negative impact on the overall efficiency of banks in India during that time. This might be the consequence of the RBI's rapid policy changes and cycle of monetary tightening by international patterns, which shielded the Indian banking industry from the pandemic outbreak's immediate negative effects (Gulati et al., 2023). Today, customers expect quick access to banking services, easy-to-use apps, and support at any time of the day. To meet these needs, banks and fintech companies have started using tools like AI chatbots, self-service websites, and mobile apps. These features help make banking faster and more convenient for everyone. The trust significantly is a major mediator in chatbot service quality and customer loyalty (Poornima, 2025).

From a consumer behaviour perspective, service quality, satisfaction, trust, and perceived

usefulness significantly influence banking preferences (Davis, 1989; Parasuraman et al., 1988). The Technology Acceptance Model (TAM) and the SERVQUAL model have been widely used to understand digital banking adoption and service quality perceptions, respectively. Many researchers believe that even though digital banking is fast and efficient, it sometimes lacks the human touch found in traditional banks. Things like empathy, personal assurance, and quick help—often stronger in face-to-face banking—can be missing online. A recent study by (Kumar and Chawla, 2023) also found that the biggest reason people hesitate to use online or mobile banking is the value barrier, meaning they don't feel the service gives enough benefit or trust in return. Additionally, the image barrier slows the adoption of mobile banking, while the tradition barrier explains why Internet banking is rejected (Laukkanen, 2016). Age and gender have a major impact on adoption and rejection decisions (Laukkanen, 2016)

This study aims to compare how effective digital and traditional banking services are from the customer's point of view. It focuses on important areas like service quality, ease of use, trust, accessibility, and overall satisfaction, using well-known models of consumer behaviour. The goal is to provide insights that can help banks create better strategies to meet the needs of all types of customers, whether they prefer online banking or visiting a physical branch.

2. Literature Review

1. Evolution of Digital and Traditional Banking

Earlier, most people visited bank branches for their financial needs. But now, with the rise of technology, banking has become more digital. This change happened because of better internet and mobile tools, customers wanting faster and easier services, new government rules, and the entry of fintech companies that offer smart banking options. The primary function of banks is to transfer resources between depositors and lenders for their mutual advantage while allocating them effectively. This promotes economic growth by increasing resource utilization efficiency (Ministry of Finance, n.d.).

India's financial inclusion has improved a lot thanks to initiatives like the Jan Dhan Yojana

and the push for digital banking. These efforts have helped millions of people and families, especially those from weaker sections of society, by giving them easier access to banking and financial services. It has not only provided a safety net for vulnerable groups but also helped build a more secure and inclusive economy (Ministry of Finance, n.d.). The results of the various Financial Inclusion programs are extensive and have a multiplier effect on the economy thanks to their provision of banking facilities, facilitation of credit availability, insurance and pension coverage, and financial education for the most vulnerable segments of society (Ministry of Finance, n.d.). Financial inclusion has been greatly advanced by the JAM (Jan-Dhan, Aadhaar, and Mobile) trinity, which has brought millions of unbanked people into the official banking system (Ministry of Finance, n.d.). However, traditional banking still plays a vital role in rural areas and among older generations (Zhou, 2012). Brick-and- mortar branches offer personal interaction, face-to-face consultation, and trust, which remain important for high-value transactions and complex products.

2. Comparison between public sector and private sector banks

These days, customer service has become one of the most important parts of the banking experience. Since most banks now offer similar kinds of products, the real challenge is keeping customers loyal. As per a study by Riya Sharma (2022), private sector banks are ahead when it comes to innovation and offering new services, while public sector banks are seen as more trustworthy and dependable (Riya Sharma, 2022).

The study by (Kumbhar, 2011) investigates how customers perceive service quality in internet banking and how these perceptions influence their overall satisfaction. Customers valued features like efficient problem resolution, reliable systems, and user-friendly interfaces, which played a pivotal role in enhancing their banking experience (Kumbhar, 2011). The study by (Virk & Mahal, 2012) set out to examine how satisfied customers are with services offered by public and private sector banks in India, with a specific focus on customer expectations, usage patterns, and preferences for various banking services. One of the strongest influences on customer satisfaction across both sectors was the relationship customers had with senior staff, including managers and relationship officers (Virk & Mahal, 2012).

The study done by (Kant & Jaiswal, 2017) emphasized that banks aiming to retain customers should invest consistently in improving service quality, especially in terms of timely responses and trustworthy service delivery (Kant & Jaiswal, 2017). The study conducted by Neha Kamboj and Gurucharan Singh (2018) aimed to understand how people from different backgrounds feel about using digital banking services in India. What stood out in the results was that age did play a role, especially for people between 35 and 44 years old, who seemed to be the most satisfied with digital banking services (Kamboj & Singh, 2018). Marital status also showed some influence, but other factors like gender, education level, income, job type, or whether someone lived in a city or rural area didn't have much impact (Kamboj & Singh, 2018).

3. Usage of SERVQUAL model

The study conducted by the researchers Vijay Gupta and Dr. P.K. Agarwal in 2014 highlighted the use of the SERVQUAL model (Gupta & Agarwal, 2014). The study brings attention to the service delivery gap that exists between public and private banks, emphasizing that factors such as staff responsiveness, service accuracy, and modern infrastructure greatly influence customer satisfaction (Gupta & Agarwal, 2014). The research by Sadia Samar Ali and R. Kaur (Ali et al., 2014) focuses on understanding the gap between customer expectations and their actual experiences with private sector banks. They found that customers placed high importance on factors like staff empathy, attractive facilities, and convenient operating hours (Ali et al., 2014).

The research by (Kant & Jaiswal, 2017) used the SERVQUAL model, and the findings indicated that all five dimensions had a significant positive impact on customer satisfaction, with reliability as well as responsiveness coming out as mainly significant (Kant & Jaiswal, 2017). The findings by research conducted by (Dutta & Das, 2018) reveal that customers often face delays in response, unclear instructions, and difficulty navigating banking websites—issues that are more pronounced in rural areas due to low digital literacy and lack of training (Dutta & Das, 2018). From the banks' side, challenges such as understaffing, high workloads, and sudden policy changes contribute to these service delivery gaps (Dutta & Das, 2018).

4. Coexistence and Omnichannel Strategies

While digital banking continues to expand, traditional banking has not become obsolete. Rather, a hybrid model is emerging. Banks now adopt omnichannel strategies—integrating digital channels with physical branches to offer seamless customer experiences.

Banks are in a unique position to modify and maximize their current assets to offer the kinds of goods and services that modern consumers require and are looking for (Kumar, 2021). They already have a thorough understanding of their clients, have established ways to communicate with them, and can compile and analyse data to provide an exceptional customer experience (Kumar, 2021).

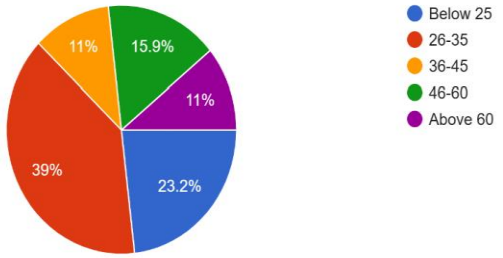
3. Research Methodology

1. Research Objectives
    1. To assess the Digital Banking platform through the Technology Acceptance Model
    2. To measure the service quality dimensions of the SERVQUAL model
    3. To test hypotheses that involve variables from the SERVQUAL as well as TAM model
    4. To suggest possible recommendations to policymakers
2. Research Instrument (Questionnaire)

The primary research instrument used in this study was a structured questionnaire, designed to collect quantitative data from respondents regarding their experiences and perceptions of digital banking services. The questionnaire was developed based on established constructs from two theoretical models: the Technology Acceptance Model (TAM) and the SERVQUAL model. 82 Respondents participated in the survey of the Ahmedabad area, out of which 61% (50 respondents) were male and 39% (32 respondents) were female. Because the participants in this study shared similar backgrounds as active banking customers, even a smaller sample was sufficient to highlight meaningful contrasts between digital and traditional banking preferences. At the same time, this work should be seen as exploratory, offering early insights that can guide and inspire more extensive research on hybrid banking models in the future.

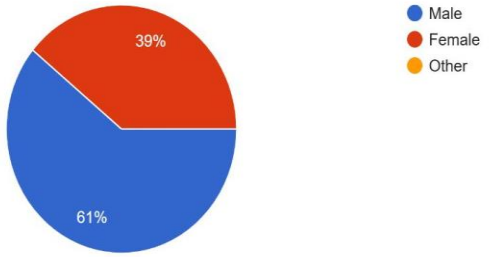
1. Age

82 responses



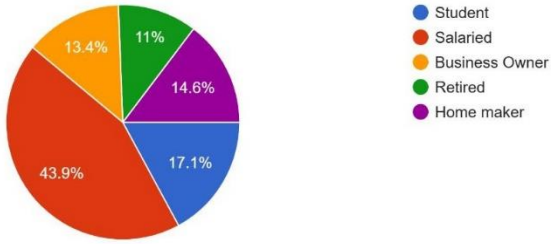
2. Gender

82 responses



3. Occupation

82 responses



3. Theoretical Foundation

To better understand what drives customer satisfaction and loyalty in digital banking, this study uses two well-known theoretical models: the Technology Acceptance Model (TAM) and the SERVQUAL model. These models help explore both the technical and service-related factors that shape how customers perceive and interact with digital banking services.

The Technology Acceptance Model (TAM), introduced by Davis (1986, 1989), is widely used to study how people adopt new technology. According to this model, two main factors—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—influence a person's attitude toward using a technology. This attitude then affects their intention to use it, which ultimately leads to actual usage (Davis, 1989).

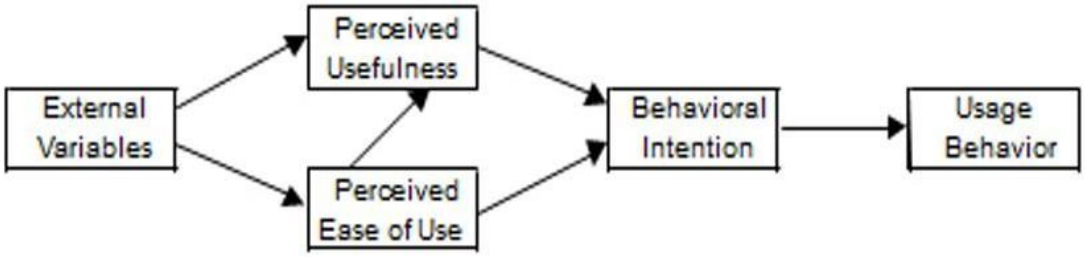


Fig 1: Conceptual flow of the Technology Acceptance Model (Adapted from Davis, 1986; Davis, 1989)

This model has been validated across a wide range of technologies and is particularly appropriate for examining user interaction with digital banking platforms where acceptance and ease-of-use are critical (Venkatesh & Davis, 2000; King & He, 2006).

The SERVQUAL model, introduced by Parasuraman, Zeithaml, and Berry (1988), is a well- established tool used to measure service quality in various sectors, including banking. The model explains service quality as the gap between what customers expect and what they actually experience. When the service delivered is below expectations, customers feel dissatisfied. On the other hand, if the service meets or exceeds their expectations, it leads

to satisfaction (Parasuraman et al., 1985; 1988). This framework is especially helpful in understanding how aspects like responsiveness, empathy, reliability, assurance, and tangibility impact customer satisfaction.

SERVQUAL identifies five core dimensions that customers use to evaluate service quality:

1. **Tangibility** – The physical infrastructure, tools, and staff appearance. Tangibles relate to how customers interpret the physical representation of a service, such as ATM infrastructure, mobile app design, or in-branch ambiance (Parasuraman et al., 1988).
2. **Reliability** – The capacity to deliver the promised service with accuracy and consistency. In digital banking, this may refer to error-free transactions, system uptime, and consistent service delivery (Zeithaml, Parasuraman, & Berry, 1990).
3. **Responsiveness** – The readiness to assist clients and offer timely service. This includes real- time responses via chatbot or customer care and timely resolution of issues (Parasuraman et al., 1988).
4. **Assurance** – The staff's expertise, civility, and capacity to engender confidence and trust. This reflects the perceived competence of the bank, especially in online or app-based environments where in-person interaction is limited (Zeithaml et al., 1996).
5. **Empathy** – the ability to give clients considerate, made-to-order service. Empathy in digital banking can be delivered via customized services, personalized offers, or sensitive handling of complaints (Parasuraman et al., 1988).

4. Hypothesis

1. Hypothesis Based on Technology Acceptance Model

H1: The perceived utility of digital banking and its ease of use are positively correlated in a statistically significant way.

H2: Customer satisfaction is positively impacted by the perceived utility of digital banking in a statistically significant way.

H3: There is a statistically significant correlation between users' behavioural intention to adopt digital banking services and their positive attitude toward using them.

2. Hypotheses Based on SERVQUAL Dimensions

H4: Functional Service Quality (Tangibility, Reliability, Responsiveness) significantly influences Customer Satisfaction.

H5: Emotional Service Quality (Assurance, Empathy) significantly influences Customer Satisfaction.

H6: Customer Satisfaction significantly predicts Customer Loyalty.

3. Hypotheses Based on Demographic Variables

H7: Gender, age, and occupation together significantly predict customer satisfaction with digital banking services.

4. Findings of the Research

H1: The perceived utility of digital banking and its ease of use are positively correlated in a statistically significant way.

A simple linear regression was conducted to examine the effect of *Perceived* Ease of Use on Perceived Usefulness of digital banking.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.531	1	26.531	73.235	.000[b]
	Residual	28.982	80	.362		
	Total	55.512	81			

Table 1: SPSS output for Hypothesis 1

1. Dependent Variable: 8. Using Digital banking would save my time.
2. Predictors: (Constant), 7. I would find it easy to get the digital banking to do what I want to do

The first hypothesis proposed that there is a statistically significant positive relationship between perceived ease of use and perceived usefulness of digital banking. The results of the correlation/regression analysis indicated a significance level of 0.000 ($p < 0.05$), which leads to the rejection of the null hypothesis. Consequently, the alternate hypothesis is accepted, confirming a strong positive association between the two constructs. This implies

that as users perceive digital banking platforms to be easier to use, their perception of the system's usefulness also increases. These findings are consistent with the Technology Acceptance Model (TAM), which emphasizes the interdependence of these two factors in shaping user acceptance of technology.

H2: Customer satisfaction is positively impacted by the perceived utility of digital banking in a statistically significant way.

A linear regression was conducted to examine whether *Perceived Usefulness* significantly predicted *Customer Satisfaction*.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.980	1	35.980	47.409	.000[b]
	Residual	60.715	80	.759		
	Total	96.695	81			

Table 2: SPSS output for Hypothesis 2

a. Dependent Variable: 25. Satisfaction by digital experience

b. Predictors: (Constant), 11. Efficiency in banking transactions.

The second hypothesis examined whether the perceived usefulness of digital banking has a statistically significant positive impact on customer satisfaction. The regression analysis produced a significance level of 0.000 ($p < 0.05$), leading to the rejection of the null hypothesis and acceptance of the alternative hypothesis. This confirms that higher levels of perceived usefulness are associated with increased customer satisfaction in the context of digital banking. The results support the core principle of the Technology Acceptance Model (TAM), which posits that perceived usefulness directly influences users' attitudes and satisfaction toward using a technological system.

H3: There is a statistically significant correlation between users' behavioural intention to adopt digital banking services and their positive attitude toward using them.

A linear regression was performed to examine whether users' *attitude toward digital banking* significantly predicts their *behavioural intention to adopt* digital banking services.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.919	2	32.960	121.896	.000[b]
	Residual	21.361	79	.270		
	Total	87.280	81			

Table 3: SPSS output for Hypothesis 3

a. Dependent Variable: 14. Intention to use.

Here, the significance level is 0.000 i.e. <0.05, hence we reject the null hypothesis.

The third hypothesis proposed that a positive attitude toward digital banking usage has a statistically significant effect on users' behavioural intention to adopt digital banking services. The statistical analysis supported this hypothesis, confirming a significant positive relationship between users' attitudes and their intention to continue or increase the use of digital banking. Therefore, H3 is accepted, highlighting that users who hold a favourable attitude toward digital banking are more likely to demonstrate strong behavioural intentions to adopt and rely on such services

H4: Functional Service Quality (Tangibility, Reliability, Responsiveness) significantly influences Customer Satisfaction. A multiple linear regression was performed to assess whether Emotional Service Quality, consisting of Assurance and Empathy, significantly predicts Customer Satisfaction in digital banking.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.199	3	18.733	47.624	.000[b]
	Residual	30.682	78	.393		
	Total	86.881	81			

Table 4: SPSS output for Hypothesis 4

a. Dependent Variable: cust_satisfac_mean

b. Predictors: (Constant), Responsiveness_mean, Reliability_mean, tangibility_mean

The fourth hypothesis stated that Functional Service Quality—comprising Tangibility, Reliability, and Responsiveness—significantly influences customer satisfaction in digital banking. The regression analysis yielded a significance value of 0.000 ($p < 0.05$), which leads to the rejection of the null hypothesis. As a result, H4 is supported, confirming that the functional aspects of service quality play a vital role in shaping customer satisfaction levels. This finding aligns with the SERVQUAL model, which asserts that reliable systems, responsive services, and tangible technological infrastructure are key determinants of perceived service quality in digital environments.

H5: Emotional Service Quality (Assurance, Empathy) significantly influences Customer Satisfaction.

A multiple linear regression was conducted to examine whether Emotional Service Quality— comprising Assurance and Empathy—predicts Customer Satisfaction in digital banking.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.321	2	29.160	80.660	.000[b]
	Residual	28.560	79	.362		
	Total	86.881	81			

Table 5: SPSS Output for Hypothesis 5

a. Dependent Variable: cust_satisfac_mean

b. Predictors: (Constant), assurance_mean, empathy_mean

The fifth hypothesis proposed that Emotional Service Quality, consisting of Assurance and Empathy, significantly influences customer satisfaction in digital banking.

The regression output revealed a significance level of 0.000 ($p < 0.05$), which necessitates the rejection of the null hypothesis. Accordingly, H5 is supported, indicating that emotional dimensions of service quality are important predictors of customer satisfaction.

H6: Customer Satisfaction significantly predicts Customer Loyalty.

A simple linear regression was performed to assess whether customer satisfaction predicts customer loyalty in digital banking.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.669	1	33.669	88.238	.000[b]
	Residual	30.526	80	.382		
	Total	64.195	81			

a. Dependent Variable: Loyalty_mean

b. Predictors: (Constant), cust_satisfac_mean

Table 6: SPSS Output for Hypothesis 6

The sixth hypothesis tested whether customer satisfaction significantly predicts customer loyalty in the context of digital banking. The regression analysis reported a significance level of 0.000 ($p < 0.05$), leading to the rejection of the null hypothesis. Therefore, H6 is accepted, confirming that higher satisfaction with digital banking services significantly increases customer loyalty. This suggests that satisfied users are more likely to continue using digital banking platforms, recommend them to others, and exhibit long-term engagement. The finding reinforces the critical role of satisfaction as a key driver of sustained customer relationships in the digital banking ecosystem.

H7: Gender, age, occupation, and type of bank together significantly predict customer satisfaction with digital banking services.

This part of the study looks at whether factors like age, gender, and occupation have any effect on how satisfied people feel with online banking services. Some literature have shown that older people or those in certain jobs may be less comfortable with digital platforms, which could affect their satisfaction. Also, men and women might have different preferences when it comes to using digital banking. That's why it's important to see if these three demographic factors, when looked at together, have any impact on how happy customers are with online banking.

To examine the impact of demographic variables—gender, age, occupation, and type of bank account on customer satisfaction, Multiple Linear Regression (MLR) analysis was employed. This method allows the assessment of the collective and individual contributions of independent variables (IVs) to predict the dependent variable (DV).

Regression model:

Customer Satisfaction=β0+β1(Gender)+β2(Age)+β3(Occupation)+ β4(type of bank ac) + c

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31.861	5	6.372	8.802	.000[b]
	Residual	55.020	76	.724		
	Total	86.881	81			

a. Dependent Variable: cust_satisfac_mean

b. Predictors: (Constant), 5. Preferred mode of Banking, 2. Gender, 3. Occupation, 4. Type of Bank account (mostly used), 1. Age

Table 7: SPSS output for Hypothesis 7

Here, the significance value is 0.0. hence, we reject H0. The regression confirms that demographic variables significantly predict customer satisfaction, as the overall model is highly significant (**$p < 0.001$**).

Variable	B (Effect Size)	Sig. (p-value)	Interpretation
(Constant)	0.715	0.399	Intercept: Not meaningful alone.
Age	0.216	0.057	*Marginally not significant* (just above 0.05); older customers tend to be more satisfied, but not conclusively.
Gender	0.208	0.332	Not significant; gender does not influence satisfaction.
Occupation	–0.228	0.044	Significant, occupation negatively influences satisfaction. Some occupational groups (likely business owners or retirees) are less satisfied.
Type of Bank Account	0.290	0.182	Not significant; account type doesn't impact satisfaction.
Preferred Mode of Banking	1.457	0.000	Highly significant; customers preferring digital banking report much higher satisfaction. This is the strongest predictor in your model.

Based on the analysis of all seven hypotheses, the following key insights were observed:

1. Perceived ease of use significantly enhances the perceived usefulness of digital banking (H1).
2. Perceived usefulness positively and significantly impacts customer satisfaction (H2).
3. A positive attitude toward digital banking significantly drives users' behavioural intention to adopt such services (H3).
4. Functional service quality factors—tangibility, reliability, and responsiveness—have a significant positive influence on customer satisfaction (H4).
5. Emotional service quality dimensions—assurance and empathy—are also significant predictors of customer satisfaction (H5).
6. Customer satisfaction plays a pivotal role in predicting customer loyalty in digital banking (H6).
7. Demographic variables collectively influence customer satisfaction, with

occupation showing a statistically significant impact, while age and gender do not individually contribute significantly (H7).

5. Implications for bankers and policymakers

The results of this study offer useful insights for both bankers and policymakers who are working to improve customer satisfaction and loyalty in digital banking. One of the key findings is that when customers find digital banking easy to use and useful, they're more likely to be satisfied and continue using it. This means banks should focus on making their apps and websites simple to use, with easy navigation and helpful features. Listening to customer feedback, fixing bugs quickly, and offering personalized services can also make digital banking more valuable and enjoyable for users.

From the service quality side, this study clearly shows that both functional aspects (like how reliable or responsive the service is) and emotional aspects (like empathy and assurance) play a big role in shaping customer satisfaction. This means banks should try to create a balance between technology and human interaction. For example, using video calls for customer support, chatbots that can quickly connect to a real person when needed, and keeping customers informed during technical issues can really help build trust. Emotional service is especially important when customers face problems, as it helps them feel heard and valued—even when they're using digital platforms.

The strong connection between customer satisfaction and loyalty highlights why it's important for banks to regularly measure how happy their customers are. Tools like Net Promoter Score (NPS) and regular customer experience (CX) surveys can help banks keep track of what's working and what needs improvement. When banks listen to their customers and make meaningful changes, they're more likely to keep those customers and even gain new ones through positive word-of-mouth.

For policymakers, the results of this study also suggest that demographics matter—especially when it comes to occupation. People who are self-employed, working in informal jobs, or from older age groups may struggle more with using digital banking services. That's

why it's important to create policies that help bridge this gap. Programs that promote digital awareness, offer affordable access to smartphones and internet, and design banking tools specifically for different work groups can really make a difference. Also, clear rules that protect customers from online fraud or service failures can build greater trust in digital banking overall.

In conclusion, this study highlights the importance of moving away from a one-size-fits-all approach in digital banking. The findings show that different customer groups have different expectations, and meeting those needs requires a mix of smart technology, personal service, and supportive policies. Banks should focus not only on improving their digital platforms but also on making sure the service feels human and accessible. At the same time, policymakers must ensure that digital banking is inclusive and safe for everyone. Together, these efforts can help build stronger customer satisfaction and loyalty in the ever-changing digital landscape.

6. Limitations of the study and Future scope

Like any research, this study has a few limitations. First, the sample size was relatively small, which may not fully represent the larger population of banking customers. This means the results might not apply to everyone. Also, since the study was conducted at one point in time, it doesn't show how people's opinions or experiences may change in the future. Another limitation is that only a few demographic factors—like age, gender, and occupation—were looked at. Other important factors, such as income level, education, and digital skills, were not considered, which could have influenced the results.

In the future, researchers can build on this study by using a larger and more diverse sample from different regions and types of banks. This would make the findings more applicable to the general population. A long-term study could also be useful to understand how customers' views and satisfaction change over time. Adding more demographic details, such as income, education, and level of digital literacy, would provide a deeper understanding of customer

behaviour. Future studies can also focus on comparing different digital platforms (like mobile vs. internet banking) and explore important aspects such as trust, online security, and ease of use to get a complete picture of what influences digital banking experiences.

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The Influence Shift: Measuring the effectiveness of Micro Influencers on Digital Buying Behaviour

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Abstract

Micro-influencers, or those with 1,000–50,000 followers, are becoming more and more popular in the digital market because of their unique capacity to boost customer interaction and sway the purchasing decisions of more niche audiences. The study's goal is to assess the impact of micro-influencers on online purchasing patterns and their applicability to hyper-local marketing. As more people look to real and approachable online personas,

micro-influencers are seen as trustworthy, active people whose content is relatable in ways that are far more genuine than typical celebrity endorsements. Drawing from a theoretical framework based on five influencer attributes—expertise, attractiveness, trustworthiness, interactivity, and parasocial relationship—the current study explores the relationship between these attributes and the impact of consumers' views and purchase intention. The study also looks at how exposure to advertisements influences the relationship between consumers' decision-making processes and their level of faith in advertising. A structured online questionnaire was used to gather original data from 286 social media users who follow at least one local micro-influencer. We used SPSS and JAMOVI to investigate the significance of influencer attributes, engagement, and brand adoption. According to preliminary findings, consumer response can be significantly predicted by interactivity and parasocial interactions. This has huge implications for marketers looking to enhance their digital strategy through partnerships with hyper-local influencers.

Keywords: *Micro-Influencers, Digital Buying Behaviour, Hyper-Local Marketing, Consumer Perception, Parasocial Relationship, Influencer Trust, Influencer Engagement.*

Introduction:

The brand-to-customer relationship has changed as a result of social media, and marketing has shifted from mass disruption to dialogue marketing. Micro-influencers have emerged as a powerful force in the current digital era, particularly in very localised industries where relatability and authenticity are more important than reach. Micro-influencers build stronger relationships with their smaller but more engaged audiences, which increases consumer action, credibility, and trust.The purpose of this study is to look into how micro-influencers affect digital buying habits, especially in younger urban and semi-urban consumers. The study examines how customer involvement and purchase decisions are impacted by influencer attributes such as attractiveness, knowledge, dependability, interaction, and parasocial relationships. The function of advertisement transparency is also investigated in order to understand its moderating effect on trust and brand adoption. As influencer marketing continues to evolve, brands looking to optimise their return on investment through targeted, cost-effective tactics must comprehend these dynamics. This study

examines answers from 286 Gujarati social media users using a descriptive cross-sectional methodology, providing useful insights into the workings of influence and the potential for micro-influencers to propel hyper-local marketing success.

Literature Review

Expertise

By emphasising image satisfaction and advertising trust as important factors influencing purchase intention, this study investigates how micro-influencers affect customer attitudes. According to data gathered from 320 Instagram users in Gujarat, experience and advertising trust have little effect on opinions, but attractiveness and uniqueness do (Karamchandani, 2025).According to this study, Gen Z appreciates genuine, imaginative content from influencers, while micro-influencers are less likely to trigger avoidance behaviour and are more relatable. Influencers should not be too controlled by brands because this might result in bad emotional reactions and backlash. To increase trust and decrease customer avoidance, credibility and moral behaviour are essential (Pradhan, 2023).This study emphasises how believability and buying habits are increased when influencers are congruent with their followers. It recommends that companies select specialised specialists to increase engagement and trust, which will result in more successful marketing (Venciute, 2023).This study underlines how consumer views towards beauty advertisements are influenced by the legitimacy of peer-endorsers, who are based on trust, knowledge, and attractiveness. It also highlights the significance of relatable and appealing endorsers, particularly for customers who are familiar with the product (Munnukka, 2016).Therefore, based on the above literature, the following hypothesis was proposed.

H_1: Perceived expertise of micro-influencers positively influences consumer parasocial relationships.

Trustworthiness

Compared to traditional celebrity endorsers, micro-influencers are more effective at influencing digital purchasing behaviour because they increase engagement and build trust among niche audiences. Micro- influencers provide increased authenticity and cost-efficiency, which is especially advantageous for small and medium-sized businesses, even

though celebrity endorsements can increase brand awareness (Kumar, 2024). Instagram micro-influencers are seen as trustworthy and relatable, which has a significant impact on customers' decisions to buy. They are an excellent substitute for small firms in India's digital marketing sector because to their low costs and good return on investment (Gupta, 2019).According to the study, Instagram superstars' greater social presence and perceived sociability make them more trustworthy than traditional celebrities. It demonstrates that Instagram influencers, despite having comparable beauty, generate more positive brand sentiments, changing the function of celebrities in digital marketing (Jin, 2019). According to this study, non-conventional Instagram celebrities—such as YouTubers and bloggers—have a significant impact on consumer behaviour because they are perceived as more relatable and trustworthy than traditional celebrities. The strategic significance of selecting sympathetic endorsers in digital marketing is highlighted by the fact that users respect authenticity, believe the reviews of influencers, and frequently imitate their lifestyles (Djafarova, 2017). This study looks at how customer purchasing decisions are impacted by influencer marketing and pinpoints the causes of decreased sales. The results show that although influencer marketing has many advantages, problems like oversaturation and eroded trust can make it less successful. However, resolving these problems can increase its profitability (Govindan, 2021). According to this thesis, trustworthiness and attractiveness are important determinants of buy intentions on Instagram, with female consumers being more swayed by trustworthiness. It provides brands with information to improve their influencer marketing tactics (Rebelo, 2017). This study identifies "Sinfluencers" who deceive followers and investigates the effects of concealed influencer promotions. It draws attention to how difficult it is for customers to identify authenticity and the avoidance behaviour that results (Jhawar, 2024). Therefore, based on the above literature, the following hypothesis was proposed.

H_2: Higher perceived trustworthiness of micro-influencers enhances parasocial relationships and increases the likelihood of brand adoption.

Attractiveness

This study illustrates the distinct marketing responsibilities of influencers by classifying them into the following categories: Mega, Macro, Micro, Nano, Blog, Vlogging, and

Gaming. It highlights how crucial it is to choose influencers that share the objectives of campaigns and target audiences in order to implement successful marketing tactics (Şenyapar, 2024). The results of this study, which contrasts micro-influencers and celebrity endorsers on Instagram, show that micro-influencers are more successful at fostering consumer-brand interaction since they generate more clicks, comments, and likes than celebrities do (Marques, 2021). This study looks at the influence of Instagram influencers on travel choices, emphasising the importance of follower count, content, and credibility. It reveals that influencer posts have a major impact on how people perceive a place, and their efficacy varies depending on how popular the influencer is (Hernández-Méndez, 2024). This study demonstrates how consumer attitude plays a crucial mediating role in the relationship between purchase intention and influencer attributes like attractiveness and product fit. In order to improve audience perception and increase sales, brands ought to select relatable influencers (Lim, 2017). Therefore, based on the above literature, the following hypothesis was proposed.

H_3: The physical and stylistic attractiveness of micro-influencers positively affects parasocial relationship.

Interactivity

This study investigates the ways in which influencer marketing can counteract online cynicism among consumers. It discovers that genuine, reliable content from influencers fosters trust, which in turn raises purchase intention and brand loyalty. The study emphasises how crucial authenticity and realism are in influencer partnerships in order to overcome suspicion and improve customer engagement (Gökerik, 2024). According to this study, in luxury fashion marketing, micro-influencers' uniqueness and credibility increase consumer interaction, increasing buy intention and brand equity (Pedro, 2023). According to this survey, Irish Millennials place a high value on relatability, credibility, and trust and are heavily impacted by micro-influencers when making lifestyle purchases. Because they are more personable and participate in two-way communication, micro-influencers have a greater impact than traditional celebrities (Wahane, 2019).Influencers are effective marketing tools due to their captivating content and online presence; their effects vary depending on the age group and have significant strategic ramifications (Kádeková, 2018).

This study investigates the relationship between purchase intentions and consumer attitudes towards social media influencers. It helps marketers improve their strategy for increased engagement and conversions by offering insights into the critical characteristics driving perceptions (Ilieva, 2024). Therefore, based on the above literature, the following hypothesis was proposed.

H_4: Greater interactivity between micro-influencers and followers strengthens consumer engagement and positively impacts parasocial relationships.

Parasocial Relation

Advertising transparency raises influencer trust, which in turn improves buy intention, according to this study. This link is mediated by brand awareness, and the outcome is unaffected by the influencer type (micro or celebrity) (Sesar, 2022). Depending on their age, gender, and level of education, young consumers follow social influencers for a variety of reasons, including entertainment, trends, and information seeking. Social identity is a crucial mediating factor that connects these incentives to real purchasing decisions impacted by recommendations on social media (Croes, 2021). The study reveals notable generational disparities in consumer behaviour by examining the influence of social media influencers on Generations Y and Z's purchase decisions. This study highlights the relatability and efficacy of micro-influencers in influencing purchase intent, demonstrating that they have a stronger effect on consumer purchasing behaviour than mega-influencers. According to the results, micro- influencers are useful for focused marketing campaigns (Furtana, 2024). According to this study, social media influencers (SMIs) have an impact on customer behaviour through their personality and content characteristics, which encourages choice imitation and raises buy intent. It emphasises how income levels increase the impact of this influence, which is mediated by customer loyalty, providing marketers with information to improve their digital tactics (Chan, 2022). According to this report, Millennials see micro-influencers as important sources of product inspiration and awareness because they perceive them as approachable and trustworthy. Micro-influencers are powerful marketing partners because they greatly increase brand awareness and consumer engagement, particularly on platforms like Instagram, even though direct sales may be less common (Rahmah, 2019). Therefore, based on the above literature, the following hypothesis was proposed.

H_5: Stronger parasocial relationships with micro-influencers positively influence brand adoption.

H_{5A}: Parasocial relationship mediates the relationship between influencer characteristics and influence- driven brand adoption.

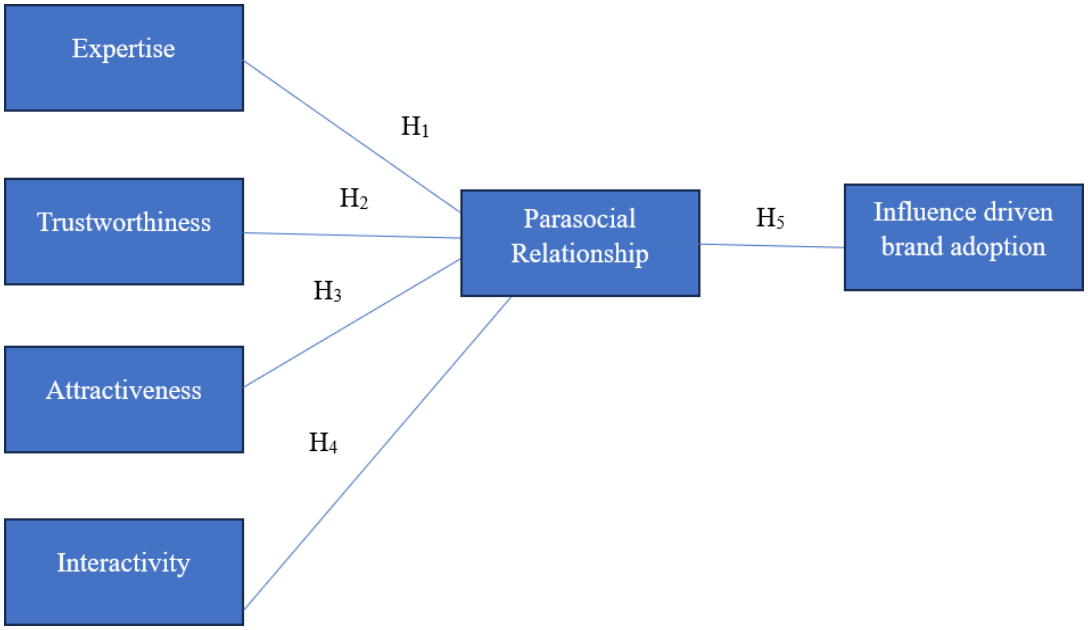

Figure 1: Theoretical Framework

Research Methodology

In order to investigate how micro-influencers affect consumer behaviour in hyper-local digital marketing campaigns, this study uses a descriptive cross-sectional research design. A total of 286 respondents were surveyed, all of whom are active social media users following at least one local micro-influencer. To reach people who have seen hyper-local influencer content on websites like YouTube, Instagram, and other comparable digital channels, the non-probability convenience sampling technique was used. The study employed a structured online questionnaire administered through Google Forms to gather primary data. The questionnaire included both closed-ended and Likert scale-based questions intended to evaluate consumer trust, engagement, content preferences, and purchase decisions influenced by micro-influencer marketing. The theoretical framework is based on adopted scales with reference to (Lin, 2021), (Oulhi, 2024) and (Zhou, 2024) .The responses were analysed using SPSS for descriptive statistics and inferential analysis, while JAMOVI was used to assess the model fit and structural relationships among variables. To further

contextualise the results and bolster the theoretical framework, secondary data was gathered from industry reports, case studies, academic literature, and influencer marketing platforms. For researchers, marketers, and brands aiming to reach niche markets, this mixed approach guarantees a thorough grasp of the behavioural impact of micro-influencers in hyper-local digital spaces.

Data Analysis and Interpretation

SEM

Table 1: Overall Reliability of all scales

Scale Reliability Statistics	
	Cronbach's α
Scale	0.903

Table 2: Individual Reliability

Scale Reliability Statistics	
Scale	Cronbach's α
Expertise	0.745
Attractiveness	0.684
Trustworthiness	0.786
Interactivity	0.748
Parasocial Relationship	0.807
Brand Adoption	0.783

Cronbach's α = 0.903 - The overall reliability of the measurement instrument is exceptionally high, with a Cronbach's alpha of 0.903, indicating excellent internal consistency. This confirms that the scale used is highly reliable for research purposes.

Table 3: Model Test

Label	X^2	df	p
User Model	751	288	<.001
Baseline Model	14603	325	<.001
Scaled User	794	288	<.001
Scaled Baseline	4269	325	<.001

Table 4: Fit indices

			95% Confidence Intervals		
Type	SRMR	RMSEA	Lower	Upper	RMSEA p
Classical	0.073	0.075	0.069	0.082	<.001
Robust	0.064	0.095	0.089	0.102	<.001
Scaled	0.064	0.079	0.072	0.085	<.001

SRMR = 0.064: Excellent (< 0.08 is good)

RMSEA = 0.079: Acceptable (< 0.08 is good, < 0.05 is excellent)

CFI = 0.872: Below ideal threshold (> 0.90 preferred)

TLI = 0.855: Below ideal threshold (> 0.90 preferred)

The model demonstrates a reasonable fit, with SRMR and RMSEA values falling within acceptable thresholds. However, the CFI and TLI values indicate scope for further refinement to enhance model adequacy.

Table 5: User model versus baseline model

	Model	Scaled	Robust
Comparative Fit Index (CFI)	0.968	0.872	0.779
Tucker-Lewis Index (TLI)	0.963	0.855	0.751
Bentler-Bonett Non-normed Fit Index (NNFI)	0.963	0.855	0.751

Relative Noncentrality Index (RNI)	0.968	0.872	0.779
Bentler-Bonett Normed Fit Index (NFI)	0.949	0.814	
Bollen's Relative Fit Index (RFI)	0.942	0.79	
Bollen's Incremental Fit Index (IFI)	0.968	0.873	
Parsimony Normed Fit Index (PNFI)	0.841	0.721	

Table 5.1: Parameter estimates

				95% Confidence Intervals				
Dep	Pred	Estimate	SE	Lower	Upper	β	z	p
Parasocial	Expertise	0.0232	0.0777	-.1292	0.176	0.0195	0.298	0.766
Parasocial	Attractiveness	0.1076	0.0985	-.0855	0.301	0.0944	1.092	0.275
Parasocial	Trustworthiness	0.2415	0.0765	0.0915	0.392	0.2297	3.155	0.002
Parasocial	Interactivity	0.7489	0.0798	0.5926	0.905	0.7213	9.391	<.001
Brand_ adoption	Parasocial	0.7708	0.0565	0.66	0.882	0.8071	13.638	<.001

Table 5.2: Measurement model

				95% Confidence Intervals				
Latent	Observed	Estimate	SE	Lower	Upper	β	z	p
Expertise	E1	1	0	1	1	0.583		
	E2	1.278	0.1511	0.982	1.574	0.745	8.46	<.001
	E3	1.188	0.142	0.91	1.467	0.693	8.36	<.001
	E4	1.269	0.1473	0.981	1.558	0.74	8.62	<.001
Attractiveness	A1	1	0	1	1	0.607		
	A2	1.021	0.102	0.821	1.221	0.62	10.01	<.001
	A3	1.101	0.1026	0.899	1.302	0.668	10.73	<.001
	A4	1.005	0.1006	0.808	1.202	0.611	10	<.001
Trustworthiness	T1	1	0	1	1	0.658		
	T2	0.993	0.0915	0.814	1.173	0.653	10.85	<.001
	T3	1.243	0.0968	1.053	1.433	0.817	12.84	<.001
	T4	1.182	0.0957	0.994	1.369	0.777	12.35	<.001
Interactivity	I1	1	0	1	1	0.666		
	I2	0.999	0.0739	0.854	1.144	0.665	13.51	<.001
	I3	1.123	0.0752	0.976	1.271	0.748	14.93	<.001
	I4	0.986	0.0746	0.84	1.132	0.657	13.23	<.001
Parasocial	PR1	1	0	1	1	0.692		
	PR2	0.873	0.0583	0.759	0.988	0.604	14.99	<.001
	PR3	0.973	0.0521	0.871	1.075	0.673	18.67	<.001
	PR4	0.955	0.0563	0.845	1.065	0.661	16.98	<.001
	PR5	0.945	0.0541	0.839	1.051	0.654	17.47	<.001
Brand_ adoption	BA1	1	0	1	1	0.66		
	BA2	1.199	0.0766	1.049	1.35	0.792	15.67	<.001

	BA3	1.048	0.0694	0.912	1.184	0.692	15.11	<.001
	BA4	0.955	0.0673	0.824	1.087	0.631	14.2	<.001
	BA5	0.979	0.0738	0.834	1.123	0.646	13.27	<.001

1. Interactivity is King: The most striking finding is that interactivity has by far the strongest influence on parasocial relationships (β = 0.72). This suggests that micro-influencers who actively engage with their audience through comments, responses, and interactive content are much more effective at building the personal connections that drive consumer behaviour.

2. Trustworthiness Matters, But Less Than Expected: While trustworthiness does significantly predict parasocial relationships (β = 0.23), its effect is much smaller than interactivity. This is particularly interesting given how much emphasis marketing literature places on trust.

3. Expertise and Attractiveness Don't Drive Connection: Surprisingly, neither expertise nor attractiveness significantly predicts parasocial relationships. This challenges traditional influencer marketing assumptions that focus heavily on expertise and physical appeal.

4. Parasocial Relationships are Crucial: The extremely strong relationship between parasocial relationships and brand adoption (β = 0.81) confirms that the emotional connection consumers feel with influencers is the key mechanism driving purchasing behaviour.

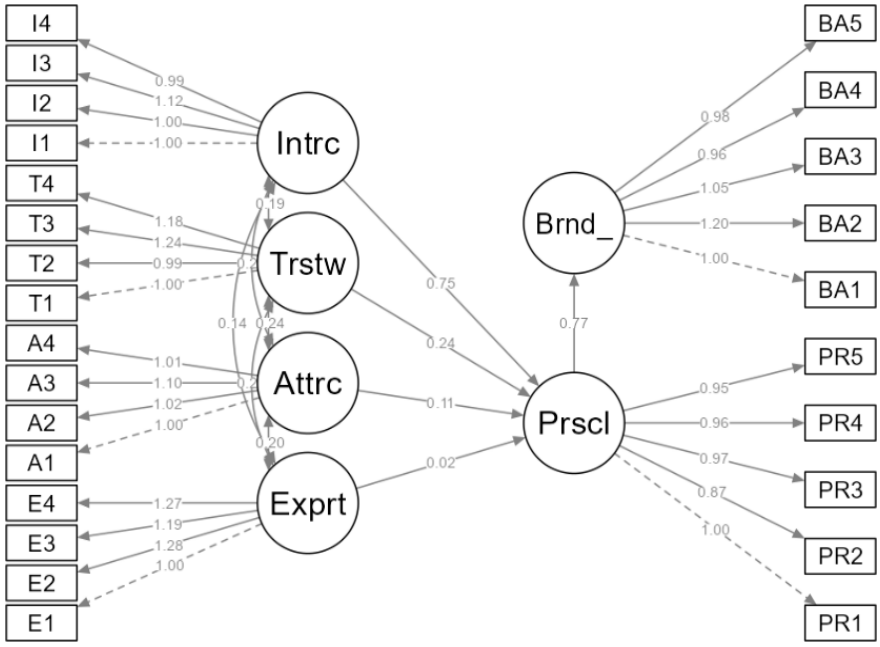

Figure 2: Measurement model

Regression analysis

Table 6: Model summary

Model	R	R^2	Adjusted R^2	Std. Error	Change Statistics					Durbin - Watson
					R^2	F Change	df 1	df 2	Sig.F Change	
1	.671a	.450	.440	.55695	.450	45.777	5	280	.000	1.844

a. Predictors: (Constant), PR, TW, EX, AT, IT

b. Dependent Variable: BA Table 7: ANOVA

Model		Sum of Square	df	Mean Square	F	Sig.
1	Regression	70.999 s	5	14.200	45.777	.000[b]
	Residual	86.855	280	.310		
	Total	157.854	285			

a. Dependent Variable: BA

b. Predictors: (Constant), PR, TW, EX, AT, IT

Demographic Analysis

Table 8: Demographics and General Findings (N = 286)

Variable	Category	Frequency	Percent (%)
Daily Social Media Usage	Less than 1 hour	17	5.9
	1–2 hours	98	34.3
	2–4 hours	118	41.3
	More than 4 hours	53	18.5
Motivations to Follow Micro-influencer	Aesthetic content	61	21.3
	Expertise in a field	72	25.2
	Giveaways and promotions	19	6.6
	Local relevance	30	10.5
	Relatable personality	104	36.4
Influencer Post Impact on Purchase Decision	Before-and-after results	69	24.1
	Daily lifestyle use	63	22
	Discount or offer announcement	45	15.7
	Live Q&A or stories	14	4.9
	Product review/tutorial	95	33.2
Product Types Likely to Buy	Electronics	43	15
	Fashion & accessories	121	42.3
	Food & beverages	59	20.6
	Local or handmade items	12	4.2
	Skincare/beauty products	51	17.8

Action After Viewing Influencer Post	Comment or share	25	8.7
	Like or react	58	20.3
	Search for reviews or price	108	37.8
	Visit brand's page	95	33.2
Purchase Frequency from social media	2–3 times a month	33	11.5
	Once a month	67	23.4
	Once a week	13	4.5
	Rarely	172	60.1
Gender	Female	158	55.2
	Male	128	44.8
Age Group	16–19 years	225	78.7
	20–23 years	41	14.3
	24–27 years	20	7
Education	High School	28	9.8
	Undergraduate/PG Diploma	199	69.6
	Postgraduate	49	17.1
	Professional Course	10	3.5
Annual Family Income	Less than 3 lakhs	131	45.8
	3–5 lakhs	66	23.1
	6–8 lakhs	42	14.7
	9–12 lakhs	20	7
	More than 12 lakhs	27	9.4

The data reveals that a majority of respondents (41.3%) spend 2–4 hours daily on social media, with relatable personality (36.4%) and expertise (25.2%) being key motivators to follow micro-influencers.

Product reviews/tutorials (33.2%) are the most influential post types, and fashion &

accessories (42.3%) are the most likely purchases.

Most respondents are young (16–19 years), undergraduate students, and tend to rarely make purchases via social media despite high engagement.

Findings and Implications

Results from 286 social media users show that both interactivity ($\beta = 0.72$) and parasocial relationships ($\beta = 0.81$) are good predictors of consumer engagement and brand adoption. Credibility ($\beta = 0.23$) had an impact of medium size, while expertise and attractiveness did not significantly affect the parasocial relationship ($p > 0.05$). $R^2 = 0.45$ for the model (i.e. accounted for 45% of the variation in brand adoption). These findings suggest that interactive, affectively rich influencer strategies are more effective in influencing consumer behaviour than traditional characteristics. Marketers should drive towards conversation and relatability through micro-influencers to enhance diet purchase intent, especially in hyper-local and youth-oriented digital campaigns. Marketers should aim to drive conversation and relevance by recruiting micro-influencers to raise purchase intent, especially in hyperlocal and youth-driven digital campaigns.

Conclusion and Future research directions:

This research highlights the significant impact of interactivity and parasocial relationships on consumer behaviour in the context of micro-influencer marketing. While traditional factors such as expertise and attractiveness proved to be statistically insignificant in predicting consumer-brand connections, the results indicate that interactivity ($\beta = 0.72$) and parasocial relationships ($\beta = 0.81$) serve as the strongest influencers of brand acceptance. This calls into question longstanding marketing beliefs and emphasizes the transition toward emotionally driven, two-way communication approaches in highly localized digital environments. Trustworthiness demonstrated a moderate effect ($\beta = 0.23$), reinforcing its relevance but positioning it as secondary to engagement-focused factors.

Nevertheless, the study is constrained by its geographical focus on urban and semi-urban areas in Ahmedabad, along with a primarily young student demographic. The reliance on self-reported data may introduce biases, and the cross-sectional design limits causal

conclusions. Future studies should aim to encompass a wider geographic area and include a more varied demographic to enhance external validity. Employing a longitudinal framework or experimental methodology could shed light on how parasocial relationships develop over time and affect repeat purchases or ongoing brand loyalty. Additionally, examining cross-platform influences—comparing the effects of influencers on Instagram, YouTube, or emerging platforms like Threads—could uncover platform-specific behavioral trends. Researchers might also assess the relative effectiveness of nano, micro, and macro influencers across different industries and campaign strategies. Ultimately, this dynamic field necessitates a more in-depth inquiry into how emotional, interactive, and trust-related elements can be leveraged to foster genuine and sustainable influencer-brand-consumer connections.

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