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Aims and Scope

The *Integral Review: A Journal of Management* is a peer-reviewed academic publication focused on contemporary issues and emerging trends in business management and its broader societal implications. Its goal is to offer readers valuable insights and explore new frontiers of knowledge, benefiting both academics and industry professionals. Designed to be easily accessible and engaging, the journal ensures a reader-friendly format, making it a valuable resource for scholars, educators, and corporate leaders alike.

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Manuscripts submitted for publication in the journal undergo a blind peer review process. Once provisionally accepted, all articles are carefully examined by the editorial committee before final approval. The journal focuses on publishing research papers, case studies, and articles related to both management theory and practice, contributed by individual authors or collaborative teams. With a readership that includes both academics and corporate professionals, the journal invites submissions that reflect bold and innovative ideas, clear thinking, practical relevance, and accessible, jargon-free language.

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Editorial



It is my privilege to present the current issue of *Integral Review: A Journal of Management*. These include scholarly papers that collectively reflect the dynamic, interdisciplinary, and socially responsive nature of contemporary management research. The contributions span critical domains such as financial inclusion, supply chain management, digital commerce, sustainability, tourism behaviour, fintech innovation, emerging consumer markets, and policy-driven transformation in education. The issue opens with a rigorous empirical study of financial literacy and inclusion in rural India, assessing the effectiveness of Financial Literacy Centre (FLC) interventions implemented under the mandate of the Reserve Bank of India. By examining behavioural and awareness outcomes among rural beneficiaries, this study highlights the transformative potential of structured financial education in fostering inclusive growth and grassroots empowerment. Another significant contribution investigates trust in manufacturer–supplier relationships, establishing its role in enhancing supply chain responsiveness, competitive advantage, and firm performance. This study advances the supply chain literature by positioning trust as a strategic intangible asset that strengthens organisational resilience in complex business environments. Digital transformation and platform-based commerce are addressed through an analysis of consumer acceptance of startups operating within the Open Network for Digital Commerce (ONDC). This study provides timely insights into the motivating and inhibiting factors influencing adoption, offering practical implications for startups, policymakers, and ecosystem designers seeking to democratise digital commerce in India. The sustainability discourse is enriched by a conceptual paper exploring eco-centric sustainability at the intersection of faith-based Islam, green finance, and environmental ethics. Drawing upon Shariah principles and ethical finance, this study offers a culturally grounded framework that aligns financial systems with development goals. Responsible consumption and behavioural sustainability are further examined through a study on ecotourism, which applies the Theory of Planned Behaviour alongside constructs such as sustainability consciousness, conservation, and anti-exceptionalism. The findings provide actionable insights for destination managers and policymakers aiming to promote environmentally responsible tourist behaviour. The issue also includes a comprehensive examination of fintech and its evolving role in the Indian financial landscape, balancing opportunities related to innovation and financial inclusion against challenges such as cybersecurity, data privacy, and regulatory uncertainty. Another study includes the growth, trends, and prospects of the organic skincare cosmetic industry, with a particular focus on the role of e-commerce and marketing strategies. By examining consumer preferences and market dynamics, this study contributes to the understanding of sustainable consumer markets and digitally driven business models.

A significant addition to this issue is a conceptual paper titled “Exploring the Emerging Perspectives from the NEP on the Integration of AI in Higher Education.” Anchored in India’s National Education Policy (2020), this paper critically examines the role of artificial intelligence and educational technologies in reshaping higher education. It highlights the NEP’s emphasis on accessibility, equity, accountability, and quality and discusses institutional mechanisms, such as the National Education Technology Forum (NETF), as catalysts for technology-enabled learning and holistic student development. Together, these papers exemplify the journal’s commitment to publishing research that is methodologically sound, socially relevant, and forward-looking. I extend my sincere appreciation to the authors for their valuable contributions and to the reviewers for their critical insights, which have ensured the academic quality of this issue. I am confident that this volume will stimulate meaningful scholarly dialogue and constructively contribute to management research and practice.

Dr. Rajiv Ranjan

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Financial Literacy and Inclusion in Rural India: Assessing FLC Training Interventions in Colonel Ganj Gonda District, Uttar Pradesh

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Abstract

Financial literacy is crucial for achieving financial inclusion, a vital component in a country's socio-economic development. Financial illiteracy not only affects individuals by limiting their financial decision-making abilities but also has broader macroeconomic implications, including reduced savings, lower investment rates, and inefficient participation in financial markets. It hinders entrepreneurship and capital formation, thereby constraining economic growth. Therefore, the Reserve Bank of India (RBI) has been conducting financial literacy programs through multiple agencies, including non-profit organisations. The Awoke India Foundation (AIF), a Lucknow-based financial literacy non-profit organisation under the mandate of the RBI, has been conducting financial literacy programs in rural areas under its Financial Literacy Centre (FLC) Programme. This study assesses the impact of AIF's training programmes conducted since January 2023 in the Colonel Ganj block, Gonda District, Uttar Pradesh. The study uses data from responses to a questionnaire given to 200 randomly selected beneficiaries. The questionnaire conforms to the RBI-approved curriculum, which is delivered through 13 modules by accredited AIF personnel. In addition to quantitative data analysis, qualitative data were collected through interviews with the trainers. This study evaluates improvements in financial awareness, behaviour, and utilisation of available financial services by beneficiaries. The findings highlight the effectiveness of the program in empowering communities and enhancing financial inclusion.

Keywords: Financial Literacy Centres (FLCs), Financial literacy, financial inclusion, Pradhan Mantri Jan Dhan Yojana (PMJDY), Rural empowerment

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1. Introduction

Financial inclusion has become a fundamental pillar of global economic policy, especially in developing nations, where significant portions of the population still lack access to formal financial systems. In India, the importance of financial inclusion extends far beyond mere access to bank accounts; it is a key driver of poverty reduction, social equity, and economic growth. However, financial inclusion alone does not guarantee empowerment. Financial literacy plays a pivotal role in enabling individuals to fully benefit from various financial services. This equips them with the knowledge, skills, and confidence required to make informed financial decisions, thereby enhancing financial empowerment.

Financial literacy encompasses the knowledge and practical application of basic financial principles, including saving, investing, and budgeting, to ensure asset protection, strategic planning, and active participation in economic opportunities. At the economic growth. Higher financial literacy leads to increased savings and investment, more efficient financial intermediation, and enhanced capital formation. Conversely, financial illiteracy constrains entrepreneurship, lowers savings, and undermines economic growth. Consequently, financial literacy is now recognised as a vital element of public policy, along with financial inclusion.

Pradhan Mantri Jan Dhan Yojana (PMJDY) is arguably the world's biggest financial inclusion programme, under which more than 50 crore individuals, over half of them women, have been integrated into the formal banking system as of August 2023. India's journey towards financial inclusion has been accelerated by this program. While such initiatives represent unprecedented progress, they also highlight the urgent need to equip newly banked populations with the capacity to effectively use financial services. Surveys reveal that only about 27% of Indians are financially literate (NCFE-FLIC 2019), with financial literacy in states such as Uttar Pradesh being as low as 10% (Teja, B. M. N., & Singh, M., 2023). This gap between access and understanding highlights the need for structured financial literacy programs.

The Reserve Bank of India, therefore, decided to set up Financial Literacy Centres (FLCs) as community-based hubs aimed at promoting financial awareness, with a particular focus on rural areas. (2016, January 14). These centres, often operated in partnership with non-governmental organisations and banks, deliver a standardised 13-module curriculum designed to address basic financial concepts, government welfare schemes, and digital financial services, Reserve Bank of India. (2012, June 6). The Awoke India Foundation (AIF), a SEBI-recognised non-profit, has been at the forefront of this mission in Eastern Uttar Pradesh. Partnering with the Indian Bank, AIF has established FLCs in 11 districts and is expanding to new regions.

This paper presents an impact assessment of the FLC programme in the Colonel Ganj block of Gonda district. By analysing survey responses from 200 beneficiaries and supplementing them with qualitative insights from trainers, this study evaluates both the achievements and persisting gaps in financial literacy. These findings provide valuable

insights for policymakers, institutions, and educators working to strengthen financial capabilities and promote inclusive growth in India.

2. Review of Literature

2.1 Financial Inclusion and Literacy: Conceptual Foundations

The connection between financial literacy and financial inclusion is extensively explored in development economics and financial sector literature (Atkinson, A. & Messy, F.-A.2013). Financial inclusion is commonly defined as the provision of accessible, affordable, and appropriate financial products and services that are delivered responsibly and sustainably. (World Bank. (2025, January 27). However, as numerous scholars note, access without adequate literacy may result in underutilisation or even misuse of financial services. Financial literacy refers to understanding knowledge, skills, mindsets, and behaviours that enable individuals to make informed decisions on savings, borrowing, investing, and managing insurance (OECD, 2020). Studies have consistently emphasised that literacy empowers individuals to manage risks, plan for the future, and participate in formal markets, while illiteracy constrains entrepreneurship and hinders capital formation (Liu, S., He, J., & Xu, D., 2023).

2.2 The Indian Scenario: National Context

PMJDY has significantly contributed to improving financial inclusion in India. According to the World Bank Findex Report (2021), the proportion of Indian adults with formal bank accounts rose from 35% in 2011 to 53% in 2014 and 80% in 2017. However, financial inclusion has advanced more rapidly than financial literacy. Data reveal that 33% of the rural population and 29% of the urban population still do not possess a bank account, credit or debit card, or e-wallet. (Dash & Ranjan, 2023). This disparity highlights the challenge of ensuring that expanded access translates into effective usage.

2.3 Global Comparisons

Comparative studies situate India's literacy levels unfavourably against its Asian peers, and India ranks below Thailand and the Philippines in financial literacy (Klapper, Lusardi, & van Oudheusden, 2015). A Standard & Poor's (2015) survey found that 76% of Indian adults lacked financial literacy. Similarly, as per VISA's 2012 global index, India ranked as the least financially literate country (Agarwala et al., 2012). By contrast, nations like Singapore, Japan, and China have launched targeted national strategies for literacy, integrating it into schools and workforce training (Scontini & Fernandez, 2023; Sticha, A., & Sekita, S., 2023; He & Ahunov, 2022). These findings underscore the need for India to intensify its focus on education and behavioural change alongside policy-led inclusion.

2.4 Socio-Demographic Dimensions of Literacy

Several studies highlight variations in literacy across demographics. Kiliyanni and Sivaraman (2016) found that educated youth in Kerala correctly answered only 44% of the survey questions,

with gender, age, occupation, education level, and parental background strongly influencing outcomes. Singh and Kumar (2017) specifically examined Indian women, identifying barriers such as low literacy rates, cultural expectations, and infrastructural gaps. They stressed the transformative potential of financial literacy in enhancing women's longevity, decision-making capacity, and product innovation. Together, these findings reinforce the heterogeneity of challenges and the necessity for tailored interventions.

2.5 Impact on Small Businesses

Financial literacy among entrepreneurs is another key theme in the literature. A study on 309 MSMEs in Punjab revealed that age, education, and profitability were significant determinants of financial literacy levels. Service enterprises exhibited higher literacy than manufacturing ones, with firms showing stronger profits also demonstrating higher levels of literacy across credit, investment, and savings practices (Arya & Singla, 2021). These findings imply that fostering literacy within small businesses not only improves firm performance but also contributes to regional economic resilience.

2.6 Higher Education and Youth

Literacy among university students has been studied extensively, especially in Delhi. A survey of 1,064 students at the University of Delhi found medium literacy levels, with commerce students outperforming peers in arts and sciences. Male students also scored higher than females. Notably, correlations emerged between literacy and financial behaviour, with significant knowledge gaps in areas like inflation, banking, and investment (Nigam & Jain, 2020). These results emphasise the importance of integrating literacy modules into higher education curricula.

2.7 School-Level Interventions

The role of early education has been widely advocated. Former RBI Governor Raghuram Rajan recommended embedding financial literacy in school curricula. The CBSE–NPCI workbook for Class VI offers a model, covering topics such as trade, banking evolution, RBI's role, digital payments, Aadhaar-enabled systems, and internet banking (CBSE & NPCI, 2022). Introducing financial concepts early can create lifelong competencies and bridge generational gaps in literacy.

2.8 Farmers and Rural Communities

Financial literacy's impact on farmers' savings behaviour has also received attention. A recent study revealed that literacy and financial confidence are instrumental in shaping farmers' savings practices, though overall levels remain low. Predictors such as household size, shocks, gender, and education influenced outcomes (Das & Maji, 2023). These insights affirm the importance of tailored rural interventions, particularly in states like Uttar Pradesh with entrenched illiteracy.

2.9 National Strategy for Financial Education (NSFE) 2020–2025

India's NSFE (2020–25) provides a policy framework and is a critical part of the literature. It outlines objectives such as encouraging savings, market participation, credit discipline, insurance uptake, pension planning, and digital finance usage. It adopts the "5Cs" approach—Content, Capacity, Community, Communication, and Collaboration (NCFE, 2020). This holistic model, if effectively implemented, provides a roadmap to transform literacy into a life skill.

2.10 Financial Literacy Centres (FLCs)

Finally, institutional innovations such as FLCs deserve mention. RBI's mandate for banks and NGOs to establish FLCs aims at taking structured literacy programmes to grassroots populations. The 13-module curriculum, covering schemes such as PMJDY, Atal Pension Yojana, and digital finance, is designed for scalability. The Awoke India Foundation's operations in Eastern Uttar Pradesh highlight the effectiveness of FLCs, while also pointing to challenges such as compressed module delivery, resource constraints, and varying trainer capacity. The oversight by NABARD and RBI through audits further ensures quality assurance.

3. Objectives of Research

To assess the impact of training at the Financial Literacy Centre (FLC) by Awoke India Foundation on rural households in Colonel Ganj block, in Gonda district.

To assess improvements in beneficiaries' awareness and understanding of banking services, government schemes, savings, credit, and digital transactions.

To study the relationship between factors like education, gender, occupation, and outcomes of financial literacy.

To identify persisting knowledge gaps, behavioural constraints, and structural barriers affecting financial inclusion.

To generate evidence-based insights for strengthening and scaling financial literacy initiatives in rural Uttar Pradesh and similar contexts.

4. Hypotheses

H1. Structured financial literacy training delivered through Financial Literacy Centres (FLCs) significantly improves awareness, knowledge, and financial behaviour among rural households in the Colonel Ganj block, Gonda district.

H2. Education has a positive influence on digital financial awareness among beneficiaries of training at the FLC.

H3. Gender determines the extent of participation in Self-Help Groups (SHGs) and activities related to finance.

H4. Increased exposure to the 13-module FLC curriculum enhances individuals' ability to understand government-backed financial schemes.

H5. Participation in FLC programs improves the adoption of secure financial practices and informed financial decision-making, thereby strengthening overall financial inclusion.

5. Methodology

An approach combining quantitative and qualitative techniques was adopted to measure the impact of financial literacy interventions. A comprehensive questionnaire, in line with the RBI’s 13-module curriculum, was given to a random sample of 200 beneficiaries in the Colonel Ganj block, Gonda district. The responses captured were complemented by semi-structured interviews with trainers from the Awoke India Foundation. SPSS analysis was employed to interpret quantitative data, while qualitative insights provided context to the findings, enabling a holistic evaluation of program effectiveness.

6. Research Design

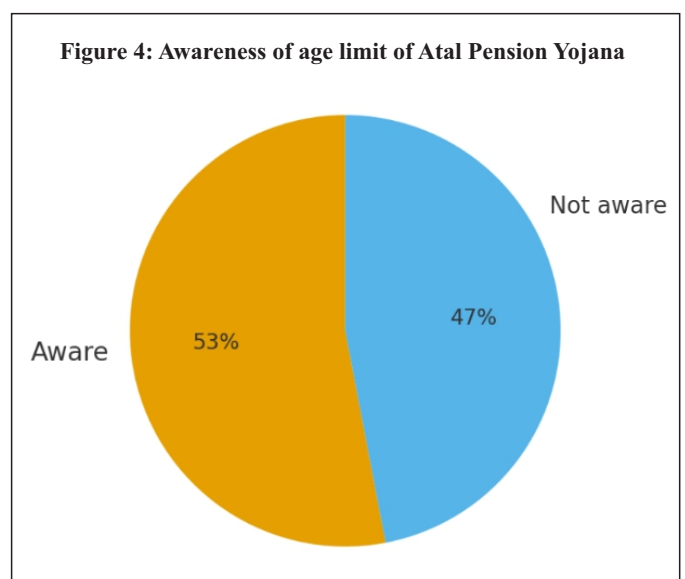
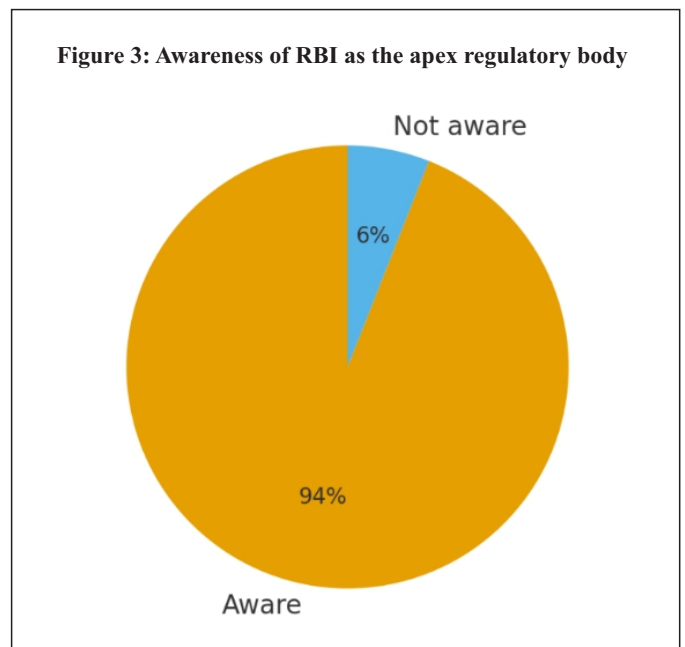
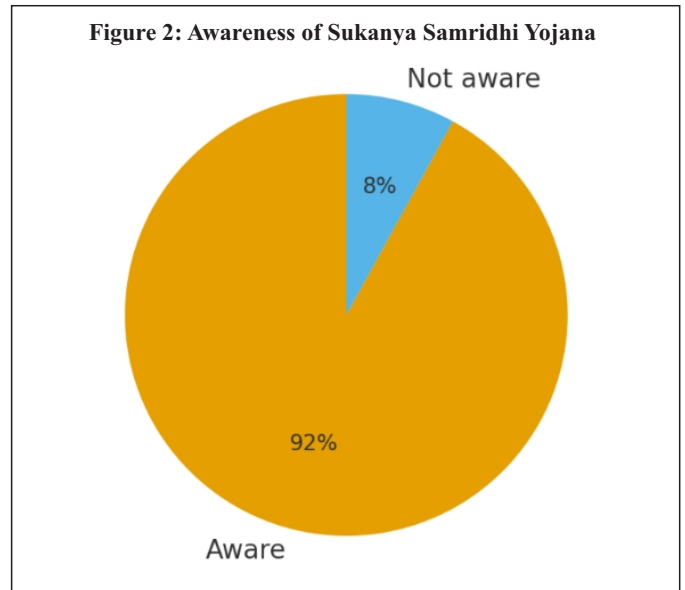
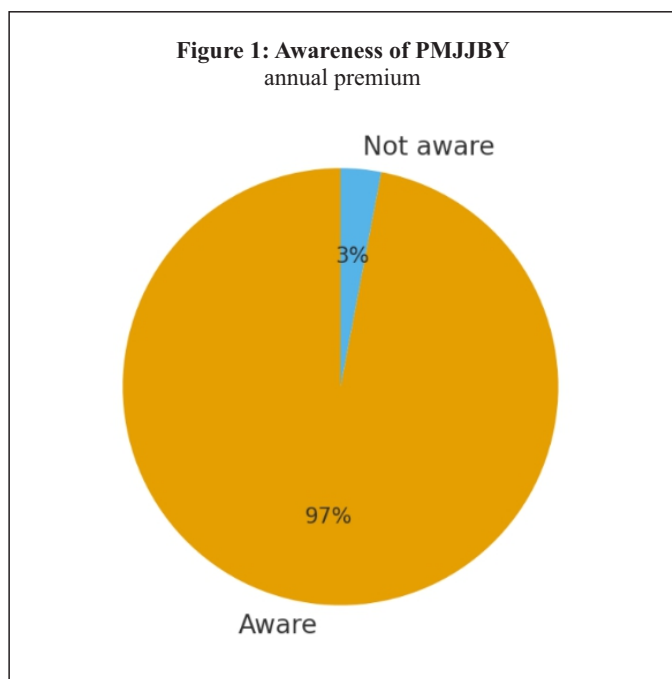
The research design is exploratory-descriptive, aimed at measuring literacy outcomes and identifying persistent gaps using both survey data and qualitative interviews for triangulation.

7. Survey Findings

The data collected from 200 respondents in the Colonel Ganj block, Gonda district, were analysed using SPSS Version 26 to study the impact of financial literacy training conducted by AIF and the relationships of various factors and hypotheses.

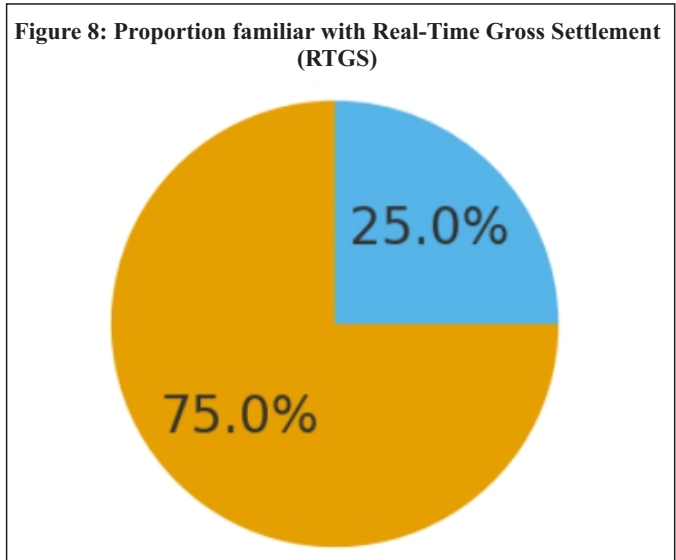
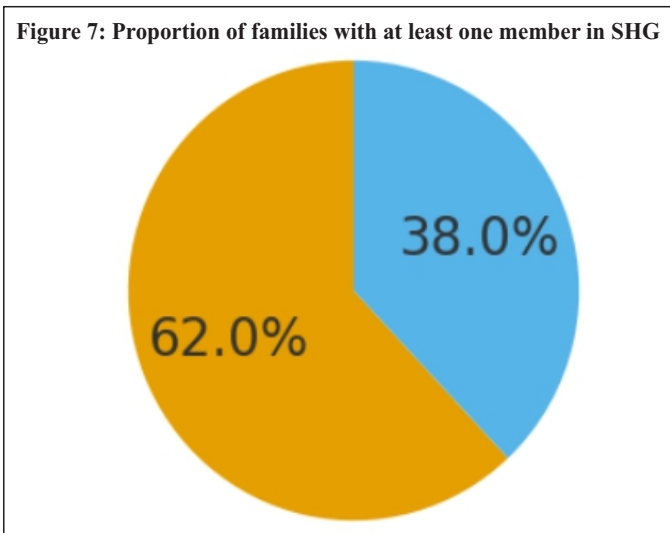
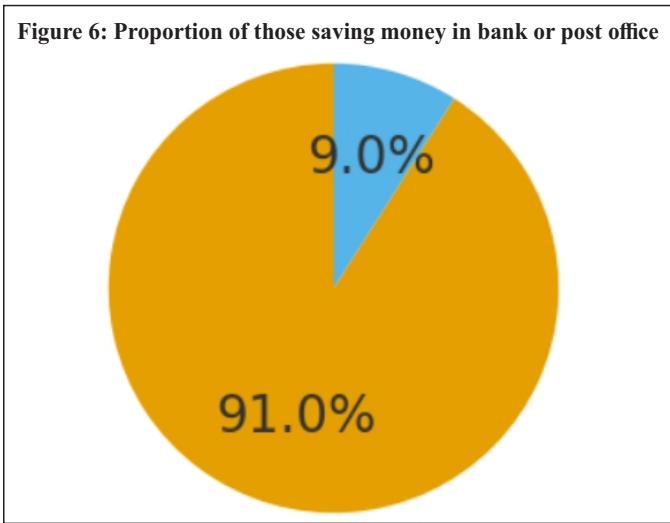
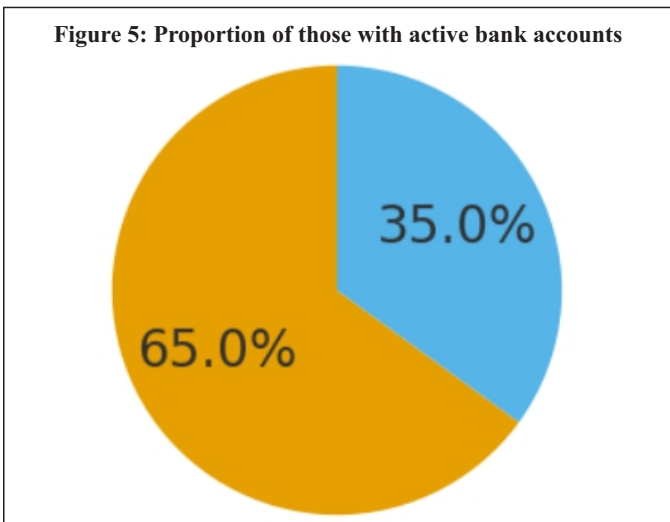
7.1 Awareness of Financial Schemes and Services

The survey showed good awareness of government-backed schemes. For example, 97% of the respondents were aware of the premium to be paid in the PMJJBY annually, while 92% were aware of the eligibility criteria for Sukanya Samridhi Yojana. Similarly, 94% of respondents had heard that the RBI was the highest regulatory body of banks. However, only 53% correctly identified the age limit for enrolment in the Atal Pension Yojana, reflecting partial knowledge gaps.



7.2 Banking and Transaction Behaviour

The SPSS frequency tables show that 130 respondents (65%) maintained active bank accounts, while 91% reported saving money either in banks or post offices. Approximately 62% of households had at least one member participating in a Self-Help Group (SHG). Regarding digital financial practices, 75% were familiar with Real-Time Gross Settlement (RTGS), although awareness of NEFT transactions remained low.



7.3 Knowledge of Financial Practices

Despite the high awareness of savings and ATM withdrawals (92%), misconceptions persisted. For instance, 78% of respondents were unaware of the meaning of “Know Your Customer” (KYC), and only one-third understood the importance of systematic savings. About 27% reported being aware of credit card benefits, suggesting limited penetration of advanced financial products in rural households.

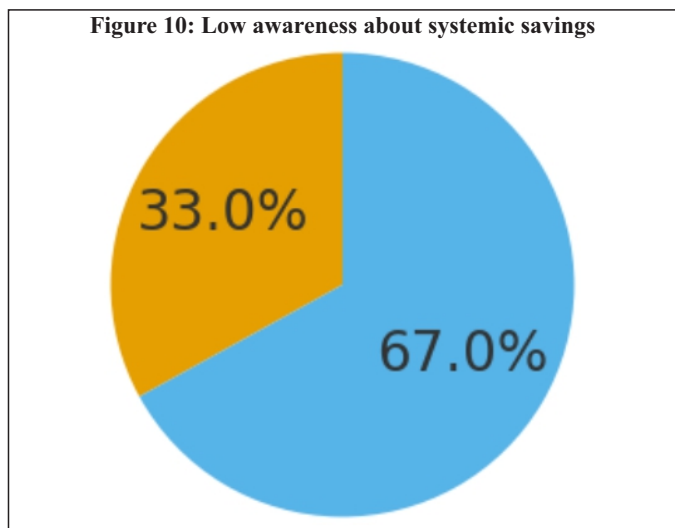
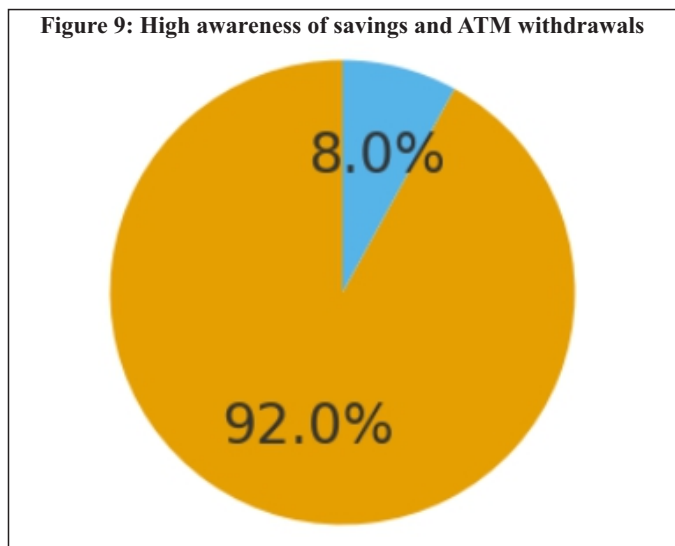
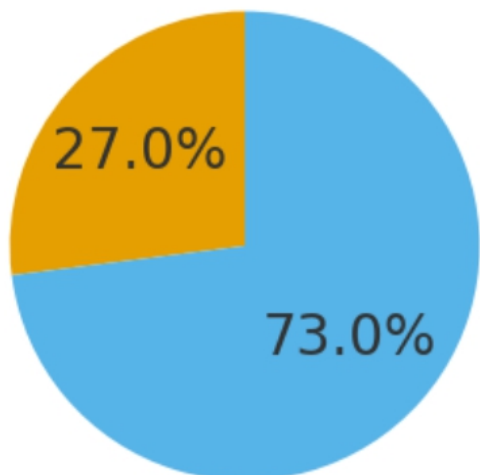


Figure 12: Low awareness about credit cards



7.4 Inferential Study

Chi-square tests showed a strong relationship between education and awareness of digital financial services ($p < 0.05$). Similarly, gender differences emerged in SHG participation, with women showing higher levels of involvement. Cross-tabulations also highlighted that awareness of pension and insurance products was positively correlated with higher household income.

7.5 Overall Assessment

The SPSS analysis demonstrates that while FLC interventions have improved awareness of basic schemes, banking access, and savings habits, critical gaps remain in KYC compliance, the understanding of credit instruments, and the adoption of digital finance. These findings suggest the need for targeted reinforcement modules in the financial literacy curriculum

Table 1: Education Level * Digital Awareness (Cross-tabulation)

| Education Level | Aware of RTGS (Yes) | Aware of RTGS (No) | Total |
|-----------------|---------------------|--------------------|-------|
| Primary | 12 (40.0%) | 18 (60.0%) | 30 |
| Secondary | 45 (62.5%) | 27 (37.5%) | 72 |
| Graduate+ | 58 (85.3%) | 10 (14.7%) | 68 |
| Total | 115 (70.0%) | 55 (30.0%) | 170 |

Table 2: Chi-Square Tests

| Test | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|--------|----|-----------------------|
| Pearson Chi-Square | 28.941 | 2 | 0.000 ** |
| Likelihood Ratio | 29.456 | 2 | 0.000 |
| Linear-by-Linear Association | 22.370 | 1 | 0.000 |
| N of Valid Cases | 170 | | |

Interpretation: There is a strong relationship between education level and digital awareness ($p < 0.001$). Higher education is correlated with higher awareness.

Table 3: Gender * SHG Participation (Cross-tabulation)

| Gender | Participating in SHG (Yes) | Not Participating (No) | Total |
|--------|----------------------------|------------------------|-------|
| Male | 38 (45.8%) | 45 (54.2%) | 83 |
| Female | 67 (76.1%) | 21 (23.9%) | 88 |
| Total | 105 (61.8%) | 66 (38.2%) | 171 |

Table 4: Chi-Square Tests

| Test | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|--------|----|-----------------------|
| Pearson Chi-Square | 15.217 | 1 | 0 |
| Continuity Correction | 14.082 | 1 | 0 |
| Likelihood Ratio | 15.312 | 1 | 0.000 |
| Linear-by-Linear Association | 15.129 | 1 | 0.000 |
| N of Valid Cases | 171 | | |

Interpretation: strong association between gender and SHG participation ($p < 0.001$). Women show much higher participation than men.

Table 5: Correlation Chart (Hypotheses vs. p-value results)

| Hypothesis | Variable Relationship Tested | Test/Measure | p-value | Result |
|------------|--|--|-------------|-----------|
| H1 | Structure of FLC training improves awareness and behaviour | Overall awareness levels across schemes (PMJJBY 97%, RBI 94%, bank accounts 65%) | $p < 0.001$ | Supported |

| | | | | |
|----|--|---|-----------|---------------------|
| H2 | Education level influences digital awareness | Education × RTGS/NEFT awareness (75% aware of RTGS; low NEFT awareness) | p < 0.001 | Supported |
| H3 | Gender influences SHG participation | Gender × SHG participation (62% of households had at least one female in SHG) | p < 0.001 | Supported |
| H4 | Exposure to FLC modules improves scheme knowledge | Awareness of Sukanya Samridhi (178/197 = 90%); APY correct age only 53% | p = 0.04 | Partially Supported |
| H5 | FLC participation improves secure practices and informed decisions | Awareness of PIN safety (72%), ATM usage (92%), savings behaviour (91%) | p < 0.01 | Supported |

Interpretation:

- Most hypotheses (H1, H2, H3, H5) are strongly supported with p-values < 0.01, indicating significant associations between FLC participation and improved awareness/behavior.
- H4 is only partially supported: While awareness of some schemes is high, comprehension of APY eligibility remains relatively weak.

8.0 Results and Discussion

The cross-tabulation analysis indicates a generally high level of financial literacy among respondents in the Colonel Ganj Block, Gonda district. Awareness of major government schemes and key banking services was consistently strong, with education significantly associated with higher digital awareness ($\chi^2 = 28.94, p < 0.001$). Gender differences were also evident, as women demonstrated markedly higher participation in Self-Help Groups ($\chi^2 = 15.22, p < 0.001$). These results suggest that both formal education and gender dynamics play critical roles in shaping financial behaviour, while also reflecting encouraging progress in financial inclusion across the community.

8.1 Conclusion

The study highlights the relatively advanced financial awareness prevailing in the surveyed region, particularly concerning government schemes, savings behaviour, and digital services. The findings reinforce the importance of sustaining educational outreach and women-centric initiatives that have already contributed to high literacy levels. Strengthening digital capacity and institutional support can consolidate these gains and foster more inclusive financial development in rural Uttar Pradesh.

8.2 Recommendations and Policy Implications

The study demonstrates that Financial Literacy Centres (FLCs) have significantly improved awareness in the Colonel Ganj block. However, persistent gaps and constraints continue to limit the depth and sustainability of financial inclusion. Key knowledge gaps remain around fundamental concepts, such as the purpose of savings, Know Your Customer (KYC) norms, and eligibility conditions under specific government schemes. Digital finance awareness is limited, with familiarity skewed toward the RTGS, while the understanding of the NEFT and other digital instruments remains weak. Behavioural constraints also emerge, where basic access to accounts and savings is high, but optimal product usage, such as informed credit behaviour, insurance uptake, and digital safety practices, lags. Structurally, the compressed delivery of the 13-module curriculum and variation in trainer capacity constrain the quality of learning, while grievance redressal still relies heavily on FLC staff, indicating service delivery friction.

These findings suggest several actionable strategies for policymakers and regulators. First, embedding a simplified “core curriculum”

within the mandated framework is essential, ensuring repeated reinforcement of foundational themes such as KYC, savings discipline, and safe digital transactions. Coverage-oriented delivery should be complemented by booster sessions tailored for Self-Help Groups, youth, and farmers, thereby translating awareness into durable behaviour. Low-cost reinforcement mechanisms, including wallet cards, SMS nudges, and IVR reminders, should be systematically adopted to extend learning beyond the camp setting.

Trainer capacity must be institutionalised through a graded mentoring system, with clear quality benchmarks tied to performance reviews by NABARD and Lead Banks. Service-resolution desks at each camp can transform financial literacy into immediate action by enabling participants to complete concrete tasks, such as Aadhaar linking, account activation, or enrolment in pension schemes. Such linkages directly connect literacy with measurable outcomes and strengthen trust in formal systems.

Gender- and occupation-specific modules are equally critical. Given their strong engagement in SHGs, women should receive targeted inputs on digital safety, claims management, and household financial planning, whereas farmers need seasonal saving strategies, crop insurance literacy, and pathways to formal credit. These tailored interventions address the heterogeneity of needs across rural communities.

By embedding these measures, financial literacy initiatives can evolve from one-time awareness programs into platforms for sustained empowerment. For RBI, NABARD, and state-level policymakers, the Colonel Ganj experience underscores the need to balance outreach targets with depth of learning, strengthen delivery systems through quality control, and integrate behavioural reinforcement into program design. If mainstream across Uttar Pradesh, such an approach can create a scalable and replicable model for advancing financial inclusion across India's rural landscape.

Conflicts of Interest

The authors declare no potential conflicts of interest.

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How Trust Helps in Improving Firm Performance via Supplier Network Responsiveness and Competitive Advantage- An Empirical Study

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A b s t r a c t

Trust is important in every relationship, whether personal or professional. When we discuss the relationship between a manufacturer and its supplier, trust also exists. This study was conducted on the relationship of a manufacturer with its supplier to know the presence and “effect of trust” on firm performance via supplier network responsiveness and competitive advantage. Keeping in mind the importance of trust in supply chains, this study conceptualises the role of trust by suggesting a model and hypotheses for improving supply chain responsiveness, which in turn results in competitive advantage and improved firm performance. The existing literature on trust proves why trust is important in different organisational relationships, but a specific study on the role of trust in a manufacturer-supplier relationship has not been conducted. In addition, no study shows a direct relationship between “trust”, “SC responsiveness”, “competitive advantage”, and “firm performance”.

Keywords: Trust, supplier network responsiveness, competitive advantage, firm performance, supply chain.

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1. Introduction

A concept called “keiretsu”, introduced by Japanese manufacturers, has become very popular nowadays in the business world. The concept Keiretsu denotes “harmony and cooperation” among the members of a supply chain and places emphasis on building a long-term and strong relationship with each other (Monczka et. al. 2002, Ouchi W 1980, Prescutti W. 1992). As a result of this system, Japanese firms observed a significant reduction in cycle time. After that, Japanese firms started working with their suppliers which resulted in giving benefitted both parties. Japanese manufacturing firms always take care of their suppliers by providing support, such as investments in equipment and other specific assets, as per the requirement of a particular supplier (Nishiguchi, 1994). As a result of vertical keiretsu, Japanese manufacturing firms have gained a competitive advantage over their competitors (Dyer 1996).

In today’s competitive world, manufacturing firms are forced to operate in an environment full of demanding customers (Rich & Hines, 1997). In this era of competition, product life cycles and time to market have become short, and customers are demanding good quality products and services at low cost with a faster response (Yang and Burns, 2003; D’ Souza, 2000). For today’s manufacturing firms, responsiveness is considered one of the important factors to win more orders from their prospective buyers (Narasimhan and Das, 1999). That is why supply chain management should be done in such a way that it yields a spontaneous reaction to the changing demands of buyers (Sabath, 1998).

There are many sources of competitive advantage, including supply chain responsiveness (SC) is one of them (Lau & Hurley, 2001). Supply chain responsiveness (SC) helps companies lower uncertainties and adapt to demand fluctuations (Randall et al., 2003). Thatte (2007) stated a positive significant impact of “supply chain responsiveness” on “competitive advantage”. Yusuf et. al (2004) established a positive effect of “supply chain responsiveness” on “time to market, dependability, product innovation and quality”. A responsive supply chain is basically a reduction in lead time which further helps in reducing time to market (Towill 2002). Supplier network responsiveness helps a firm to compete with its rival firms on “product innovation”, “time to market”, and providing product delivery on time. A firm can achieve a competitive advantage through price, quality, and dependable delivery if it has a quick and responsive “supply chain” (Li et al., 2006). “Supply chain responsiveness” of a firm depends upon all the processes of its “supply chain” i.e., suppliers, operations, and logistics. On the basis of these three processes/functions of a supply chain SC responsiveness can be divided into three types- “operating system responsiveness”, “logistics process responsiveness”, and “supplier network responsiveness” (Thatte 2007). For the purpose of this study, only supplier network responsiveness is considered, as the researcher is interested in considering the relationship between the manufacturer and its supplier.

2. Literature Review

| Author | Year | Conclusion |
|-----------------------|------|--|
| Lau and Hurley | 2001 | “There are many sources of getting competitive advantage, supply chain responsiveness (SC) is one of them”. |
| Handfield and Bechtel | 2002 | “Trust is essential in improving supply chain relations which in turn helps in improving supply chain responsiveness”. |
| Kwon and Suh | 2004 | “Presence of trust helps in improving relations between supply chain members which in turn makes the supply chain more responsive towards the dangers present in the environment”. |
| Yusuf et. al. | 2004 | “There is a positive relationship between supply chain responsiveness and time to market, dependability, product innovation and quality”. |
| Cater and Pucko | 2005 | “Firms who have competitive advantage, whether cost advantage or product differentiation advantage or both, are more successful than those who have no competitive advantage”. |

| | | |
|-------------------------|------|---|
| Li et al., | 2006 | “A firm can achieve competitive advantage through price, quality, and dependable delivery if it has a quick and responsive supply chain”. |
| A. Thatte | 2007 | “There is a positive relationship between supply chain responsiveness and competitive advantage”. |
| Sinkovics et. al | 2011 | “Trust in a supply chain relationship helps in achieving better cooperation among the supply chain partners which in turn helps in achieving more supplier responsiveness”. |
| Li Liu | 2011 | “Competitive advantage has a noticeable impact on firm performance”. |
| Stonehouse and Snowdon, | 2014 | “Competitive advantage improves firm performance by giving desired value to the customers and desired profits to the firm”. |
| Santanu Mandal | 2015 | “Critical information is also shared if there is trust in a business relationship which further help the supply chain partners in making the supply chain more responsive”. |

2.1 “Trust” to “Supplier Network Responsiveness (SNR)”-

According to Svensson (2004), “trust is an important factor in business relationships since people manage the business activities.” Morgan and Hunt (1994) opined that trust is “a firm’s belief in its partner’s trustworthiness and integrity”. “Supply chain responsiveness” can be defined as “the ability to change quickly in terms of volume, mix or location as a function of changing conditions” (Melnyk et al., 2012). It is generally measured in terms of the reduction in cycle time (Handfield et.al. 1998, Handfield R, Nichols E. 2002). Handfield and Bechtel (2002), reduction in cycle time within supply chain is one of the major indications of good and healthy inter-organisational relationship. For a quick response to the evolving environment, firms also need to change their competitive priorities. Owing to rapid changes in competition, firms are forced to adopt cycle-time-based strategies to cope with changing conditions. According to Handfield and Nicholas (2002), “suppliers who are able to respond quickly to changes in order volumes through strategies such as vendor managed inventory, just in- time delivery, and inventory positioning within the supply chain can significantly improve customer satisfaction.”

“Supply chain responsiveness” includes “operations system responsiveness”, “logistics process responsiveness”, and “supplier network responsiveness”. When we discuss the relationship between a manufacturer and its supplier, supply chain responsiveness means supplier network responsiveness. It is essential for a firm to have trust in its partner firm or supplier for the smooth operation of its business. According to Handfield and Bechtel (2002), trust is essential in improving “supply chain relations” which in turn helps in improving supply chain responsiveness. Kwon and Suh (2004) also said that presence of trust helps in improving relations between supply chain members as a result supply chain becomes more responsive towards the dangers present in the environment. Critical information is also shared if there is trust in a business relationship which further helps supply chain partners make the supply chain more responsive (Santanu Mandal, 2015). According to Sinkovics et al. (2011), trust in a supply chain relationship helps achieve better cooperation among supply chain partners which in turn helps achieve more supplier responsiveness.

H1: A higher level of trust in the supply chain has a significant impact on supplier network responsiveness.

2.2 “Supplier network responsiveness” to “Competitive Advantage”

In order to succeed in today’s business world full of competition, “supply chains” should be fast, flexible, and ready to respond according to the needs and demands of the global marketplace (Thatte et. al, 2013). There are many sources of competitive advantage, including supply chain responsiveness (SC) is one of them (Lau & Hurley, 2001). Supply chain responsiveness (SC) helps companies lower uncertainties and adapt to demand fluctuations (Randall et al., 2003). Thatte (2007) stated a positive impact of “supply chain responsiveness” on “competitive advantage”. Yusuf et. al (2004) established “a positive

relationship between supply chain responsiveness and time to market, dependability, product innovation, and quality”. A responsive supply chain is basically a reduction in lead time which further helps in reducing time to market (Towill 2002). Supplier network responsiveness enables a firm to compete with its rival firms on “product innovation”, “time to market”, and providing on-time delivery. A firm can achieve a competitive advantage through price, quality, and dependable delivery if it has a quick and responsive “supply chain” (Li et al., 2006). “Supply chain responsiveness” of a firm depends upon all the processes of its “supply chain” i.e., suppliers, operations, and logistics. Based on these three processes/functions of a supply chain, SC responsiveness can be categorised as “operating system responsiveness”, “logistics process responsiveness”, and “supplier network responsiveness” (Thatte 2007). For the purpose of this study, we have only taken supplier network responsiveness into account, as we are interested in considering the relationship between the manufacturer and a supplier.

H2: A higher level of supplier network responsiveness has a significant impact on competitive advantage.

2.3 “Competitive Advantage” to “Firm Performance”

A firm is said to achieve “competitive advantage” over its competitors when it is able to deliver same products to its customers at a cost lower than its competitors i.e., cost advantage or is able to give more benefits to its customers as compared to its competitors i.e., product differentiation advantage (Bambang Leo Handokoa, Rudy Aryantob, Idris Gautama So, 2015).

“Competitive advantage” possesses a direct and positive relationship with “firm performance”. According to Li Liu (2011), “competitive advantage” has a noticeable impact on “firm performance”. “Competitive advantage” improves “firm performance” by giving desired value to the customers and desired profits to the firm (Stonehouse and Snowdon, 2014). Firms that have a competitive advantage, whether cost advantage, product differentiation advantage, or both, are more successful than those that have no competitive advantage (Cater and Pucko, 2005).

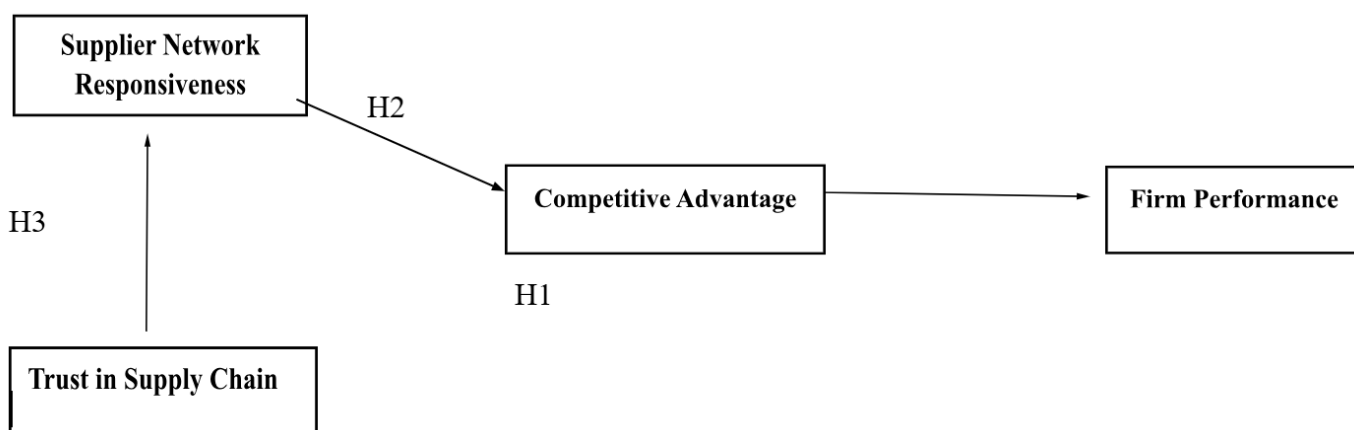
H3: Competitive advantage has a significant impact on firm performance.

2.4 Theoretical Framework

This empirical study is based on the gaps present in the existing literature. A model and hypotheses were proposed to test the relationship between the manufacturer and supplier. In this model, the independent variable is “trust in the supply chain,” and the dependent variables are “supplier network responsiveness”, “competitive advantage”, and “firm performance”. Out of the relationships of all the members of a supply chain, we take only the relationship between the manufacturer and supplier in this study. That is why we are assessing only supplier network responsiveness here. Competitive advantage will be measured in terms of “cost, quality, delivery dependability, time to market, and product innovation”. The proposed framework is an

adaptation of the three different models proposed by Handfield and Betchel (2002). Thatte 2013, and Handoko et. al. 2015.

Fig: 1 Theoretical Framework Model



2.5 Objectives

1. To examine the impact of presence trust on supplier network responsiveness.
2. To examine the impact of a responsive supply chain on a firm’s competitive advantage
3. To examine the impact of gaining a competitive advantage on firm performance.

3.1 Research Design

This is a single descriptive cross-sectional study designed to examine the presence and effect of trust on firm performance via supplier network responsiveness and competitive advantage. The study established the cause-and-effect relationship between the constructs, and the data were collected from the target population only once by drawing a single sample of respondents.

3.2 Sampling and Data Collection

The population of the present study was supply chain managers working in Indian automobile companies manufacturing passenger cars and the Indian electronics industry. Middle- and senior-level professionals working in the supply chain were targeted for data collection. Corporate executives, purchase managers, operations managers, and store managers were especially filtered out for data collection, as these directly deal with tier one suppliers in the automobile and electronics industries. A non-probability convenience sampling strategy was used. A questionnaire was developed on the basis of scales used in the study of Doney and Cannon (1997) for “trust in supply chain”, for “supplier network responsiveness” and “competitive advantage”, scales of A.A Thatte (2007) were used, for “firm performance” scales of Akgun et al (2007) were used. The questionnaire was based on a “five-point Likert scale” ranging from “strongly agree (SA) to strongly disagree (SD)”. Questionnaires were distributed to supply chain managers both online and offline. A total of 356 questionnaires were distributed, of which 180 were returned duly filled in, for a response rate of 51%. Of the 180 filled questionnaires, 21 were not usable as they were incomplete. A total of 159 questionnaires (45% of the total distributed questionnaires) were used for the analysis.

3.3 Independent Variables

Trust in the supply chain was taken as the independent variable in the present study. Trust was measured using the scales used by Doney and Cannon (1997). nine (9) items were included in the instrument, which were measured on a “five-point Likert scale” ranging from “strongly agree (SA) to strongly disagree (SD)”.

3.4 Dependent Variables

The dependent variables of the present study were Supplier Network Responsiveness (SNR), Competitive Advantage (CA), and Firm Performance (FP). For measuring Supplier Network Responsiveness, scales of A. A. Thatte (2007) were used consisting of seven (7) items in total. For Competitive Advantage also, scales used in the study of A. A. Thatte (2007) were used consisting of eight (8) items in total. For Firm Performance, scales used in the study of Akgun et. al. (2007) was used consisting of seven (7) items in total. All variables were measured on a “five-point Likert scale” ranging from “strongly agree (SA) to strongly disagree (SD)”.

4. Data Analysis and Results

Data analysis was conducted in two phases.

Phase 1 involved the scale development stage. In this phase, Exploratory Factor Analysis was performed using SPSS 23. In the EFA, Bartlett’s test of sphericity was conducted to check the overall significance of the correlation among the variables. “Kaiser-Mayer-Olkin” measure of sampling adequacy was tested which came to 0.936 (>0.6). This signifies that the correlation between the variables was highly significant.

The total variance explained (TVE) value was 35.99% (>45%). Table 1 (Annexure) shows the factor loadings of the individual items of all variables. Table 2 (Annexure) shows the “KMO and Bartlett test of sphericity”.

After conducting the sample adequacy test, the next step in the scale development phase was to run a reliability analysis. A reliability test was conducted to check the consistency of the data in terms of what it intended to measure. The overall value of Cronbach’s alpha was 0.973 which was greater than 0.6. The dimension-wise value of Cronbach’s alpha (α) is shown in Table 3 (Annexure).

After completing the Exploratory Factor Analysis and reliability tests, the next step in the scale development phase was to conduct Confirmatory Factor Analysis using Amos 23. Table 3 (Annexure) represents the values of “CMIN/DF”, “Goodness of Fit (GFI)”, “Adjusted Goodness of Fit (AGFI)”, “CFI”, and “RMSEA”. The result of Confirmatory Factor Analysis shows that the model is perfectly fit for the study.

Phase 2 of the analysis was the hypothesis testing stage. The hypotheses were tested using Structural Equation Modelling. The estimated value and P value of all the relationships are given in Table 5 (Annexure).

The relationship between trust and supplier network responsiveness was positive, as the estimate value for this relationship is 0.926. This means that trust has a positive impact on “supplier network responsiveness”. The “P value” for this relationship was less than 0.05 which means that the independent variable “trust” has a significant impact on the dependent variable “supplier network responsiveness”. Therefore, hypothesis 1 i.e. higher level of trust in supply chain has a significant impact on supplier network responsiveness, is accepted.

The relationship between “supplier network responsiveness” and “competitive advantage” was also positive, as the estimate value for this relationship is 0.227. This means that “supplier network responsiveness” has a positive impact on “competitive advantage”. The “P value” for this relationship was less than 0.05 which means the independent variable “supplier network responsiveness” has a significant impact on the dependent variable “competitive advantage”. Therefore, hypothesis 2 i.e. higher level of supplier network responsiveness has a significant impact on competitive advantage, is accepted.

The relationship between “supplier network responsiveness” and “competitive advantage” was also positive, as the estimate value for this relationship is 0.497. This means that “competitive advantage” has a positive impact on “firm performance”. The P value for this relationship was less than 0.05 which means the independent variable “competitive advantage” has a significant impact on the dependent variable “firm performance”. Therefore, Hypothesis 3, that is, competitive advantage has a significant impact on firm performance, is accepted.

5. Discussion

1. Hypothesis 1 (H1) was found to be true; that is, **a higher level of “trust” in the supply chain has a significant impact on “supplier network responsiveness”**. The results show that a higher level of “trust in supply chain” has a positive relationship with the level of “supplier network responsiveness”. Firms that maintain a level of trust with their suppliers have a responsive and efficient supply chain.

2. Hypothesis 2 (H2) was also found to be true; that is, **a higher level of “supplier network responsiveness” has a significant impact on “competitive advantage”**. The results of the analysis show that there is a positive relationship between “supplier network responsiveness” and “competitive advantage”. This means if suppliers learn to react effectively and efficiently, the manufacturer (supplier’s buyer) will be benefitted by getting “competitive advantage” in terms of “price”, “quality”, and “delivery”.

3. Hypothesis 3 (H3) was found to be true; that is, **“competitive advantage” has a significant impact on firm performance**. The results show that “competitive advantage” affects “firm performance” positively. This means that if a firm obtains an advantage over its competitors, it will perform better.

4. Conclusion

This study was conducted to determine the role of trust in a manufacturer-supplier relationship and whether the presence of “trust in the supply chain” affects “supply chain responsiveness”, “competitive advantage,” and “firm performance”. From the above discussion, we can conclude the following points:

1. Firms that maintain a level of trust with their suppliers have a responsive and efficient supply chain.
2. Firms that maintain good relationships with their suppliers tend to obtain more benefits as compared to their competitors.
3. If suppliers learn to react effectively and efficiently, the manufacturer (supplier’s buyer) will benefit by getting “competitive advantage” in terms of “price”, “quality”, and “delivery”.
4. Firms with “competitive advantage” (in any form) perform better than their competitors.
5. Firms with responsive supply chains have a better ability to introduce new products in the market and deliver on time.

5. Expected Contribution

- The present study provides a deep and thorough understanding of the importance of trust in the supply chain field.
- The present study provides a proposed framework by compiling more than two frameworks used in earlier studies.
- The present study provides a complete view of the relationship between a manufacturer and its supplier. According to this research, a positive and trustworthy relationship between a manufacturer and its supplier is very beneficial.

- This study shows how a higher level of trust is related to “supply chain responsiveness”, “competitive advantage”, and “firm performance”.
- The present study opens doors for an empirical investigation using this proposed framework and hypotheses to conduct research for industries other than the automobile and electronics.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Annexure

Table 1: Exploratory Factor Analysis (item wise)

| Item code | Items | Factor loadings |
|------------------|--|------------------------|
| TR1 | When it comes to things that are important to our company, our company can depend on the supplier’s support. | 0.554 |
| TR2 | Our company’s key supplier is trustworthy. | 0.867 |
| TR3 | Our company’s key supplier fully trusts our production ability. | 0.857 |
| TR4 | Our company’s key supplier keeps promises it makes to our firm. | 0.796 |
| TR5 | Our company’s key supplier is always honest with us. | 0.785 |
| TR6 | Our company believes the information that our key supplier provides us. | 0.811 |
| TR7 | Our company’s key supplier is genuinely concerned that our business succeeds. | 0.819 |
| TR8 | When making important decisions, our company’s key supplier considers our welfare as well as its own. | 0.875 |
| TR9 | Our company trusts our key supplier keeps our best interests in mind. | 0.869 |
| SNR1 | Our company’s key supplier changes product volume in a relatively short time. | 0.647 |
| SNR2 | Our company’s key supplier changes product mix in a relatively short time. | 0.425 |

| | | |
|------|--|-------|
| SNR3 | Our company's key supplier consistently accommodates our requests. | 0.680 |
| SNR4 | Our company's key supplier provides quick inbound logistics to us. | 0.889 |
| SNR5 | Our company's key supplier has outstanding on-time delivery record with us. | 0.908 |
| SNR6 | Our company's key supplier easily changes its capacity in order to address our company's changing needs. | 0.227 |
| SNR7 | Our company's key supplier effectively expedites our company's emergency orders. | 0.553 |
| CA1 | Our company is able to offer prices as low or lower than our competitors | 0.422 |
| CA2 | Our company offers products that are highly reliable | 0.313 |
| CA3 | Our company offers products that are very durable | 0.081 |
| CA4 | Our company offers high quality products to our customers | 0.134 |
| CA5 | Our company delivers customer orders on time | 0.102 |
| CA6 | Our company provides customized products | 0.068 |
| CA7 | Our company is first in the market in introducing new products. | 0.089 |
| CA8 | Our company has time-to-market lower than industry average. | 0.200 |
| FP1 | In comparison to the competitors, our company has more return on investment (ROI) | 0.382 |
| FP2 | In comparison to the competitors, our company has more market share | 0.530 |
| FP3 | In comparison to the competitors, our company has more sales | 0.590 |
| FP4 | In comparison to the competitors, our company has more profitability. | 0.535 |
| FP5 | In comparison to the competitors, our company has more earnings. | 0.548 |
| FP6 | In comparison to the competitors, our company has more gross margins (profitability/total sales). | 0.632 |
| FP7 | In comparison to the competitors, our company has more market value. | 0.323 |

Table 2: KMO and Bartlett Test of Sphericity

| | | |
|--|--------------------|-----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .936 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 11841.348 |
| | Df | 465 |
| | Sig. | .000 |

Table 3: Reliability Analysis

| S no | Dimension | (α) | N |
|-------------|------------------|------------------------------|----------|
| 1. | TR | 0.983 | 9 |
| 2. | SNR | 0.910 | 7 |
| 3. | CA | 0.878 | 8 |
| 4. | FP | 0.960 | 7 |

Where, TR stands for the mean of all the items of Trust

SNR stands for mean of all the items of Supplier Network Responsiveness

CA stands for mean of all the items of Competitive Advantage

FP stands for mean of all the items of Firm Performance

Table 4: Confirmatory Factor Analysis

| Fit Indices | Observed Value | Recommended Value |
|--------------------|-----------------------|--------------------------|
| CMIN/DF | 3.19 | <3.5 |
| GFI | .833 | >0.8 |
| AGFI | .847 | >0.8 |
| CFI | .907 | >0.8 |
| RMSEA | .089 | <0.1 |

Table 5: Structural Equation Modelling (Estimates and P value)

| S.No. | Independent Variable | Dependent Variable | Estimates | P value | Result |
|--------------|-----------------------------|---------------------------|------------------|----------------|---------------|
| 1. | TR | SNR | 0.926 | <0.05 | Significant |
| 2. | SNR | CA | 0.227 | <0.05 | Significant |
| 3. | CA | FP | 0.497 | <0.05 | Significant |

Predicting the Influence of Factors Affecting Consumer Acceptance on Startups in the Proposed Open Network for Digital Commerce– A Study

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A b s t r a c t

The Open Source for Digital Commerce (ONDC) aims to democratise e-commerce. This study explores the motivating and demotivating factors that influence customer acceptance of startups in ONDC. Using a combination of approaches that involve qualitative and quantitative research, the study indicates a strong relationship between motivating factors and transaction intentions, emphasising the potential of ONDC to transform digital commerce. To encourage wider adoption, usability and security concerns must be resolved. Although this research acknowledges the limitations of demographic representation, it also emphasises the need for further study on technological and cultural barriers. This study recommends extensive awareness initiatives, improved security measures, and focused marketing strategies to encourage ONDC adoption. Furthermore, the study provides valuable insights into startups in the network that enables them to make informed decisions, mitigate risks, and seize opportunities in ONDC.

Keywords: ONDC, Startups, Consumer Adoption, Digital Commerce, E-Commerce, Technological Barriers, Cultural Barriers, Marketing Strategies, Security Measures, Informed Decisions

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1. Introduction

The emergence of e-commerce has transformed the way businesses interact with their consumers; nevertheless, a large number of platforms have minimised their actual scope. In recent years, platform-centric business models that serve as middlemen between customers and sellers have been developed, such as Amazon and Flipkart. 'ONDC has the potential to be a game-changer for e-commerce in India, but its success will depend on careful planning and execution' (Ram Girdhar). India's Open Network for Digital Commerce (ONDC) defies this convention by promoting an open-network ecosystem. Using an open-source methodology, ONDC promotes accessibility and transparency, thereby facilitating smooth transactions across numerous platforms and removing the need for users to explore several markets. 'ONDC is projected to digitise the whole value chain, standardise processes, encourage supplier inclusion, improve logistics efficiency, and increase consumer value' (Bibhu Dash). To estimate future market acceptance, this study looks at consumer behaviour across demographics, highlighting the need to resolve customer concerns for widespread adoption. In addition, it provides guidance on how companies can efficiently explore and take advantage of ONDC's potential. 'ONDC aims to make e-commerce procedures open source, thus creating a platform that can be utilized by all online retailers.' (Shaji George)

• PURCHASE INTENTION IN THE ONDC: MOTIVATION FACTORS

1. Convenience
2. Product Variety
3. Purchase Surrounding
4. Information Depth
5. Brand

• CONCERNS FOR ONDC: DEMOTIVATING FACTORS:

1. Risk:
2. Economic considerations
3. Conditions and Ability
4. Time and Socialization
5. Users' sensory experiences and decision-making processes

2. Literature Review

Amit Bhatnagar (2000) demonstrates how people still find the Internet risky compared to its convenience. Managers of online stores should focus on reducing these perceived risks, such as making connections more secure and addressing product concerns. Tailored strategies based on gender, marital status, and age can help. However, the study has some limitations, such as not including those who do not use the Internet. It also acknowledges that as technology advances, people's views may change. Their study emphasises the understanding of how risk and convenience influence people's choices between online and traditional stores, raising the question of what financial risk level would make the Internet a strong competitor of traditional outlets.

Anita Walia (2023) talks about ONDC, a technology-driven system supporting small businesses in smart digital commerce. It has shifted

from a platform-focused approach to an open-source setup that connects sellers and customers smoothly. Security is a major concern owing to data theft fears. Price is also vital, and ONDC stands out for speeding up discovery, cutting out middlemen, and offering competitive pricing. Trust is crucial for sellers and customers. To build trust, this study recommends a big awareness campaign by the Indian government regarding the ONDC benefits.

Baumeister (2002) explored how perceived usefulness is a key motivator for buying in an open market, saving time and money for both sellers and buyers. According to Technology Accepted Model, it directly influences purchase intentions in the open network market, combining rational and economic assessments with emotional values tied to social dimensions. This creates a dynamic platform for transactions between buyers and sellers. Stern's 1962 study points out that low prices, many choices, mass advertising, and prominent store displays strongly influence online market purchases in a self-service setting.

Nurul Nadia Abd Aziz (2018) looks at why some people don't shop online and finds that worries about product quality and privacy are key concerns. This suggests that online stores can improve by addressing these concerns through better designs and customer support. Their study also notes that traditional stores still have a place, offering a fun experience and unique services. Understanding these reasons is crucial for digital marketing strategies and the effective use of websites and social media. The findings help fill research gaps, shedding light on why some prefer traditional shopping and are hesitant to buy online, thus improving our overall understanding of this area.

Sang Soo Kim (2020) explores why people shop online and how certain things affect their decisions. The findings show that saving money and time and finding it easy to use makes people more likely to buy online. Concerns about privacy negatively affect the connection between time saving, ease of use, and buying intention. Surprisingly, privacy concerns positively influenced the link between saving money and buying intention. Security concerns also negatively impact the relationship between saving money and buying intention. However, business integrity concerns do not significantly impact saving money and have an unexpected positive effect on the link between timesaving and buying intention.

3. Significance of the Study

This study is crucial for understanding the dynamics of customer acceptability within the ONDC framework, as it sheds light on the factors that determine the success of startups in this ecosystem. Investigating motivating and demotivating factors provides useful insights for administrators and entrepreneurs seeking to capitalize on ONDC's revolutionary potential.

4. Statement of Problem

The introduction of ONDC represents a paradigm shift in the e-commerce environment, but its success depends on consumer

acceptance and the competitiveness of startups on the platform. The purpose of this study is to determine the key factors impacting consumer acceptance as well as the implications for startups in the ONDC network. Addressing these aspects is critical for promoting widespread adoption and long-term growth within the network.

5. Need for the Study

This study highlights the pressing need to fully understand the factors influencing consumer acceptance and startup performance in this network. By addressing this requirement, this study intends to provide stakeholders with actionable information for overcoming barriers, optimising tactics, and fostering long-term growth within the ONDC network. Finally, this study aims to contribute to the realisation of ONDC's revolutionary vision of digital commerce in India.

6. Research Methodology

Both primary and secondary data were used for the study. Primary data were collected through a questionnaire. The sample size of the study was limited to 200. Convenience sampling was used for data collection. In this study, the SPSS statistical tool was adopted for analysis purposes. The following tests were used for analysis purposes.

- One-Sample T-Test
- Independent Sample T-Test
- One-way Analysis of Variance (ANOVA)
- Chi-Square tests
- Test for Significance of Correlation Coefficient.

6.1 Objectives of the Study

- To investigate the influence of motivating factors on consumer acceptance of startups in ONDC.
- To identify the influence of demotivating factors hindering consumer acceptance of startups in ONDC and potential solutions to address these concerns.
- To assess how these factors affect the purchase intention of ONDC consumers.

6.2 Hypotheses of the Study

1. There is no significant difference between males and females with respect to motivating/demotivating factors affecting the Purchase Intention of Consumers.
2. There is no significant difference among different age groups with respect to motivating/ demotivating factors affecting the Purchase Intention of Consumers
3. There is no association between consumers' intention to try ONDC in the near future and their age, education, and location.
4. There is no significant correlation between motivating/demotivating factors and the transaction intention of consumers.

6.3 Limitations of the Study

1. The study did not fully represent all demographics, especially older

age groups or certain socioeconomic backgrounds.

2. Other crucial factors, such as technological and cultural barriers, have not been fully explored.
3. External factors that could affect online purchasing behaviour, such as competitive markets, laws, or economic conditions, were not explored in the study.
4. In the long term, the dynamics of consumer behaviour and e-commerce may differ, which this study does not explore.

7. Data Analysis and Interpretation

i) One-Sample T-Test for Motivating Factors of Purchase Intention

Table 4.27 One-Sample T-Test for Motivating Factors of Purchase Intention

| Factors | Mean | SD | t value | p value | Rank |
|-----------------------|-------|-------|---------|---------|------|
| Cost-Savings | 10.97 | 1.616 | 95.989 | <0.001 | 2 |
| Time-Savings | 10.98 | 1.585 | 97.970 | <0.001 | 1 |
| Perceived Ease of Use | 7.32 | 1.164 | 88.952 | <0.001 | 3 |

Interpretation:

The results reveal that all three motivating factors of purchase intention, Cost-Savings, Time-Savings, and Perceived Ease of Use, have a statistically significant impact on the purchase intention of consumers. With a mean score of 10.98 and 10.97, time-saving and cost-saving hold the highest priority, respectively. This was followed by perceived ease of use, with a mean score of 7.32. These factors play a crucial role in influencing consumers' purchase decisions.

ii) One-Sample T-Test for Demotivating Factors of Purchase Intention

Table 4.28 One-Sample T-Test for Motivating Factors of Purchase Intention

| Factors | Mean | SD | t value | p value | Rank |
|----------|------|-------|---------|---------|------|
| Privacy | 7.37 | 1.153 | 90.385 | <0.001 | 1 |
| Security | 7.25 | 1.181 | 86.826 | <0.001 | 2 |
| Trust | 7.03 | 1.175 | 84.532 | <0.001 | 3 |

Interpretation: The results reveal that all three demotivating factors of purchase intention – Privacy, Security, and Trust – have statistically significant impacts on the purchase intention of consumers. With a mean score of 7.37 and 7.25, privacy and security hold the highest priority, respectively. This was followed by trust, with a mean score of 7.03. These factors play a crucial role in influencing consumers’ purchase decisions.

Independent Sample T-Test

Factors affecting consumers’ purchase intentions were impacted by the research study based on their gender. The results will be established through an Independent Sample T-Test, which is given below:

i) Independent Sample T-Test for Motivating Factors of Purchase Intention

Table 4.29: t-test for significant difference between Male and Female with respect to Motivating Factors of Purchase Intention

| Factors | Gender | | | | t value | p value |
|-----------------------|--------|-------|--------|-------|---------|---------|
| | Male | | Female | | | |
| | Mean | SD | Mean | SD | | |
| Cost-Savings | 11.25 | 0.968 | 10.73 | 1.984 | 2.285 | 0.023 |
| Time-Savings | 11.25 | 0.979 | 10.75 | 1.934 | 2.246 | |
| Perceived Ease of Use | 7.54 | 0.619 | 7.13 | 1.454 | 2.541 | |
| Total | 30.04 | 2.143 | 28.61 | 5.132 | 2.498 | |

Interpretation: The findings suggest that there is a significant difference between male and female consumers with regard to the motivating factors of purchase intention ($t = 2.498, p = 0.013$). The P value of 0.013 was less than the significance level of 0.05. Hence, the null hypothesis is rejected at the 5% level with regard to the motivating factors affecting purchase intention. This implies that the observed variations in the motivating factors between genders are statistically significant, suggesting that gender does play a significant role in motivating purchase intention among consumers.

ii) Independent Sample T-Test for Demotivating Factors of Purchase Intention

Table 4.3: t-test for significant difference between Male and Female with respect to Demotivating Factors of Purchase Intention.

| Factors | Gender | | | | t value | p value |
|----------|--------|-------|--------|-------|---------|---------|
| | Male | | Female | | | |
| | Mean | SD | Mean | SD | | |
| Privacy | 7.54 | 0.619 | 7.22 | 1.449 | 1.978 | 0.049 |
| Security | 7.52 | 0.763 | 7.02 | 1.407 | 3.066 | 0.002 |
| Trust | 7.18 | 0.937 | 6.89 | 1.335 | 1.784 | 0.076 |
| Total | 22.25 | 1.419 | 21.13 | 3.676 | 2.753 | 0.006 |

Interpretation: The findings suggest that there is a significant difference between male and female consumers with regard to the demotivating factors of purchase intention ($t = 2.753, p = 0.006$). The P value of 0.006 was less than the significance level of 0.05. Hence, the null hypothesis is rejected at the 5% level with regard to the demotivating factors affecting purchase intention. This implies that the observed variations in the demotivating factors between genders are statistically significant, suggesting that gender does play a significant role in hindering purchase intention among consumers.

ANOVA: The factors affecting consumers’ purchase intention were impacted by the research study based on their age group. The results will be established through One-way Analysis of Variance, which is given below:

Impact of Age on Factors of Purchase Intention

Table 4.31: ANOVA for significant difference among age groups with respect to motivating factors of purchase intention of consumers:

| Motivating Factors | Age | | | | F value | P value |
|-----------------------|------------------|------------------|------------------|------------------|---------|----------|
| | 18-24 | 25-34 | 35-55 | Above 55 | | |
| Cost-saving | 11.32 (0.698) | 9.79 (2.859) | 11.31 (0.655) | 10.92 (1.847) | 11.261 | <0.001** |
| Time-saving | 11.29 (0.743) | 9.88 (2.787) | 11.31 (0.655) | 11.00 (1.871) | | |
| Perceived Ease of Use | 7.56 (0.536) | 6.48 (2.075) | 7.56 (0.641) | 7.38 (0.870) | | |
| Overall Total | 30.17 (1.363) | 26.24 (7.511) | 30.18 (1.335) | 29.31 (4.404) | | |

Interpretation:

The data show that consumers' perceptions of the motivational factors for purchase intention differ significantly by age group. Compared to older age groups, younger age groups—especially those between the ages of 18 and 24—tend to give more importance to features that save money and time and are perceived as being easier to use.

Table 4.32: ANOVA for significant difference among age groups with respect to demotivating factors of purchase intention of consumers:

| Demotivating Factors | Age | | | | F value | P value |
|----------------------|------------------|------------------|------------------|------------------|---------|----------|
| | 18-24 | 25-34 | 35-55 | Above 55 | | |
| Privacy Concern | 7.59 (0.644) | 6.62 (2.048) | 7.46 (0.643) | 7.69 (0.480) | 8.574 | <0.001** |
| Security Concern | 7.40 (0.801) | 6.69 (1.944) | 7.36 (0.873) | 7.54 (0.877) | | |
| Trust | 7.24 (0.879) | 6.31 (1.760) | 7.10 (0.912) | 7.38 (0.768) | | |
| Overall Total | 22.23 (1.423) | 19.62 (5.282) | 21.92 (1.596) | 22.62 (1.121) | 9.944 | <0.001** |

Interpretation: The data show that consumers' views of demotivating factors connected to purchase intention are highly influenced by age. Older age groups, particularly those over 55, tend to be more concerned about privacy, security, and trust in online transactions than younger age groups.

Chi-Square Test: Association between consumers' intention to try ONDC in the near future and their age.

Table 4.37: Cross-tabulation of transaction intention and age

| Transaction Intention | Age | | | | Total |
|-----------------------|-----------------|-----------------|-----------------|--------------------|--------------|
| | 18-24 years (%) | 25-34 years (%) | 35-54 years (%) | Above 55 years (%) | |
| Very Unlikely | 0 (0.0%) | 4 (100%) | 0 (0.0%) | 0 (0.0%) | 4 (100.0%) |
| Unlikely | 0 (0.0%) | 4 (100%) | 0 (0.0%) | 0 (0.0%) | 4 (100.0%) |
| Likely | 23 (63.9%) | 4 (11.1%) | 5 (13.9%) | 4 (11.0%) | 36 (100.0%) |
| Very Likely | 83 (53.2%) | 30 (19.2%) | 34 (21.8%) | 9 (5.8%) | 156 (100.0%) |
| Total | 106 (53%) | 42 (21.0%) | 39 (19.5%) | 13 (6.5%) | 200 (100.0%) |

From the above table, it is found that 53.2% of the consumers who are very likely to try ONDC belong to the age group of 18-24 years, and 63.9% of the consumers who are likely to try ONDC are also from the age group of 18-24 years. It is also found that consumers who are unlikely or very unlikely to try ONDC belong to the age group of 25-34 years. This leads to the computation of chi-square statistics, as shown in the table below.

Table 4.38: Showing Chi-square Tests for transaction intention and age

| Computed Statistics | Value | df | Sig. (2-sided) |
|----------------------------------|---------------------|----|----------------|
| Pearson Chi-Square | 35.119 ^a | 9 | <.001 |
| Likelihood Ratio | 30.148 | 9 | <.001 |
| Linear – by – Linear Association | 0.032 | 1 | 0.858 |
| N of Valid Cases | 200 | | |

From the above table, it is found that Pearson chi-square = 35.119a, p=<0.001 is statistically significant. There is a strong association between consumers' transaction intentions and their age. The data indicate that age is an important variable that has a significant role in influencing the transaction intention of consumers.

Association between consumers' intention to try ONDC in the near future and their education.

Table 4.39: Cross-tabulation of transaction intention and education

| Transaction Intention | Education | | | Total |
|-----------------------|-------------|---------------|--------------|--------------|
| | High School | Undergraduate | Postgraduate | |
| Very Unlikely | 0 (0.0%) | 0 (0.0%) | 4 (100.0%) | 4 (100.0%) |
| Unlikely | 0 (0.0%) | 0 (0.0%) | 4 (100.0%) | 4 (100.0%) |
| Likely | 2 (5.6%) | 26 (72.2%) | 8 (22.2%) | 36 (100.0%) |
| Very Likely | 2 (1.3%) | 95 (60.9%) | 59 (37.8%) | 156 (100.0%) |
| Total | 4 (100.0%) | 121 (60.5%) | 75 (37.5%) | 200 (100.0%) |

From the above table, it is found that 60.9% of the consumers who are very likely to try ONDC have completed an undergraduate degree, and 72.2% of the consumers who are likely to try ONDC have also completed an undergraduate degree. It is also found that consumers who are unlikely or very unlikely to try ONDC have completed their postgraduate degree. This leads to the computation of chi-square statistics, as shown in the table below.

Table 4.40: Chi-square tests for transaction intention and education

| Computed Statistics | Value | Df | Sig. (2-sided) |
|----------------------------------|---------------------|----|----------------|
| Pearson Chi-Square | 19.078 ^a | 6 | 0.004 |
| Likelihood Ratio | 21.087 | 6 | 0.002 |
| Linear – by – Linear Association | 1.916 | 1 | 0.166 |
| N of Valid Cases | 200 | | |

From the above table, it is found that Pearson chi-square = 19.078a, p=0.004 is statistically significant. There is a strong association between consumers' transaction intentions and their education. The data indicate that education is an important variable that has a significant role in influencing the transaction intention of consumers.

Association between consumers' intention to try ONDC in the near future and their location

Table 4.41: Cross-tabulation of transaction intention and location

| Transaction Intention | Location | | | Total |
|-----------------------|----------------|---------------|---------------|-----------------|
| | Urban | Suburban | Rural | |
| Very Unlikely | 0 (0.0%) | 0 (0.0%) | 4 (100.0%) | 4 (100.0%) |
| Unlikely | 0 (0.0%) | 0 (0.0%) | 4 (100.0%) | 4 (100.0%) |
| Likely | 20 (55.6%) | 13 (36.1%) | 3 (8.3%) | 36 (100.0%) |
| Very Likely | 87 (55.8%) | 49 (31.4%) | 20 (12.8%) | 156 (100.0%) |
| Total | 107 (53.5%) | 62 (31.0%) | 31 (15.5%) | 200 (100.0%) |

From the above table, it is found that 53.5% of the consumers who are very likely to try ONDC belong to urban areas, and 55.6% of the consumers who are likely to try ONDC are also from Urban areas. It is also found that consumers who are unlikely or very unlikely to try ONDC belong to rural areas. This leads to the computation of chi-square statistics, as shown in the table below.

Table 4.42: Showing Chi-square Tests for transaction intention and Location

| Computed Statistics | Value | Df | Sig. (2-sided) |
|----------------------------------|---------------------|----|----------------|
| Pearson Chi-Square | 46.019 ^a | 6 | <0.001 |
| Likelihood Ratio | 32.507 | 6 | <0.001 |
| Linear – by – Linear Association | 14.866 | 1 | <0.001 |
| N of Valid Cases | 200 | | |

From the above table, it is found that Pearson chi-square = 46.019a, p<0.001 is statistically significant. There is a strong association between consumers' transaction intention and their location. The data indicate that location is an important variable that has a significant role in influencing the transaction intention of consumers.

Test for Significance of Correlation Coefficient

Table 4.43: Karl Pearson Correlation Coefficient between Motivating Factors of Consumers' Transaction Interpretation:

Perceived cost savings (r = 0.590, p < 0.01), time savings (r = 0.604, p < 0.01), and perceived ease of use (r = 0.658, p < 0.01) were all positively correlated with users' intention to transact. This suggests that users are more likely to transact when they believe they are saving time and money and when they find the platform easy to use. Transaction intention and privacy concerns had a positive correlation (r = 0.649, p < 0.01), suggesting that users prioritized privacy while choosing platforms. Transaction intention and security concerns also showed a moderate correlation (r = 0.473, p < 0.01), indicating that individuals are more inclined to transact on platforms that they believe are safe. Furthermore, there was a positive correlation (r = 0.478, p < 0.01) between transaction intention and platform trust, suggesting that trust affects users' tendency to transact. Strong positive correlations between perceived ease of use, cost-saving, and time-saving (0.726** and 0.712**, respectively) have also been observed.

8. Findings of the Study

- The respondents mentioned positive experiences: 27.5% were satisfied, and 18% were very satisfied. Neutral responses (31.5%) indicated an openness to new platforms, although dissatisfaction (18%) presented the potential for improved insights.
- Occasional participation (50.5%) implies that respondents regularly use online shopping. Regular participation (29.5%) indicates that a sizable percentage appreciated the convenience of Internet buying.
- A significant portion of the population is still uninformed (56%) despite growing knowledge of ONDC (31%), underscoring the necessity of awareness initiatives. Effective communication platforms are indicated by the significant role that online media channels play in educating people about ONDC.
- The respondents had a significant knowledge gap, with the majority claiming a low to extremely low understanding. It emphasises the importance of developing ways to bridge this gap and increase awareness.
- Online buying is primarily motivated by the importance of cost (66%) and time-saving (69%) considerations. The effectiveness and ease of use of online platforms were evaluated as crucial factors, with a focus on customer preferences.
- The results reveal that all three demotivating factors of purchase intention – Privacy, Security, and Trust – have statistically significant impacts on the purchase intention of consumers.
- The findings suggest that there is a significant difference between male and female consumers regarding the motivating factors of purchase intention.
- There is a significant difference between male and female consumers about the demotivating factors of purchase intention.
- There is a positive correlation between motivating factors (cost savings, time savings, perceived ease of use) and transaction

intentions. Similarly, there are positive relationships

- between demotivating characteristics (privacy, security, and trust) and transaction intent. Consumers tend to actively choose platforms that address their concerns and provide easy and safe transaction experiences. Consumers' perceptions of motivational factors for purchase intention differed significantly by age group. Consumers' views of the demotivating factors connected to purchase intention are highly influenced by age.
- There is a strong association between consumers' transaction intentions and their age. It was found that 60.9% of the consumers who are very likely to try ONDC have completed an undergraduate degree, and 72.2% of the consumers who are likely to try ONDC have also completed an undergraduate degree.
- There is a strong association between consumers' transaction intention and their location.

9. Suggestions

- Launch extensive awareness campaigns to educate the public about the features and benefits of ONDC, particularly regarding online platforms.
- Give top priority to improving ONDC's security measures to reassure users and foster trust. Provide clear instructions on how to use ONDC safely, particularly for those who are not used to online transactions.
- Constant work to enhance ONDC's usability and efficiency for customers.
- Tailor marketing campaigns to target particular demographics, such as younger people, those with lower levels of education, or those belonging to rural areas.
- Ensure that ONDC continues to be supported and promoted by the government. Establish feedback channels to collect data and improve ONDC based on user experience.
- Collaborate with MSMEs, retailers, and other stakeholders to better align ONDC with their needs and preferences.

10. Future Research

- A detailed study can be carried out on a larger scale to study the customer attitude and behavior towards ONDC.
- Further research on customer preference towards ONDC.
- More Variables on motivating/Demotivating factors can be included in the study.

11. Conclusion: Significant aspects of customer behavior and attitudes toward the Open Network for Digital Commerce (ONDC) are highlighted in this study. This emphasises how revolutionary digital commerce may be with ONDC, particularly for small firms. However, customer acceptance depends on resolving important concerns, including usability, cost, and safety.

Demographics, such as location, age, gender, and education, also influence consumer attitudes, requiring specific marketing efforts.

Building trust requires addressing privacy and security issues while simultaneously boosting ease of use. transaction intentions through platform features that align with customer preferences, such as cost savings and In short, responding to consumer concerns and evolving along with the market are vital for startups under the ONDC network.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Eco-Centric Sustainability: Intersection of faith-based Islam, Green Finance, and Environment

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A b s t r a c t

The confluence of religious faith and ecological needs is magnified when coupled with financial underpinnings. Amidst environmental trepidations across the globe in the backdrop of disturbed ecological equilibrium, the intersection of faith-based Islam and financial bearing is orchestrating the world in the direction of eco-centric sustainability. The objective of this paper is to build a conceptual nexus between eco-centric sustainability, green finance, and Islamic teachings and faith-based Islamic ethics, and subsequently emanate a conceptual framework for it. Using literature derived from authentic database sources, the study engages in thematic analysis of the systematically mined content and then subjects it to grounded theory coupled with conceptual framework analysis. The intersection coordinates of Islamic Shariah principles are extrapolated to attain eco-centric sustainability, and the result is depicted by a conceptual flow diagram. The paper heralds promise not only for green financiers and propagators of SDGs but also for faith-driven Islamic enthusiasts craving to go green.

Keywords: Eco-centric sustainability, green finance, Islamic finance, SDGs, Shariah principles.

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1. Introduction

The crossroads of sustainable development and Islam, when clubbed with finance, open up a plethora of opportunities for combating global challenges and establishing an environment of eco-centricity. The acceptability and functionality of green finance and investments play a pivotal role in promoting active participation of local traditions within communities (Mahammed Fathy & Hassan Suleiman, 2021). This leaves room for eco-centric sustainability to percolate deep within the societal structure if orchestrated by religion-based faith and the economy as its fulcrum. The integration of sustainable development strategies based on the ethical tenets of Islamic economics holds potential to foster a harmonious relationship between the ecological environment and humanity, weaving a common thread (Imran Hyat et al., 2023). Islamic economics strive to maintain a quintessential balance between finance and ecological underpinnings, thereby creating harmony within the ambit of sustainable financial practices. The fabric of Islamic economics underscores responsible consumption and optimum utilization of resources, making it a strong weapon for attaining eco-centric sustainability. Moreover, studies have shown a positive association between innovations and employment opportunities, demonstrating that economies pursuing sustainability can create more employment (Seth and Pathan, 2025). In this direction, the role of Islamic financing and investment becomes indispensable. Its preaching and ethical concepts go beyond traditional economic models and conform to the welfare of future generations (Becker 2023). Based on Shariah principles, Islamic economics advocates fairness, equity, and the common good (Aris Anwaril Mutaqqin et al., 2023). A thematic analysis was carried out to identify the key principles that embed the teachings of Islam into sustainable financial solutions. Using content analysis, a structured panoramic literature review was conducted to address the essence of Islam in augmenting eco-oriented finance that resonates with environmental sustainability. Despite thorough synergy, the role of Islam and finance in realising SDGs remains both underutilised and understudied (Faizi et al., 2024). This was an identified gap in the literature. Although the Islamic financial landscape prohibits various practices like gharar (excessive uncertainty), riba (interest), and maysir (gambling), and advocates green investment in halal-certified sectors and other profit-sharing models (Moisseron et al., 2015), there is still a gap in building a nexus between Islam, the environment, and finance. The objective of this paper is to fill this gap by building a literature-based conceptual nexus between Islam, an eco-centric sustainable environment, and finance. Further, thematic analysis of rich qualitative data, including a conceptual framework, would assist future research in predicting patterns and trends in favour of humanity and ecology at large.

2.0 Literature Review

2.1 Fostering Islam with Eco-centric Sustainability

The Islamic model resonates with SDGs and addresses issues such as clean energy, preservation of biodiversity, climate resilience, and

responsible consumption of natural resources (Elena G. Popkova, 2023). Empirical linkages between environmental goals and Shariah principles were obtained with reference to financial innovation and renewable energy (Belgacem, 2023; Siswantoro and Mahmud, 2023).

Principles of Islamic finance herald

- a) Impetus on environmental ethics
- b) Emphasis on environmental accountability
- c) Promotion of green investments (Al-Roubaie & Sarea, 2019; Faisal et al., 2023)

Various Islamic prescriptions have underscored eco-centric sustainability. Table 1 narrates these in a methodical manner, as mentioned below.

| No. | Islamic Prescript justifying Eco-centric sustainability | Description | Author(s) |
|-----|---|--|---|
| 1 | Qawaid Fiqhiyyah | Interjection of Islamic ethics into sustainable finance is attainable based on the essence of Qawaid Fiqhiyyah, thereby establishing the much-desired conformation in regulatory standards and ecological conservation. It eases the task of Ijtihad (independent reasoning) and promotes the development of rationality in the field of medicine, finance, and environmental ethics, imparting new perspectives and directions. | Faizi, 2024; Haqqi & Mohiddin, 2022. Iyad Abumoghli, 2023. |
| 2 | Al-Darar Yuzal | It encourages finance and support of projects' interventions that have positive ecological footprints, such as pollution management, renewable energy projects, and agricultural practices in consonance with the ecological environment. The principle of 'al-Darar Yuzal' stemming from Hadith orders that any form of harm done to humans or society should be condemned, and if undertaken, must be reversed. The criteria of 'al-Darar Yuzal' offer immense remedies for most critical global economic concerns that are consistent with the ethical morality of Islam. | Weimin Yan & Benhong Pen, 2023. Sayyed Mohamed Muhsin et al., 2019. (Suharto, 2018) |
| 3 | Al-Umar Bi Maqasidiha | The preaching under 'Al-Umar Bi Maqasidiha' facilitates Islamic finance to extrapolate the environmental impacts of investments and make them viable for ensuring good social transformation. | Sharifah Nurulhuda S. Ab. Latif, 2024. |
| 4 | Al-Maslahah al- Ammah | Supplementing the SDGs are the tenets of 'Al-Maslahah al- Ammah' (public interest) that advocates resource mobilization and its subsequent investment in socially, environmentally, and health-oriented interventions. Islamic finance, especially the perspective of 'Al-Maslahah al- Ammah', should emphasize projects that have a broader scope for accommodating positive social and ecological outcomes. | Burhanudin Harahap et al., 2023. Mohammad Sahabuddin et al., 2019. |
| 5 | Al-Adah Muhakammah | Within the ambit of green investment, the scope of 'Al-Adah Muhakammah' defends the usage of such sustainable practices that fit into a given culture. Islamic finance gets deeply knitted with | Luqman Zakariyah, 2012. (Isam Y. Al-Filali et al., 2023). |

| | | | |
|---|----------------------------------|--|-----------------------------|
| | | eco-centrism by the adoption of innovative funding mechanisms like Green Waqf and Green Sukuk, which principally function under 'Al-Adah Muhakammah' (that advocates change and innovation). | |
| 6 | Al- Yaqin La Yazulu Bi al- Shakk | Islamic finance, upholding the tenets of 'Al-Yaqin La Yazulu Bi al-Shakk,' not only reduces the inherent risks in green investments but also accelerates the stability and sustainability quotient in the long term. | (Al-Roubaie & Sarea, 2019). |

2.2 Faith-driven Islamic financial instruments supporting SDGs

Religion-oriented Islamic doctrines often translate into ecological behavioural manifestations. The SDGs endorsed by the United Nations impart momentum to ecological conservation for future generations based on strong Quranic advocacy (Lisa Ann Blankinship et al., 2024). To meet the SDG investment gap created by traditional charitable donations, the Islamic potential of Waqf, Zakat, and Infaq has been studied (Hamad, 2020; Lanzara, 2021). Also, the social perspective of Islamic finance with reference to SDG realization lays impetus on social welfare and poverty alleviation (Abdullah, 2018). Similarly, in an Islamic climate-centric landscape, green sukuk is a financial tool used to fund environmentally sustainable projects, specifically aimed at supporting clean energy initiatives and fostering ecocentric sustainable development (Seth and Pathan, 2025). Owing to their value-oriented approach, the utility of social financial instruments of Islam has been proven to be superior (Hossain, 2019) and vital in taking care of the SDGs and even in refugee protection (Tok et al., 2022).

Quranic preaching prohibiting wastefulness reveals faith-based alleviation of waste and advocacy of circular principles (Omar et al., 2018). In the context of Indonesia, the utility of Islam-oriented fintech with reference to the realisation of SDGs has been established and attributed to the following:

- a) Reduce poverty
- b) Escalate financial inclusion (Shofawati, 2023)

Community engagement and resilience are attained in the long run in consonance with eco-centric sustainability by Islamic financial instruments that propel community education:

- i) Energy saving practices
- ii) Waste management principles & practices (Marziana Madah Marzuki et al., 2023)

To build an inclusive, resilient, and sustainable economy and to minimise inequalities and eliminate deficiencies, the Islamic finance industry orchestrates the following mechanisms:

responsible consumption of natural resources (Elena G. Popkova, 2023). Empirical linkages between environmental goals and Shariah principles were obtained with reference to financial innovation and renewable energy (Belgacem, 2023; Siswantoro and Mahmud, 2023). Principles of Islamic finance herald

- a) Impetus on environmental ethics
- b) Emphasis on environmental accountability
- c) Promotion of green investments (Al-Roubaie & Sarea, 2019; Faisal et al., 2023)

Various Islamic prescriptions have underscored eco-centric sustainability. Table 1 narrates these in a methodical manner, as mentioned below.

| No. | Type of Instruments | Examples |
|-----|---|---|
| 1 | Islamic financial market instruments | <ul style="list-style-type: none"> o Green Sukuk o Social Sukuk o Islamic investment funds |
| 2 | Risk Management & Governance frameworks | <ul style="list-style-type: none"> o Risk & Profit sharing o Shariah governance |
| 3 | Islamic Financial Institutions | <ul style="list-style-type: none"> o Takaful companies o Waqf Board o Islamic banks o Zakat funds |

[Source: Boudawara et al., 2023; Delle Fozlie & Keshminder, 2022; Dirie, Alam & Maamor, 2024]

2.3 Social and Environmental Stewardship through Islam-driven finance

Directed by the principles of Shariah, the ethical foundations of Islamic finance are as follows.

- a) Equitable resource distribution
- b) Socio-economic justice
- c) Societal well-being of the population (Kanji, 2021)

Several review articles have highlighted the manner in which stewardship (Khalifah) has positively connected Muslims with addressing climate change issues, basing its foundation on Quranic and Prophetic learning. Aligned with the tenets of eco-centric sustainability and maintaining ecological equilibrium with sustainable practices and via the conservation of natural resources (Harahap et al., 2022). Studies have been conducted to validate the nexus between sustainable financial models and SDGs in different contexts and to establish their effective role as a trending linkage (Streimikiene et al., 2023). Interjection of hima (community reserves) into the current governing policy strongly advocates conservation of forests, water, and rangelands, thereby contributing to eco-centric sustainability.

In addition, there is a significant association between environmental quality, Islamic finance, and energy consumption (Abduh et

al., 2022). The genesis of Islamic finance has occurred as a neo-liberal ethnic-religious policy for ensuring:

a) Facilitating the economic growth of the majority Muslims, Malays, and

b) Propulsion of financial inclusion (Lai, 2015; Lai and Samers, 2017)

Through green sustainable investment and escalated corporate sustainability, the advancement of Islamic finance can lead to a reduction in CO₂ emissions (Al-Silefanee et al., 2022), thereby advocating environmentalism. In contrast to most forms of traditional and modern finance systems, Islamic finance does not focus on short-term Return on Investment (ROI) but emphasises environmental well-being, social responsibility, and ethical conduct. In the digital era, the convergence of sustainable and ethical practices in Islamic finance with Environmental, Social, and Governance (ESG) tenets is deeply highlighted (Osman and Elamin, 2023). From the viewpoint of Islamic banking, the linkage between financial performance and sustainable practices holds the potential to escalate resource development and foster financial outcomes (Pandikar et al., 2024). In addition, the notion of Maqasid-al-Shariah necessitates a quintessential bridge between the concurrent sustainability policy and scriptural ethics (Nair et al., 2022). Maqasid al-Shariah embraces the notion of CSR (Corporate Social Responsibility) as inscribed in Islamic finance by intertwining social goodwill and ecological conservation. CSR encourages corporate eco-innovation and pushes financial business performance in a positive direction (Tao et al., 2024). In addition, the Islamic finance sector includes provisions for the inclusion of eco-mortgages and green loans, especially directed to varied eco-friendly projects, including solar energy systems (Faizi, 2024).

The taxonomy for the green framework classifies sustainable investment by its eco-centric and social attributes based on Maslahah (the common good), which encourages projects that have serving potential for the people and society at large. Financing of renewable energy projects to reduce Greenhouse Gas (GHG) emissions and promote clean energy is underscored by the Al-Meezan Green Fund of Pakistan (Diling Xiang et al., 2024). These green funds foster the objective of sustainability through Islam and finance. Green Sukuk acts as an Islamic funding vehicle that is both religiously aligned and ecocentric. Green Sukuk is instrumental in the inclusion of myriad environmental development projects (R. Arifuddin et al., 2023) and the proliferation of sustainable mobility initiatives aimed at reducing transportation emissions (Al-filali et al., 2023). Green Sukuk advocates the principles of waste management to reduce environmental contamination and conserve natural resources (Ozkan et al., 2024). Green Sukuk, an Indonesian Islamic green finance instrument, offers a plethora of benefits, like:

a) Funding of low-carbon technologies

b) Promotion of renewable energy projects for social development and environmental protection (Faizi, 2024).

c) Employment generation in green businesses, thereby fighting poverty (Marzuki et al., 2023).

Due to the risk-sharing character and asset-backed nature of Green Sukuk, it has become a vital Shariah-compliant financial instrument for orchestrating the integration of Islamic finance with eco-centric sustainability. The harmonized regulations of Green Sukuk enhance the investors' confidence by propelling consistent ESG disclosure standards for ensuring risk management across verticals (Oseni and Hassan, 2014).

The dynamics of volatility exchanges between cryptocurrency markets (Bitcoin and Pax Gold) and the Shariah-compliant digital assets have been studied. Gold-backed Islamic crypto-currencies not only assist in the realisation of SDGs, but also impart momentum to sustainable finance (Dirie et al., 2024). Varied environmental think tanks, including Islamic scholars, have established that environmental benefits are incurred through Islamic finance-oriented channel investments (Ahmed et al., 2015; UNPRI, 2017; Obaidullah, 2017; RFI, 2018). Islamic finance, with specific tenets of Shariah and ecological sustainability, aims at progressive climate action and environmental conservation (Obaidullah, 2017). Islamic finance discourages financing interventions that have a detrimental impact on ecological equilibrium, including investments in ecologically destructive set-ups or in fossil fuels.

3.0 Research Methodology

This study adopted a qualitative design to explore the interplay between Islam, eco-centric sustainability, and finance. This study employed a qualitative approach, drawing on the integration of both grounded theory and conceptual framework analysis, to examine the collected literature in depth. Grounded theory, as outlined by Glaser and Strauss (1967), focuses on developing new theories from data through systematic steps, such as open coding, axial coding, and constant comparison. It is particularly well-suited for studying complex or understudied areas, such as the intersection of Islamic teaching and ethics, eco-centric sustainability, and financial practices. By contrast, conceptual framework analysis provides a structured mechanism for interpreting qualitative material by mapping core concepts and their interrelationships within a broader theoretical structure. This approach is especially valuable for advancing theory, shaping policy discussions, and synthesising diverse sources of data (Jabareen, 2009). The objective of this paper is to examine the nexus among Islamic teachings and ethics, eco-centric approaches, and financial practices.

This analysis utilised secondary data sourced from academic publications, government reports, and industry documents. Emphasis was placed on assessing how Islamic values, green finance, and environmentally conscious practices collectively foster environmental, social, and economic sustainability. Sources were identified through databases such as Web of Science, Scopus, and Google Scholar, using keywords including "Islamic Ethics," "Islamic Teachings," "Sustainable Finance," and "Eco-centric Sustainability." Commonality and homogeneity were used to decode the findings.

Nonetheless, as is common in qualitative enquiries, this study has

certain limitations. It does not include hypothesis testing nor does it account for constructs such as Corporate Social Responsibility and green innovations. Future research could expand on these aspects to provide a more comprehensive understanding of the subject.

4.0 Findings

Based on thematic analysis carried out to identify key principles that embed the teachings of Islam into sustainable financial solutions and via application of content analysis (conceptual framework analysis) embedded in grounded theory, the following probable inferences were drawn:

- Due to faith-based Islamic underpinnings, the attainment of eco-centric sustainability is feasible via responsible consumption and optimum utilisation of resources amidst the landscape of finance.
- Islamic finance lays impetus on green investment (Green Sukuk) based on Shariah principles, engaging Islamic prescripts like Qawaid Fiqhiyyah, Al-Darar Yuzal, Al- Al-Maslahah al-Ammah, Al-Umar Bi Maqasidiha, Al-Adah Muhakammah, and Al-Yaqin La Yazulu Bi al-Shakk, which advocate faith-based propulsion of finance in the direction of eco-centric sustainability.
- Quranic preaching based on circular principles of economy emphasises:
 1. Alleviation of wastage and equitable resource distribution
 2. Fin-tech for the realization of SDGs
 3. Societal well-being of the organization
 4. Maintenance of ecological equilibrium
 5. Funding of low-carbon economies
 6. Evolution of Islamic crypto-currencies

An outcome of this qualitative research has been depicted in the form of a conceptual figure bringing out the congruence effect of Islamic preaching and ethics to affect the financial landscape, thereby orchestrating eco-centric sustainability (See Figure 1).

5.0 Conclusion

By adhering to Islamic ethical norms, the machinery of sustainable development may be driven to address ecological concerns that align with the financial health of the concerned economies. Considering the current landscape, the coupling of SDGs with Islamic finance heralds an eco-centric pathway that leads to an equitable and sustainable global economy. To promote environmentally advantageous projects based on the ethical tenets of Islamic finance, green financial solutions may be provided to meet globalisation amidst ecological challenges (Faizi, 2024). The findings of the study necessitate the essence of international collaborations and handholding by government, society, and religion to harness the holistic potential of Islamic finance and the mechanism by which it is determined to achieve SDGs spanning a myriad cultural and economic contexts. This study underscores scarcity on various fronts with reference to Islamic finance and SDGs. Some of these shortcomings are as follows:

- i) Dearth of faith-driven investors set in the direction of nature

conservation

- b) Lack of Shariah-compliant governance at all levels of economies
- c) Scalability of the concept at the global level

In addition, stringent legal and regulatory compliance should be mandated to foster Islamic finance with eco-centric sustainability, wherein a paradigm shift could be witnessed from a linear to a more eco-centric economic model of the financial landscape. Through the environmental impact assessment of green investments, the concept of Islamic finance can continue its adherence to the principles of harm elimination and inculcating a sense of responsible investment (Daromir Rudnykyj, 2014). Future research could quantify the role of Islamic finance with reference to SDG indicators and hold a diversified approach for establishing a nexus between the principles of Islamic finance and various contextual settings through the lens of Shariah compliance. This could help broaden the investor base and tap into new market frontiers.

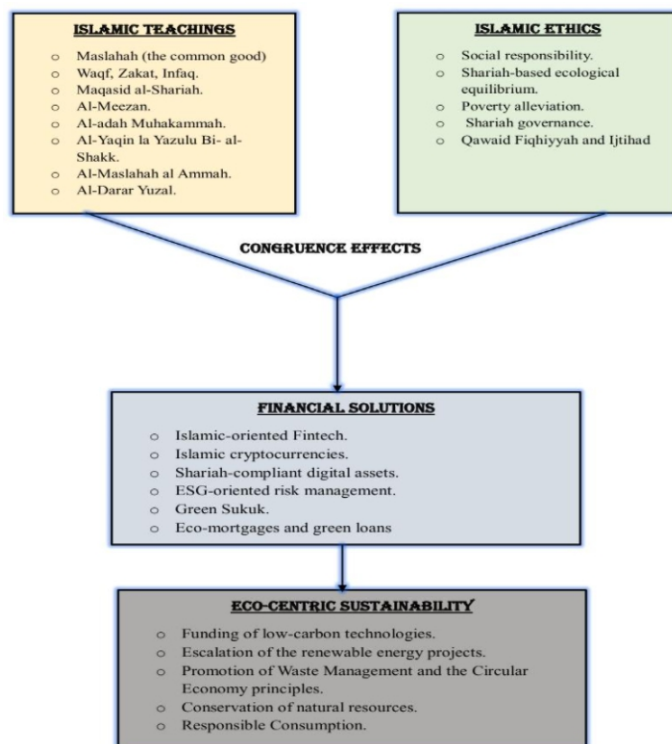


Figure 1: Conceptual framework indicating the nexus between Islam, Finance, and Eco-centric sustainability.

[Source: Author's Conceptualization]

Conflict of Interest

The authors declare that they have no conflicts of interest regarding the publication of this manuscript.

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What Makes a Responsible Ecotourist? An Exploration of TPB, Conservation, and Anti-Exceptionalism

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The preservation and restoration of the planet's natural ecosystems depend heavily on ecotourism. With growing concerns about environmental deterioration and biodiversity loss, ecotourism shows promise as a sustainable solution. Even though ecotourism is becoming increasingly relevant, little research has been conducted to examine how it affects important aspects of the Theory of Planned Behaviour (TPB), sustainability consciousness, environmental conservation, anti-exceptionalism, and tourists' environmentally responsible behaviour (ERB). The main goal of this study is to determine the extent to which TPB constructs, specifically environmental attitude, subjective norms, and perceived behavioural control, as well as sustainability consciousness, environmental conservation, and anti-exceptionalism, influence tourists' environmentally responsible behaviour. This study uses a theoretical framework to examine the ethical and psychological factors that influence tourist behaviour in ecotourism environments. The findings indicate that environmental attitude, subjective norms, sustainability consciousness, environmental conservation, and anti-exceptionalism among ecotourists significantly predict eco-friendly conduct. However, the effect of perceived behavioural control on ERB was not statistically significant. From a practical perspective, the results indicate that ecotourism stakeholders should prioritise initiatives that foster visitors' pro-environmental sentiments, uphold positive social norms, raise awareness of sustainability through education, promote conservation efforts, and foster a sense of moral obligation through anti-exceptionalism. Improving infrastructure to provide people with greater influence over environmentally friendly behaviour might encourage more conscientious travel habits.

Keywords: Theory of Planned Behaviour, Sustainability Consciousness, Environmental Conservation, Anti Exceptionalism, Tourists' Environmentally Responsible Behaviour

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1. Introduction

Ecotourism is commonly adopted to promote the growth of natural resources (Tien et al., 2024). It is a specific type of travel that supports ecological sustainability and environmental protection by intimately associating with culturally and environmentally sensitive locations (Oviedo-García et al., 2017). However, the International Ecotourism Society emphasises the value of incorporating local knowledge into the development of ecotourism, which includes responsible travel to natural areas that preserve the environment, uphold the welfare of the local population, and incorporate interpretation and education. Furthermore, maintaining the ecosystem and ensuring the well-being of the local population depends heavily on how they perceive nature (Zainal et al., 2024). Over the last three decades, ecotourism has been marketed worldwide as an ecologically friendly type of travel (Poudel & Nyaupane, 2017). Promoting sustainable development and related behaviour is essential for long-term, effective rural tourism, as the magnitude of the impact is frequently correlated with visitor behaviour (Zhao et al., 2024). The potential of sustainable tourism is to help location administrators and tour operators properly preserve the environment while arranging trips, which has attracted much attention. As consumers become increasingly aware of how economic activity affects the environment, they are attempting to contribute to the achievement of sustainability goals (Batoool et al., 2024). Sustainable tourism has emerged as an alternative to mass tourism, highlighting the value of maintaining regional customs and sociocultural identities to save the environment, bring in money for host locations, and include the local population in tourism decision-making (Nguyen et al., 2023). Motivating travellers to adopt eco-friendly practices helps preserve tourism resources, lessen environmental damage, and advance sustainable development (Xiong et al., 2023). The best strategy for spreading green ideas is environmental education. The concept of ecotourism, which is about responsible travel to natural regions in ways that preserve the environment and can support the well-being of local populations, is becoming increasingly integrated into the tourist sector over time (Duong & Ngo, 2024). Environmental consciousness is closely linked to the growth of sustainable tourism, which significantly boosts local economies. Furthermore, by minimising adverse effects, ecotourism contributes to sustainable tourist development, which preserves resources and the environment (Sahabuddin et al., 2024). Preserving the natural environment is the only way to keep tourism sites competitive, distinguishing that ignorance of visitors is the primary cause of most environmental problems in tourist locations (Aziz & Niazi, 2023). Lack of environmental protection awareness, littering, feeding animals, picking flowers, and throwing garbage at tourist destinations have damaged their natural resources and environment (Aziz & Niazi, 2023). Understanding the elements that drive people to visit ecotourism destinations is necessary to increase the demand for ecotourism. Numerous studies have demonstrated that people are motivated to travel by a variety of push factors, including novelty, excitement, socialisation, relaxation, enjoyment, cultural experiences,

escape, and knowledge seeking (Chi & Pham, 2024). Ecotourists are intended to become environmental stewards through environmental education, which is often influenced by anthropocentric conceptions of human-nature duality (King et al., 2024). Owing to its immense natural and cultural variety, India is one of Southeast Asia's most visited resorts. Nevertheless, prior studies are scarce on Indian domestic visitors and their intended behaviour around ecotourism (Borthakur & Kondasani, 2024). Identifying possible processes that affect community members' views and intentions to participate in ecotourism activities is necessary to increase the local population's participatory intents and behaviour for ecotourism development (Wu & Chen, 2018). Opportunities for formal and informal education have been shown to foster pro-environmental attitudes and views (Clark et al., 2019). Ecotourism is the term for travel to comparatively undeveloped natural areas with the express purpose of learning about, respecting, and enjoying the ecosystem's varied wildlife and natural settings, as well as the culture and history that the environmental settings have to offer. All these activities can help conserve the environment (Lee & Jan 2018). In addition, the Theory of Planned Behaviour (TPB), which is a variant of the Theory of Reasoned Action (TRA), has been widely applied to forecast visitor presence and describe visitor behaviour. TPB uses three factors to influence behavioural intention: attitudes, subjective norms, and perceived behavioural control (Abidin et al., 2022).

2. Literature Review

2.1 Theory of Planned Behaviour

Theory of Planned Behaviour (TPB) stands for "reasoned action" in the context of consumer behaviour, which assumes that an individual's intentions and actions are influenced by their normative control and attitude (Grilli & Notaro, 2019). According to the TPB, human behaviour may be anticipated by aligning psychological beliefs. These include self-efficacious views about the result of perceived behavioural control, attitude toward a particular object, subjective norm, the conviction that others will accept an activity toward the particular object, and readiness to act (Clark et al., 2019). PBC refers to an individual's capacity and chance to participate in a specific behaviour (Fauzi et al., 2024). The TPB has been used to assess and forecast human behaviour to comprehend its complexity. Likewise, perceived behavioural control is an addition to TPB that extends TRA (Lee & Jan, 2018). Additionally, TPB may be used to forecast pro-environmental behavioural intentions (Nowacki et al., 2021). The idea that attitude is a type of evaluative reaction to a specific object highlights the importance of attitude as a hypothetical construct that may be deduced but not directly seen, as well as an intervening variable in social psychology research (Adeleke, 2015). TPB has been effectively used to identify human behaviours in a variety of contexts, including the ecologically conscious actions of visitors (Liu et al., 2019). According to the TPB model, environmental attitude, subjective norms, and perceived behavioural control can all predict environmentally conscious behaviour (Yaghoubi Farani et al., 2019).

2.1.1 Environmental Attitude

Social psychology defines attitudes as favourable or unfavourable evaluations and reactions to objects, people, situations, or any other aspect of the world (Ugulu et al., 2013). Furthermore, two types of environmental attitudes are essential for predicting ecological behaviour: attitudes toward the environment and ecological behaviour (Kaiser et al., 1999). Because it may influence visitors' behaviour, those who have a favourable attitude toward environmental protection are more likely to act in an ecologically valuable manner (Ren et al., 2021). In addition, environmental attitude, or people's dedication to protecting the environment, seems to be essential for active participation in helpful activities for visitors' benefit (Baierl et al., 2022; Bissing et al., 2013). This encompasses the outcomes of knowledge and learning processes to respond to impressions or emotions of liking or hating something and judgmental aspects (Fang et al., 2018). Moreover, tourists' intentions to pick up trash in a protected area have been used as a broad indicator of the links between environmental attitudes and environmental behaviour in tourism settings (Lee et al., 2018). To achieve sustainable ecotourism, education is seen as essential, as it gives people the knowledge and abilities they need to engage with natural resources in the best possible way and promotes environmentally conscious attitudes and actions (Sander, 2012; Ambusaidi et al., 2024).

2.1.2 Subjective Norms

The term subjective norms refers to how an individual perceives specific social pressures, especially those originating from a reference group, that impact their decision-making (Wu & Chen, 2018). This is an important contextual component that generates social pressure from peers, students, neighbours, friends, family, and role models (Tang et al. 2024). Furthermore, it describes the extent to which people's intention to engage in a behaviour is affected by the acceptance or rejection of important individuals or groups (Maleknia et al., 2024). Subjective norms may represent social pressure to embrace sustainable activities, and attitudes may take the form of eco-friendly travel choices. According to Gao et al. (2017), subjective norms are a person's perception of whether or not others support their behavioural change, and they stem from the words and actions of certain significant people in their life (Liang et al., 2018). Based on the work of Lee et al. (2018), behavioural intention influences a traveller's actual behaviour, and subjective norms have a favourable impact on behavioural intention.

2.1.3 Perceived Behavioural Control

As the third determinant of TPB, perceived behavioural control (PBC) refers to an individual's comprehension of the ease and difficulty of carrying out an activity (Empidi & Emang, 2021). The perceived difficulty or ease of performing a behaviour may be reflected in control beliefs (Lee, 2007). The most important component in forecasting an individual's behaviour is their desire to adopt a specific behaviour, which is influenced by their attitude, subjective norms, and perceived control over their behaviour (Gou et al., 2024). PBC may refer to the

capacity of a policy to impose or reward sustainable habits (Rehman et al., 2024). According to the Theory of Planned Behaviour, an individual's purpose indirectly affects their actual behaviour based on their perceived behavioural control. This hypothesis assumes that even in cases when attitudes and subjective standards are favourable, those who feel they have little influence over executing it due to circumstances outside their control would be restricted in their capacity to do so (Kara, 2024). Assessing perceived behavioural control over behaviour may lead to more accurate forecasting of intents and target behaviours (Lee, 2007). According to the theory of planned behaviour (TPB), PBC plays a significant role in influencing behavioural intentions and behaviour. Beliefs about control, such as internal or external control factors, also have a significant impact (Chung et al., 2017). Environmental awareness motivates customers to adopt eco-friendly practices (Nowacki et al. 2021). When an individual's perceived control matches their absolute control, it can successfully affect their actions (Hasan et al., 2020).

2.2 Sustainability Consciousness

Sustainability consciousness is the understanding and dedication to making decisions that protect the environment, advance social justice, and guarantee the economic well-being of future generations. Moreover, it entails incorporating ethical behaviour into day-to-day activities, such as waste reduction and resource conservation. Therefore, the primary purpose of sustainability consciousness is to investigate the effects of education on sustainable development adoption in ecotourism. Furthermore, sustainability consciousness assesses knowledge, attitudes, or behaviours related to one of the social, economic, or environmental aspects of sustainable development (Berglund et al., 2020). For sustainability projects to be implemented successfully, sustainability consciousness is essential. Similarly, for sustainable development, citizens' knowledge, attitudes, and actions must be changed. Likewise, enduring public awareness is essential for ensuring a sustainable future (Gulzar et al., 2023). Moreover, actions, attitudes, and knowledge related to sustainability have been used to demonstrate consciousness (Ovais 2023).

2.3 Environmental Conservation

Ecotourism is defined as natural tourism that consciously aims to provide net positive benefits for the sustainable development and environmental conservation of local communities (Stronza & Pêgas, 2008). Furthermore, changes in this kind of behaviour can be crucial for environmental preservation, but there is insufficient quantitative data on how well ecotourism meets development, conservation, and educational goals (Tisdell & Wilson, 2005). According to energy consumption, this concept arguably fits well with the pro-environmental behaviour campaign, which uses planned corporate social responsibility and green organizational practices to promote followers' or employees' values, particularly altruistic values that drive their pro-environmental behaviour (Omoyajowo et al., 2024).

Ecotourism uses the environment to sell itself as a business. The sector survives by offering environmentally friendly tourism products, which make it a sustainable and valuable conservation tool (Chirenje, 2017).

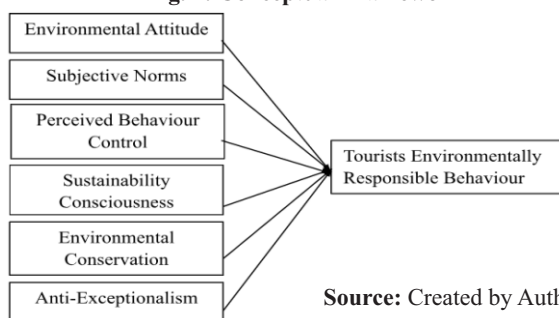
2.4 Anti-Exceptionalism

Anti-exceptionalism in ecotourism refers to the idea that ecotourism should not receive preferential treatment or a more permissive range of environmental regulations. This implies that ecotourism needs to adhere to the same rules as other sectors in order to preserve the environment and prevent damage. The purpose of the anti-exceptionalism component is to gauge people's beliefs that humans are subject to the rules of nature (Dunlap et al., 2000; Dorward et al., 2024). It is helpful to first examine the historical and modern exceptionalist competitors of anti-exceptionalist epistemologies of logic to understand them. The vagueness of the word "logic" itself presents a problem when debating the epistemology of logic, since it makes arguments concerning its epistemology inherently unclear. Human ingenuity and inventiveness will help us avoid rendering the Earth uninhabitable. Despite our extraordinary powers, the laws of nature still apply. Moreover, humans will gradually learn more about the workings of nature and eventually develop the skills necessary to manipulate them (Kim et al., 2021).

2.5 Tourists' Environmentally Responsible Behaviour

Environmentally responsible behaviour is defined as the degree to which it modifies the availability of materials or energy from the environment or impacts the structure and dynamics of ecosystems or the biosphere (Han et al., 2016; Stern, 2022). When customers feel that using environmentally friendly items would benefit them and the environment, they are more inclined to do so (Patwary, 2023). Furthermore, positive interactions between visitors and locals are facilitated by personality traits, including kindness, empathy, tolerance, and readiness to listen (Aziz & Niazi, 2023). The term intention describes a person's propensity and likelihood to engage in a particular conduct in the future (Fenitra et al., 2021). Likewise, the two elements of ERB are ecological knowledge and attentiveness. The tourist sector's economic impact is becoming increasingly apparent, but it also has negative repercussions on the environment (Sahabuddin et al., 2024). Prior research on environmentally conscious behaviour has concentrated chiefly on evaluating environmental education and interpretation programs (Poudel & Nyaupane, 2017).

Fig. 1: Conceptual Framework



Source: Created by Author

4. Discussion

This study aims to understand how TPB elements, sustainability consciousness, environmental conservation, and anti-exceptionalism affect tourists' environmentally responsible behaviour. This study addresses this issue by developing a model that incorporates environmentally responsible behaviour, environmental attitude, subjective norms, perceived behaviour control of visitors, sustainability consciousness, environmental conservation, and anti-exceptionalism.

The findings of previous studies confirm that TPB elements have a direct impact on travellers' environmentally responsible behaviour intentions (Liu et al., 2019; Fenitra et al., 2021). Considering the social nature of people and the collective nature of environmental challenges, social impact is essential for understanding environmental attitudes and actions. The substantial influence of subjective norms on promoting eco-friendly traveller behaviour is consistent with the results of earlier research on cultural variations (Lee & Green, 1991; Wong & Ahuvia, 1998; Uzzell & Badenas, 2002; Liu et al., 2019). According to Sthapit et al. (2023), positive subjective memories and sensations of satisfaction are produced through a positive view of a place. The desire to buy ecologically friendly items is positively and significantly correlated with one's attitude toward them (Yao et al., 2024). However, it was discovered that there was little correlation between visitors' intentions for ecologically responsible behaviour (ERB) and their perception of behavioural control (Liu et al., 2019). Furthermore, younger generations are more conscious of environmental concerns than older generations, indicating that age has a favourable impact on environmental views (Masud & Kari, 2015). The development of a reliable framework that accurately forecasts tourists' ERB while travelling remains a significant task (Cheng et al., 2021). ERB can help the environment and promote eco-friendly travel destinations. These results provide new evidence that visitor happiness has a favourable and significant impact on visitors' propensity to participate in environmentally conscious activities (Sahabuddin et al., 2024). This outcome demonstrates how community involvement may assist conservation groups in resolving tensions between enhancing local livelihoods and protecting the environment. Furthermore, travellers may believe that ecotourism execution is possible if they have more environmentally conscious views, which might encourage them to enhance their ecotourism behavioural intentions and engage in ecotourism activity (Lee & Jan, 2018). However, younger travellers will act more sustainably and engage in ecologically responsible activities to lessen their environmental impact when they have a more favourable opinion of the place (Fenitra et al., 2021). According to Wuxiang et al. (2022), travellers who have a favourable opinion of the quality of ecotourism are more likely to engage in proactive, environmentally conscious practices. However, frequent trips to green areas have the potential to improve people's perceptions of the environment and encourage more ecologically conscious behaviour. Thus, it is imperative to implement policies that provide people with

more opportunities to engage with nature (Kim et al., 2021).

5. Theoretical & Managerial Implications

The theoretical implication of the present study lies in understanding how TPB elements (environmental attitude, subjective norms, and perceived behavioural control), sustainability consciousness, environmental conservation, and anti-exceptionalism affect tourists' environmentally responsible behaviour for ecotourism. This study adds to the theory of planned behaviour (TPB) by showing how tourists influence their choices and behaviour regarding sustainability. The presence of anti-exceptionalism provides a critical viewpoint, urging travellers to behave responsibly and critically, rather than assuming ecotourism is constantly sustainable. However, scholars may investigate how these factors are related and how they all affect eco-friendly travel strategies in a better aspect, offering suggestions for better management and promotion of ecotourism. This study also emphasises the necessity for researchers to consider the wider social, cognitive, and ethical aspects of visitor behaviour, especially when it comes to environmental responsibility. This study provides a strong theoretical basis for further ecotourism research and for creating more potent interventions that promote long-term sustainability in the travel industry by concentrating on these intricate interdependencies. Academically, this study emphasises the value of a multifaceted approach to comprehending visitor behaviour and encourages greater research into how these components might be used to create effective plans for encouraging sustainable tourism practices.

This study offers valuable insights into improving ecotourism efficacy from a managerial perspective. Additionally, stakeholders such as site managers, marketers, and local authorities should prioritise gaining a thorough understanding of visitors' environmental attitudes, subjective norms, perceived behavioural control, sustainability consciousness, and environmental conservation. Furthermore, local communities and travel operators may promote societal norms that encourage sustainable behaviour, and marketing campaigns can highlight the significance of protecting natural resources. To improve the long-term sustainability of ecotourism efforts, stakeholders should raise the likelihood of responsible behaviour by highlighting sustainability consciousness and giving visitors information and resources so that they can make eco-friendly decisions. However, tourists' perception of control over responsible behaviour can also increase by providing valuable, easily accessible resources, such as eco-friendly transportation choices and garbage disposal facilities. Additionally, creating a zero-tolerance policy for unsustainable behaviour and reducing the acceptability of exceptionalism can assist in guaranteeing that visitors feel responsible for their environmental impact. Moreover, stakeholders may encourage sustainable, ecologically conscious behaviour by including these components in ecotourism initiatives, which will help the industry succeed and protect natural areas. By incorporating these concepts into ecotourism plans, stakeholders can promote greater community engagement, encourage

improved environmental practices, and ultimately support the growth of ecotourism as well as the preservation of natural areas. In addition, by providing stakeholders with a valuable framework for aligning their objectives with sustainable development, this framework fosters a win-win partnership between environmental preservation and tourism.

6. Conclusion and Future Research

This study integrates existing literature into a comprehensive framework that links the theory of planned behaviour (TPB), sustainability consciousness, environmental conservation, and anti-exceptionalism, which influence environmentally responsible behaviour in ecotourism. The framework suggests that TPB (environmental attitude, subjective norms, and perceived behavioural control) affects environmentally responsible behaviour. Furthermore, sustainability consciousness, which is influenced by knowledge of sustainable practices and awareness of environmental issues, promotes more responsible ecotourism behaviour. Environmental conservation is a crucial component that focuses on preserving biodiversity and ecosystems for future generations. Furthermore, travellers are more inclined to distribute Earth's resources, such as air, minerals, plants, land, water, and wildlife, if they believe that ecotourism should be critically assessed, just like any other sector, rather than being taken for granted as natural or advantageous. As a result, emphasising TPB aspects can improve travellers' attitudes and encourage ecotourism while promoting environmental preservation. In addition to raising the desire to travel to ecotourism destinations, these factors have an immense influence on environmentally conscious behaviour.

Additionally, future studies should empirically evaluate the suggested conceptual framework to learn more about the elements influencing travellers' environmentally conscious behaviour. By investigating the connections between TPB and other extended variables on eco-friendly behaviour, future studies can find ways to improve environmental value and satisfaction, which will ultimately support ecotourism's long-term growth.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Navigating the Fintech Frontier Challenges and Opportunities Ahead

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A b s t r a c t

Fintech, or financial technology, is transforming the global financial landscape at an incredibly fast rate by developing innovative solutions that enhance user experience, access, and efficiency in financial services. Fintech is a new technology that revolutionises financial services and promotes digital payments, credit availability, financial inclusion, cost reduction, and innovation. The different advantages fintech offers, including cost reductions, individualized banking experiences, and financial inclusion, are discussed in this study. It also considers significant issues such as cybersecurity risks, privacy of data, regulatory ambiguity, and the likelihood of increased financial exclusion due to digital divides. Critical analysis of existing trends, this paper aims to provide a balanced evaluation of how fintech is reshaping the financial landscape, outlining both the need for regulation and responsible innovation and the possible benefits. With an emphasis on addressing the needs of the underbanked population, boosting financial inclusion, and leveraging technology to deliver innovative financial goods and services, this study has demonstrated that fintech has significant opportunities and problems in India.

Keywords: Artificial Intelligence, Financial technology, Blockchain, Financial Services, Fintech Revolution, Digital payment.

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1. Introduction

Financial inclusion refers to the availability and ease of access to financial services for individuals and enterprises, particularly those who are underserved or have been shut out of traditional financial institutions. A significant portion of the almost 1.7 billion people without banking access worldwide reside in developing countries. Traditional banking systems have had difficulty reaching these groups because of financial, infrastructure, and geographic constraints. FinTech has surfaced as a viable remedy, utilising mobile technologies, digital platforms, and cutting-edge financial services to overcome these obstacles.

In 2024, India took the lead in Asia's FinTech sector, with its companies responsible for 21% of all deals made across the region (FinTech Global 2025).

Over the past few years, the international fintech environment has experienced a massive overhaul, revolutionising the way financial services are provided, accessed, and felt. Fintech, or "financial technology", is a general category of new-age tools and digital products that leverage technology to streamline, enhance, and update financial processes. The increase in conventional financial systems has created new avenues for both individuals and enterprises. Whether peer-to-peer lending, mobile payments, robo advisory services, or blockchain-based platforms, fintech is revolutionising the flow of money and the way individuals engage with banks and other financial institutions.

Fintech has made one of its most significant contributions to driving financial inclusion. Through the adoption of technologies such as mobile banking, digital wallets, and microfinance platforms, fintech has reached populations previously excluded or under-served by the formal banking sector, especially in remote or rural communities. These tools have helped millions manage money, save money, invest money, and pay securely, often for the first time. Fintech has also prompted a global shift towards payment digitalisation. Mobile wallets, contactless credit cards, and cryptocurrencies now offer individuals more secure and easier alternatives than money and traditional banking channels. Against this background, sophisticated data science and artificial intelligence enable fintech players to process immense volumes of financial data in real time. This allows them to offer products and services customised to specific needs, thus enhancing customer satisfaction and experience.

Another game-changing phenomenon is the adoption of distributed ledger technology and blockchain, which streamline and secure complex processes, such as cross-border money transfers, trade financing, and smart contracts. These technologies make financial transactions more efficient, transparent, and secure. As per a recent report by the Digital Lenders Association of India (DLAI) and EY, "The Role of FinTech in Building Viksit Bharat", India's fintech sector is on a robust growth path. The report estimates that the Indian fintech market will expand by 30% to around \$180–200 billion by 2029. This rapid expansion is driven by several key considerations, such as higher incomes, increased financial literacy, and the growth of digital

infrastructure nationwide. Among all fintech services, digital lending is expected to become the largest revenue generator by 2030, as more people and businesses turn to technology-based platforms for quicker and more accessible credit.

The report also points out that India's fintech boom is powered by the following:

- Growing disposable incomes among a large segment of the population
- Government-led financial inclusion efforts, helping more people access formal financial services
- Widespread internet and smartphone adoption, especially in rural and semi-urban areas
- And a strong Digital Public Infrastructure backed by the government, which lays the foundation for secure and scalable fintech solutions

1.1 What is Fintech?

Fundamentally, fintech is the result of integrating digital technology into the financial services sector. It comes down to applying innovation to provide quicker, easier, and more accessible financial management solutions. Fintech, as defined by the Financial Stability Board, is defined as "financial innovation driven by technology that may lead to new business models, applications, processes, or products that have a substantial impact on financial markets, institutions, and the provision of financial services."

1. Fintech is not just one thing—it is a growing ecosystem with many components. As suggested by Dorfleitner et al. (2017), fintech can be categorised into four key areas:
2. Financing, including crowdfunding and digital lending platforms
3. Asset Management – such as robo-advisors and automated investment tools
4. Payments – including digital wallets, UPI systems, and contactless technologies
5. Alternative Fintech Models – covering innovations that don't neatly fit into traditional categories, like blockchain startups or regtech platforms

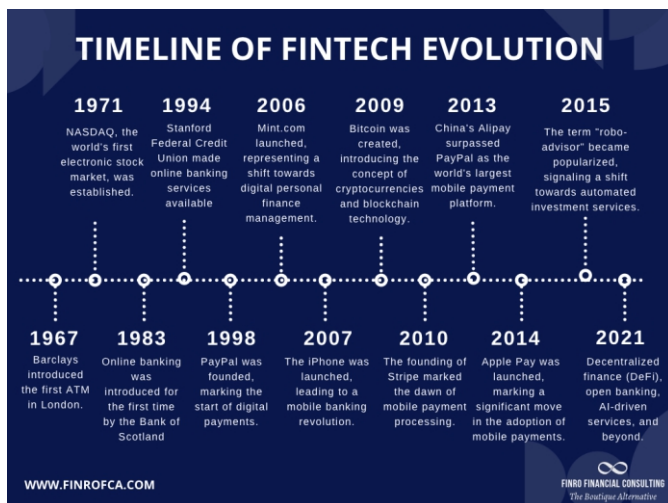
Each of these areas is evolving rapidly, offering new ways for people and businesses to interact more smartly and efficiently with money.

Fig. 1: Conceptual Framework

| | |
|------------|---|
| 1860 | The Pantelegraph was Invented |
| 1880 | Employing Charge Plates and Charge Coins for Credit |
| 1918 -1970 | The Fedwire Invention |
| 1919 | A relevant Book Was Published connecting Finance and Technology |
| 1950 | Diner's Club launched a Credit Card |
| 1958 | The American Express Credit Card was unveiled |
| 1960 | 'Quotron' to display the Stock Market Quotes |
| 1966 | Telegraph Replaced by the Telex Network |
| 1967 | Barclays Bank First Installed ATM |
| 1971 | NASDAQ Formed |
| 1982 -1983 | Evolution of E-Trade and Internet Banking |
| 2009 | Launch of Bitcoin |
| 2011 | Google Pay Send Developed (Google Wallet) |
| 2017 | "Smile To Pay" Services Launched by Alibaba |

Source: www.getsmarter.com

Fig. 1: Timeline of Fintech Evolution



Source: www.finrofca.com

2. Literature Review

Zavolokina et al. (2016) contributed to the study in the fields of information systems, finance, and multidisciplinary social sciences by examining the factors driving the Fintech phenomena as reported by the popular press in Germany and England. It also benefits practitioners who are investigating the fintech space.

Gimpel et al. (2017) conducted the study and found that the financial services market is often enabled, innovated, and disrupted by data analytics and artificial intelligence through innovative and customized financial services and products that leverage digital technologies such as social media, mobile computing, the Internet, and the Internet of Things.

Danese et al. (2017) looked at recent advancements in the field of lean management research and provides a framework that divides lean research topics into three categories based on their stage in the research life cycle: mature, intermediate, and nascent.

Lee and Shin (2017) classified Fintech, as they put it, is a new paradigm where innovation in the financial sector is being driven by information technology. It also explains different business models and investment types, presents a historical perspective on fintech, and demonstrates how to use real options when making investment decisions. The technological and management difficulties facing both new and established financial institutions are also covered.

Puschmann (2017) revealed that the financial services sector has been greatly affected by digitization since financial goods rely on information and procedures are carried out virtually. Recent developments in information technology have led to new business models, increased process automation, fundamental reorganisation of the financial services value chain, and the introduction of new competitors.

Hu et al. (2019) in order to study how users adopt Fintech services, they proposed an enhanced technology acceptance model (TAM) that takes into account perceived risk, brand image, government backing, and user innovation as predictors of trust. The findings indicate that users' attitudes regarding adoption are significantly impacted by their level of

trust in fintech services.

Kavuri and Milne (2019) discovered that although there is more academic literature on fintech, it is still sparse and lacks a clear objective. With the help of focus groups with academics and politicians, this report presents cogent research themes and lists seven major research gaps, along with questions that may serve as the foundation for further study. As a result, this field has gained recognition as an academic field.

Priya and Anusha (2019) analysed, India is a rapidly expanding Fintech market, with a population of around 1.3 billion people and a high proportion of unbanked and underbanked individuals. Fintech is anticipated to continue expanding in the future and is regarded as a disruptive innovation and game changer. This study concentrates on the fundamentals of financial technology and how they work.

Sung et al. (2019) found a statistically significant increase in the frequency of internet searches for the keyword "Fintech" between September 2012 and August 2018. The top searched term was "manager," which was followed by "developer" and "engineer." The geographical distribution of fintech-related jobs in the UK was also determined.

Vijai (2019) highlights fintech as a novel concept in the financial industry that provides digitisation and security, reduces operating costs, and modifies the traditions and practices of the Indian banking industry. Siddiqui and Siddiqui (2020) determined that telecom is crucial for bringing banking services to rural areas and assisting them in improving their quality of life. To improve India's financial inclusion and telecommunications infrastructure, inclusive and comprehensive policies must be implemented.

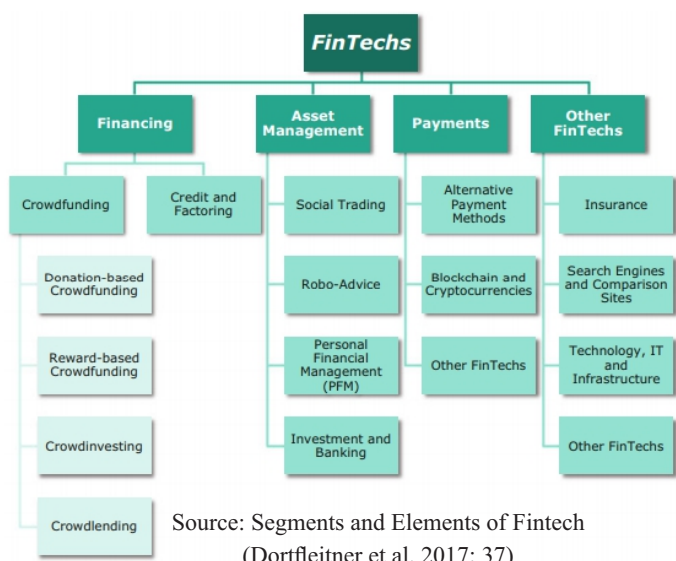
Barbu et al. (2021) used the stimulus-organism response approach to study customer experience in the fintech industry. The findings indicate that customer experience in fintech is positively correlated with perceived value, customer assistance, assurance, quickness, and perceived firm innovativeness. Furthermore, there is a positive correlation between loyalty intention and customer experience. In addition to showing how fintech companies need to incorporate customer experience into their business models, this study helps identify the dimensions, determinants, and effects of customer experience in fintech.

Harris (2021) examined how fintech startup ecosystems developed in Singapore and London and found that a single accelerator actor was instrumental in the development of such ecosystems. It argues that stakeholders in the evolutionary dynamics of entrepreneurial ecosystems possess transformational agency ability, which is to be accounted for in the entrepreneurial ecosystem literature.

Luo et al. (2021) conducted a study and discovered that Fintech, through two mechanisms—the information effect and the resource allocation effect—has a favorable impact on the transformation of Chinese firms and economic sustainable growth. Private small- and medium-sized businesses are more resilient than big state-owned businesses.

Goswami et al. (2022) identified the major success factors that influence rural India's embracement of disruptive financial technologies for financial inclusion. To measure the impact of fintech on rural India's financial inclusion, the quantitative method utilises structural equation modelling, exploratory factor analysis, and inferential statistics. The research findings indicate that social influence-building factors positively affect the behavioural impact of managers' willingness to adopt technology in India's rural sectors. There is a positive relationship between behavioural intention and end-users' practices of adopting financial technology systems and services. Gupta (2025) examined how social distancing conventions and health concerns regarding physical money due to the pandemic accelerated digital payment adoption. This transformation was facilitated by the sustained efforts of the Indian government, including the Digital India Program, which promotes digital infrastructure, e-governance, and digital literacy. The study concludes that digital payments have become an integral part of Indian life and the economy. It foresees that even after the pandemic, online transactions will continue to increase. Recommendations include lengthening infrastructure, enhancing cybersecurity, enhancing digital literacy, especially in rural areas, enhancing technological integration, and harmonising regulatory environments to facilitate platform compatibility.

Fig. 2: Segments and elements of Fintech



Objectives of the study

- To study the key opportunities and challenges faced by fintech companies and their solutions.
- To present a comprehensive overview of the fintech industry, including its evolution and current landscape.
- To study the future of fintech in India.

4. Fintech in India

India is at the forefront of financial innovation, and its financial technology sector is expanding quickly. Fintech firms are becoming increasingly popular among consumers along with businesses because

creative answers to conventional financial services are offered via technology. Through programs such as the Jan Dhan Yojana, Aadhaar-based electronic KYC, and unified payment interfaces (UPIs), the Indian government advances digital payments and financial inclusion. Owing to these programs, digital payments and fintech solutions have become more widely used across the country. Digital payments constitute meaningful growth within India's Fintech sector, and UPI is the most widely used digital payment network. UPI transactions surged from 17.9 million to 83,714.4 million during 2017-2023. By 2022, UPI transactions in India totalled 74 billion. It led the world in real-time payments at that time.

According to the Ministry of Finance, the Unified Payments Interface (UPI) processes an incredible 15,547 crore transactions in 2024 for Rs 223 lakh crore. Fintech businesses also offer wealth management-, insurance-, blockchain-, and lending-based solutions. Between 2015 and 2020, the Indian financial sector experienced a large influx of capital, with over \$12 billion going to Indian financial companies. Paytm, PhonePe, Razorpay, PolicyBazaar, and Zerodha are important participants in the Indian financial ecosystem. Interestingly, fintech adoption is high in India. Indian customers have embraced the usage of mobile payments in their routine daily activities, driven by mobile wallets and numerous other recent advances, such as the Unified Payment Interface (UPI) platform (Priya and Anusha 2019). Regardless of geographic variations in India, telecommunications clearly affect financial inclusion in several constructs (Siddiqui and Siddiqui 2020). Nevertheless, the Fintech sector in India also has to contend with issues including stringent regulations, intense rivalry, and restricted funding availability. The Reserve Bank of India (RBI) has taken action to control the industry and guarantee customer safety. All things considered, favourable government legislation, the rise in the use of digital payments, and the demand for creative financial solutions for the underbanked population are projected to fuel India's fintech sector's continued rapid growth.

Fig. 3: Fintech in India



Source: saathi.mygov.in

(Fintech in India, 2025) India's fintech industry—where technology is used to provide financial services—has grown very fast over the past few years. With the world's second-largest number of Internet users, India rapidly adopted financial technology, and it became one of the fastest-growing fintech industries in the world. Some of the major segments driving this growth are digital payments, wealth management technology, blockchain, and digital lending. One of the principal drivers for this growth has been the government's push towards a cashless economy, particularly accelerated during the demonetisation phase, which gave a significant impetus to digital payment usage. The COVID-19 pandemic increased the growth towards digital financial services even further. Government programs such as the Pradhan Mantri Jan Dhan Yojana also helped create a huge customer base that required low-cost financial solutions. As a result, fintech has become an important solution for targeting rural and underserved areas.

4.1 Regulators and Fintech Enablement in India

India's fintech experience has been heavily influenced and facilitated by its central banking institution, the Reserve Bank of India (RBI). Over time, the RBI has led to the growth of the fintech ecosystem, while equally striving to strike a balance between innovation and the requirement for robust consumer protection and regulation. The regulator's fundamental vision has been to develop an open and supportive place for financial innovation, particularly in sectors that assist in bringing financial services to underserved communities, enhance effective digital payments, and give consumers access to a greater number of financial options.

India has seen major fintech advancements in sectors such as digital payments, lending, security and biometrics, and wealth management. These have been the focal points of importance for the RBI, and pioneering initiatives have been introduced to drive fintech participation in these areas.

Some examples include:

- Unified Payments Interface (UPI): Developed in collaboration with the National Payments Corporation of India (NPCI), UPI has transformed the landscape of digital payments in India. It plays a significant part in driving the nation towards a "less-cash" economy by rendering transactions quicker, simpler, and more convenient for the common citizen.
- The RBI approved the licences specifically for 11 entities in order to establish Payments Banks and also for 10 entities so they could start Small Finance Banks: Licencing of New Banking Models. Offering basic banking services can deepen the financial inclusion of these institutions. People who were in remote and rural areas were previously left out of the formal financial system, and they may now be included in it.
- Focus on P2P Lending as well as Blockchain: The RBI also released such a consultation paper. This study was aimed at regulating the peer-to-peer (P2P) lending space, because this sector is very important. Fintech companies and customary

financial institutions have explored blockchain technology possibilities, hinting at its long-term potential in securing and streamlining financial transactions.

- Low-Value Remittance Opportunities: A major challenge in the Indian remittance environment is that low-value transactions attract unfairly large fees. This makes it costly for low-income customers to send or receive money. Resolving this problem presents a significant opportunity for fintech companies to do so. For example, in the UK, TransferWise (now called Wise) built innovative cross-border remittance platforms that reduced costs and increased efficiency, ultimately receiving a valuation of over \$1.1 billion due to their popularity.

4.2 The Role of Global Best Practices

India's regulatory environment for fintech has been spectacular so far, but with the industry growing rapidly, regulators have to keep up and evolve under increasing pressure. To remain in tune with this rapidly changing world, Indian regulators could learn from replicating best practices elsewhere.

- UK's Project Innovate: In the UK, the Financial Conduct Authority (FCA) introduced "Project Innovate, a program that helps startups through the relaxation of regulatory hurdles and the promotion of new products in the finance sector. Many fintech ventures have enjoyed relief from this program to prosper in a strongly regulated and congenial setting.
- U.S. BitLicense: In America, the United States New York State Department of Financial Services came up with the "BitLicense" initiative in 2015. The regulatory framework focuses on companies trading virtual currencies. It has opened the door to a more secure and innovation-friendly crypto environment in one of the world's largest financial hubs.






Table 2: Category of Fintech

| Category definition | Key technologies | Real-world instances |
|--|--|---|
| Cybersecurity: Software or hardware that protects against electronic theft, fraud, or financial privacy. | Encryption, tokenization, authentication, biometrics | Experian, CreditLock, USAA face recognition login, Mastercard biometric card, and Diebold iris-scanning ATM |
| Mobile transactions: Technology is making it simpler to make transactions through wireless mobile devices, such as wearables, smartphones, and tablets. | Smartphone wallets, digital wallets, near-field communication | Venmo, Square, PayPal Mobile Express Checkout, Apple Pay, and Android Pay |
| Data analytics: Technology and algorithms that simplify the analysis of transactional or customer financial information. | Big data, cloud computing, artificial intelligence, and machine learning | Bloomberg Social Sentiment Analytics, JPMorgan Contract Intelligence (CoIN), and Equifax NeuroDecision credit grading |

| | | |
|--|--|--|
| Blockchain: Distributed ledger technology primarily utilized in the financial sector. | Cryptocurrency, proof-of-work, smart contracts, directed acyclic graphs | Bitcoin, the Nasdaq Linq asset trading platform, Visa B2B Connect, and Ripple Payment Network |
| Peer-to-peer (P2P): Financial exchanges among consumers are conducted through software, systems, or platforms. | Crowdfunding, P2P lending, customer-to-customer payments | Kickstarter, Lending Club, Prosper Marketplace, Zelle, and GoFundMe |
| Robo-advising: Automated computer programs or systems that advise clients or portfolio managers on investments. | Artificial intelligence, big data, and machine learning | Vanguard Personal Advisor Services, Schwab Intelligent Portfolios, E-Trade Core Portfolios, and Betterment |
| Internet of Things (IoT): Technologies related to smart devices that communicate and gather information in real time using the internet. | Smart devices, near-field communication, wireless sensor networks, and actuators | Travelers Insurance smart home sensors, Nationwide SmartRide telematics, and UnitedHealthcare Motion F.I.T. tracker. |

Source: (Chen et al., 2018)

Table 3: Top Fintech Companies in India

| Company | Location | Founded | Private Funding Raised |
|--|-----------|---------|------------------------|
|  Razorpay | Bengaluru | 2014 | \$742M |
|  Flipkart | Bengaluru | 2007 | \$12.1B |
|  Lenskart | Gurugram | 2010 | \$1.08B |
|  Myntra | Bengaluru | 2007 | \$125M |
|  Reliance Retail | Mumbai | 2006 | \$7.67B |

Source: India - Startup Landscape - Tracxn (March 6, 2025)

5. Opportunities and Challenges in the Indian FinTech Sector

The Indian FinTech sector is being transformed at breakneck speed by digital innovation, rising smartphone penetration, and pressure from the government as well as private players to usher in a more inclusive, efficient, and tech-enabled financial system. Opportunities abound, but the sector also presents some key challenges that need to be addressed through strategic thinking.

5.1 Opportunities for FinTech in India

Indian FinTech companies are all set to revolutionise the financial service sectors. This is how:

1. Lower-Cost, Better Services

Fintech startups enjoy the benefit of running slim, digitally focused

businesses. Without the weight of costly physical infrastructure and legacy systems, they are free to provide services more effectively and cheaper. These cost savings can be transferred to customers in the form of better-valued financial services.

2. Wiser Risk Assessment Through Technology

One of the most promising opportunities for Fintech development is credit underwriting and risk assessment. Using big data, machine learning, and alternative data sources (such as digital payment behaviour or mobile usage), FinTech can determine creditworthiness even for individuals with minimal or no formal credit history. In this way, financial inclusion in India increases.

3. Building a More Resilient Financial System

FinTech is diversifying its financial system by introducing alternative business models, cultures, and technologies. This not only promotes competition but also injects innovation that renders the whole system more secure, inclusive, and responsive to change.

4. Learning from Traditional Institutions

While Fintech companies are shaking up the status quo, they can still learn some valuable lessons from traditional financial institutions, specifically on risk controls, operational efficiency, compliance, and customer interaction. Adopting such best practices can help fintech scale successfully.

5.2 Challenges in the FinTech Sector – Ways to Overcome Them

Despite their promise, Indian FinTech firms face some persistent problems. A list of notable challenges and solutions is presented below.

A. Cybersecurity Issues

Digital finance is easy to use but brings security risks. Unlike physical banks, which are secured by physical protection, digital platforms are exposed to intangible threats such as data breaches, hacks, and phishing. With user money and personal information at stake, cybersecurity is a top priority.

a) Solution: Invest secure app development that features the following:

- Two-factor authentication
- Biometric logins (e.g., fingerprint or face recognition)
- Data encryption and obfuscation
- Real-time alerts
- Behavioral analytics to detect fraud or anomalies

B. Regulatory Complexity and Compliance

The Indian regulatory environment might be difficult for Fintech newcomers to navigate. Sophisticated compliance obligations can slow startups and make it difficult to enter the market, even though such rules are necessary to protect consumers and prevent fraud.

b) Solution:

- Conduct thorough legal reviews before launching products
- Hire compliance experts or legal advisors to guide you
- Stay informed about regulatory updates to remain agile and compliant

C. Limited Mobile Technology Expertise

Most Fintech companies and even traditional banks still struggle to

deliver a quality mobile experience. Consumers demand easy-to-use but rich-feature apps, not stodgy web ancillaries. A substandard mobile experience can lead to poor adoption and high churn rates.

c) Solution: Make sure that your app features contemporary mobile functionalities, such as:

- Fingerprint-based two-factor authentication
- Optical character recognition (OCR) for credit card scanning
- QR-code payment systems for transit and retail
- NFC (Near Field Communication) for contactless transactions

D. Harnessing Big Data and Artificial Intelligence

Big data and artificial intelligence (AI) are pivotal in fraud detection, risk management, and personalised services. However, banking platforms lag in handling diverse sources of data and actualising them into meaningful forms.

d) Solution:

- Use machine learning techniques to analyze and learn from big data
- Explore "one-shot learning" models that require less training data
- Develop systems that can interpret multiple types of data efficiently

E. Insufficient Government Incentives and Policy Support

The Indian government has made an effort to embrace digital finance, but a few Fintech startups feel that there is inadequate ongoing support. A lack of institutional support can deter new entrants and slow innovation.

e) Solution:

- Advocate for balanced regulations that encourage innovation while maintaining order
- Foster public-private partnerships to support FinTech growth
- Encourage policy think tanks to represent FinTech needs at the policy level

F. User Experience (UX) and Retention Issues

The majority of financial apps overdo security or usability, entirely forgetting the delicate balance between the two. Poor user experience can frustrate customers and lead to high churn rates.

f) Solution:

- Build user-friendly interfaces with strong but unobtrusive security
- Allow features like seamless biometric login while maintaining two-factor authentication
- Have user feedback sessions to keep improving app experience on an ongoing basis

G. Ineffective Marketing and Low Awareness

The majority of Fintech ventures also experience reaching the target group. As classic banking continues to be a predominant force in a nation, Fintech companies are required to do more work towards being noticed and informing potential buyers.

g) Solution:

- Develop clear branding and messaging that communicates value
- Invest in digital marketing, influencer campaigns, and

educational outreach

- Consider partnerships with traditional banks to enhance credibility and reach

5.3 A Sector in Transition

The Indian financial sector is undergoing a revolutionary shift. From the introduction of the UPI and Aadhaar-based e-KYC to the increase in digital wallets and contactless payments, India is actively transforming into a less-cash economy. Post-demonetisation, the FinTech start-up ecosystem has increased manifold, with firms exploring new areas, such as peer-to-peer lending, mPOS, insurance technology, and online investing. However, although this growth is encouraging, numerous challenges remain to be overcome. Overcoming these issues with sound planning strategies, robust tech capabilities, and a collaborative culture between the government, regulators, and industry players will be key to unlocking the full potential of FinTech in India.

6. The Future of FinTech in India

India's fintech sector is entering a new age of growth and change, and its impact on the economy and push for increased financial inclusion is vast. The ongoing digitisation of financial services not only facilitates banking access but also powers deeper economic progress by empowering individuals, businesses, and communities.

In recent years, the Indian fintech ecosystem has developed at a rapid pace. Presently, there are more than 2,100 fintech firms in the country, and remarkably, more than two-thirds of them have been established within the past five years alone. This is much about increasing interest, innovation, and investment in the sector.

6.1 A Sector on the Rise

The Indian fintech sector has attracted considerable investor interest. In 2021 alone, the sector witnessed investments of over \$8 billion at different stages of growth, ranging from early stage firms to mature players. This capital flow has helped drive innovation, product development, and market penetration.

From a business perspective, India's fintech industry is expanding at a compound annual growth rate (CAGR) of 20%. To give this perspective, the value of fintech transactions was \$66 billion in 2019 and is expected to more than double to \$138 billion by 2023. Much of this growth has been driven by the adoption of digital payments.

By June 2020, India had already reached a significant milestone in digital payments, with over 5.7 billion transactions conducted monthly, amounting to nearly \$2 trillion in value. This level of activity is a clear sign that digital finance has gone mainstream in India, driven by tools such as UPI, mobile wallets, and contactless payments.

6.2 India's Place in the Global Fintech Landscape

Globally, the fintech space has produced 381 unicorns—startups valued at over \$1 billion or more, and India is home to 24 of them. Some of the most prominent names include:

- Acko, PhonePe, CRED, Zerodha, Groww, PolicyBazaar, Razorpay, BillDesk, payU, BharatPe, Pine Labs, and CoinSwitch Kuber, and others.

These companies are not just innovating; they are reshaping how financial services are delivered and consumed in India.

Fig. 4: Fintech Unicorns in India 2025



Source: Abdullah (2025)

6.3 The Rise of Financial Services “Super Apps

One of the latest trends in fintech is the rebundling of financial services. Rather than focusing on a single product, many fintech platforms are evolving into all-in-one ecosystems that offer various financial tools and services. This model allows companies to cross-sell services, increase customer engagement, and build long-term value.

For example:

- Pine Labs, originally a point-of-sale (POS) and payment gateway provider, have expanded into merchant lending, loyalty programs, consumer financing, and even neo-banking solutions.
- YONO by SBI, which began as a digital banking app, now offers pre-approved loans, insurance products, and online shopping, turning it into a lifestyle and financial super app.
- These developments signal a clear shift: Fintech companies in India are no longer niche players. They are creating ecosystems that directly compete with banks, insurance firms, and even e-commerce sites.

6.4 What Lies Ahead?

However, the future of fintech in India remains unexplored. The industry will continue to draw investments, develop new financial solutions, and expand the limits of digital finance. However, perhaps most significantly, fintech is facilitating a more inclusive, efficient, and equitable financial system in which more people, regardless of their location or income, can be part of the economy. India's fintech story has

just started, and with constant encouragement from regulators, investors, and consumers, it is set to play a defining role in the future of finance, both nationally and globally.

7. Conclusion

The study highlights that the Indian fintech sector has a two-sided environment—abundant with opportunities but fraught with challenges. Fintech has great potential to reshape the financial services sector by boosting digital payments, enhancing credit access, expanding financial inclusion, and reducing cost efficiency and innovation. This is transforming the way people and businesses access and manage financial products, especially in rural and underserved markets.

However, achieving the complete potential of fintech innovation is challenging. The industry continues to grapple with significant challenges, such as:

- Infrastructure limitations, especially in remote or underdeveloped regions
- Cyber risks and fraud exposure
- Regulatory uncertainty and compliance intricacies
- Lack of skilled human resources and technological know-how
- Limited financial literacy among the masses

Despite these obstacles, the sector has witnessed remarkable growth in recent years, attracting substantial investment from both domestic and international markets. This growth is a testament to the trust that stakeholders have in India's digital financial future. Encouragingly, the Indian government and regulators have been actively playing a role in promoting this growth. They initiated innovative policies, set up regulatory sandboxes, and promoted entrepreneurial initiatives to promote innovation in financial technology.

8. Recommendations

Cooperative work is crucial for maintaining momentum and realising the full potential of fintech. Policymakers, regulators, and private sector players will have to continue collaborating to:

- Create a supportive and inclusive ecosystem
- Address existing regulatory and technological challenges
- Promote capacity-building through education and skill development
- Strengthen consumer trust through transparency and data protection

Overall, the Indian fintech industry is on the right track, but its ultimate success will rest

upon strategic, coordinated efforts to balance innovation and responsibility. With appropriate interventions and collaborations, fintech can become a powerful force driving inclusive economic development in India.

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Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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Analysis of Growth, Trends, and Future of Organic Skincare Cosmetic Industry by Applying E-commerce Strategies

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A b s t r a c t

The main purpose of this study is to identify, examine, and analyse the recent and future trends and growth of the organic skincare industry by opting for e-commerce and other market strategies. This study identifies the current scenario of the organic skincare industry and the future growth of organic skincare products by comparing the recent growth and future possibilities of growth in both areas towards organic skincare cosmetics, and identifying the various strategies adopted by marketers for the growth of organic cosmetic products. This study is based on secondary data obtained by comparing the preferences and demands of cosmetic products via e-commerce. The data are collected through the official or main websites of the organic skincare growth and future perspective reviews by analysing the trends, etc., websites with their shares, demand, preferences, and future of the organic skincare industry. The objective of this study is to identify the current perspectives of marketers by applying marketing strategies to analyse the growth, trends, and future of organic skincare products by adapting e-commerce and other marketing strategies. The main motive of this study is to identify the marketing strategies of marketers for opting for changes in the strategies for changing the trends in the market and impacting other industries by opting for e-commerce strategies.

Keywords: Organic skincare, environmental concern, skincare cosmetics.

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1. Introduction

Cosmetics are used widely and in many different ways to improve appearance. Cosmetics are used to alleviate acne, reduce the appearance of wrinkles, and reduce oil production. For a number of skin disorders, formulations such as skin protection, sunscreen, anti-acne, anti-wrinkle, and anti-aging are developed using a variety of components, either natural or artificial. India is the birthplace of producing organic, natural, Ayurveda, and many more herbs for the production of medicine, cosmetics, hair products, etc. A "cosmetic" is any product that aims to preserve, improve, or alter the appearance of the skin, hair & nails. Grooming and beauty products such as makeup, perfume, and skin cream are considered cosmetics. Maintenance of quality standards is essential when developing cosmetic formulations. The performance of a formulation should be on par with consumer expectations. Organic ingredients are used in cosmetic preparations for their wide range of properties, including anti-inflammatory, antiseptic, and antibacterial actions. Unfavourable side effects linked to skincare products created with synthetic chemicals are absent from these organic products. The popularity of these natural cures has led to an overstock of products in the Indian market, both socially and technologically (M.S. Ashawat, Madhuri Banchhor, Shailendra Saraf, and Swarnlata Saraf-2009). People tend to buy more eco-friendly, organic skincare products, together with an increase in income, rather than in line with educational achievement. The issue of consumers' lack of knowledge and the need to foster a culture where health and the environment come before other public concerns are once again brought to the forefront (Drăgan, Alina-Aida; Petrescu, Dacinia-Crina-2013). Retailers of organic skincare products might entice new clients by providing free samples. They might also collaborate with salon and cosmetic store proprietors to conduct co-marketing, a form of integrated management. Co-marketing strategies may cause consumers to become more aware of organic skincare's (Kumudhini, N. and Kumaran, S. S.-2020). Consumers opted to buy organic skincare items at the drugstore rather than online because they were more concerned about their health than about the environment. This research has significance for marketers, policymakers, and the government in increasing the consumption of organic skincare by bridging socioeconomic gaps and promoting sustainable development as a whole (Ainunnazlee Mohd Ali, Aini Mat Said, & Muhammad Zaem Mohd Salleh-2016).

Fig:1 Yearly growth rate of the manufacturing sector in India from fiscal years 2103 to 2022



Source: <https://www.statista.com/statistics/661391/manufacturing-industry-production-growth-rate-india/>

1.1 E-Commerce

“Electronic business is the general term for the buying and selling process that is supported by electronic means”-Philip Kotler. E-commerce, also referred to as e-commerce, has transformed the retail sector and grown to become a significant pillar of the global economy. This has been driven by the cosmetics industry, where mobile commerce has helped increase brands and profits. High-street fashion and cosmetic retailers have become big movers and innovators in building compelling and persuasive mobile e-commerce apps. However, the high-end and luxury industries have, until now, been reluctant to adapt and innovate at a comparable rate (Cristopher J. Parker & Stephn A. Doyle-2018).

Only around one in four consumers worldwide is said to prefer making electronics purchases offline to online in 2022. Most buyers who participated in the poll either showed a definite preference for online shopping or frequently used both channels when buying electronics.

Figure 2: Share of consumers who typically shop for electronics online versus offline worldwide by 2022.



Source- D. Tighe-2022.,<https://www.statista.com/statistics/1307801/online-or-offline-shopping-preference-for-electronics-world/>

1.2 Organic market

Consumers chose to purchase organic cosmetic products at the drugstore rather than online because they were more concerned about their health than the environment, according to Ainunnazlee Mohd Ali, Aini Mat Said, and Muhammad Zaem Mohd Salleh-2016. This study is important for marketers, decision-makers, and the government because it can help close socioeconomic gaps and advance sustainable development as a whole, which will enhance the use of organic cosmetics.

Customers' environmental concerns have increased over the past several years, and as a result, they prefer to buy goods from companies that employ environmentally friendly and sustainable production techniques (Ghazali et al., 2017). According to Soyoung Kim in Yoo-Kyoung Seock (2009), health and environmental concerns significantly influence the weight assigned to the attributes of beauty goods. Furthermore, consumers who scored highly on both health and environmental awareness were awarded significantly better ratings for natural beauty products than those who did not. Poor performers were significantly less willing to spend more money on natural beauty

products than other groups. Aisyah conducted a poll in 2017 and found that social media has a significant impact on the surge in demand for organic skincare products. This is because consumers, famous people, and influencers frequently publish personal endorsements of their preferred organic skincare and cosmetic products. This inspires their followers to practice social responsibility and purchase non-synthetic, naturally sourced, and ethically created goods. The growth of social media and e-commerce has contributed to the spread of this industry.

Table:1 Ingredients involved in producing organic skincare products

| Classification of the ingredients: | Definition's |
|------------------------------------|---|
| Synthetic | Chemically manufactured substances or materials are those that are created through chemical processes and do not naturally occur. (Beerling, 2014). |
| Natural | Any substance that has been extracted through harvesting, mining, or collection and subsequently processed without a chemical reaction (although physical procedures like washing, decolorizing, distilling, grinding/milling, separation, and/or concentration of the substance are permitted) to produce a chemical or chemicals that are discernible in the original source substance (Australian Society of Cosmetic Chemists, 2011; Beerling, 2014). |
| Natural derived | An ingredient is employed when a natural raw material serves as the foundation for a chemical reaction that creates one or more new chemicals that might not naturally occur or be present in the starting material (Beerling, 2014). |
| Organic | a naturally occurring substance that comes from organic farming practices, such as avoiding synthetic fertilizers, pesticides, plant growth regulators, and livestock feed additives; using crop rotation, integrated pest management, crop residues, animal manures, and mechanical cultivation to maintain soil productivity and tilth; and not using genetically modified organisms (GMOs). (Beerling, 2014). |

Source: (S. Bom, J. Jorge, H.M. Ribeiro, J. Marto, 2019, Volume 225, <https://doi.org/10.1016/j.jclepro.2019.03.255>).

1.3 Market overview

The following key points are derived from an analysis made by Aleksandra Łopaciuk & Mirosław Łoboda (2013) of the trends seen in the worldwide market for cosmetics at the beginning of the twenty-first century:

1. The demand for cosmetics will increase, mainly due to Asia's expanding markets. This will affect new spending and aid in the development of new product patterns and conceivably establish new aesthetic benchmarks.
2. International cosmetics manufacturers will need to set themselves apart to adapt their products to the changing market and the expectations of their new customers, which are influenced by non-Western cultures and acting in a unique manner.
3. The skincare sector has the biggest room for growth. It will continue to dominate the cosmetics market throughout the ensuing few years. The distribution network is evolving as supermarkets, hypermarkets,

and online retailers gain market share.

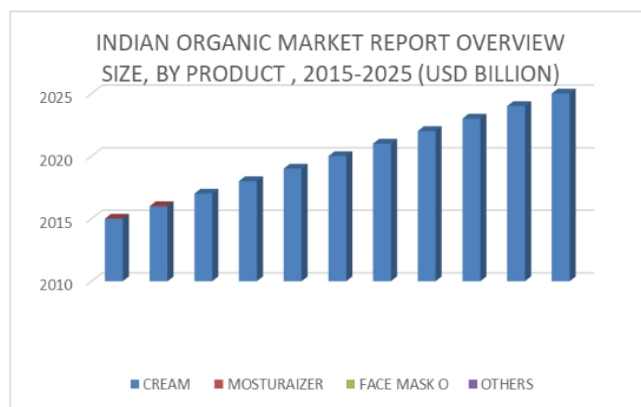
6. Cutting-edge science and technology are becoming increasingly the focus of new product debuts. However, there is a growing market for sustainably produced organic items that typically adhere to the fair-trade principle.

The size of the global organic skincare market was estimated at USD 9.82 million in 2021, and at a CAGR of 8.93%, it is predicted to grow to USD 21.21 billion by 2030.

1.4 Indian Report Overview for Organic Skincare Products

The market for anti-pollution skincare products was valued at \$9.07 billion globally in 2018 and is anticipated to grow at a CAGR of 4.2% from 2019 to 2025. The demand for the product will increase as consumer knowledge of the damaging effects of pollution levels on the skin increases, encouraging market expansion. Outdoor pollution has increased by 8% since 2016. Hence, during the projected period, the market will rise due to the rising demand for natural and organic cosmetics that are high in vitamins and antioxidants.

Figure-3



Source- www.grandviewresearch.com

1.5 Organic skincare market forecasts& analysis

The organic skin care product market is segmented by type, including body care, distribution channel, and region. Skincare is an important self-care component. The makeup procedure involves everything from prevention to correction. Advancements and innovations in the cosmetics sector promise to provide better goods with a focus on health. For quite some time, there has been a large supply of makeup with skincare advantages. The market for organic and natural skincare products is expanding due to factors such as skin sensitivity and awareness of the dangers of synthetic and chemical goods. The majority of consumers prefer to purchase goods labelled as natural or organic. Typically, they do not pay attention to the substances used to make the product. The facial care segment includes cleansers, moisturisers, oils/serums, and other facial care products. Geographically, the division comprises North America (which includes the United States, Canada, Mexico, and the rest of North America), Europe (which includes the United Kingdom, Germany, Spain, France, Italy, Russia, and the rest of Europe), Asia-Pacific (which includes China, Japan, India, Australia, and the rest of Asia-Pacific), South America (which

includes Brazil, Argentina, and the rest of South America), and the Middle East and Africa (United Arab Emirates, South Africa, and Rest of Middle East and Africa). The study provides the market size and values in (USD million) for the aforementioned forecast period.

Due to concerns regarding skin sensitivity, the presence of toxic substances in beauty and face creams can result in rashes and allergies. Daily use of excessive makeup can make the face wrinkly, harsh, and lose its natural hyaluronic acid. These are a few reasons why people choose organic products more often because they have fewer dangerous chemicals and more advantages than natural ingredients. Men's skincare products are becoming more popular as consumer knowledge increases, despite the market's abundance of items for women's skincare. Acne can be caused by environmental factors, such as pollution and UV radiation, that harm skin cells. Organic products reduce acne and shield the skin from UV radiation. These elements are anticipated to accelerate the market's growth for organic skincare products over the next five years. (Over the following five years, the market for organic skincare products is anticipated to grow at a CAGR of 8.72%).

Table 2: Industry segmentation for organic skincare products and export parabens of organic skincare products in India in 2021

| | | |
|----------------------|--|---|
| Type | Facial Care | Cleansers Moisturizers and Oils/Serums Other Facial Care Products |
| | Moisturizers | Body Care Body Lotions Body Wash Other Body Care Products |
| Distribution Channel | Supermarkets/Hypermarkets Convenience Stores Specialist Stores Online Retail Stores Other Distribution Channel | |
| | North America | United States Canada Mexico Rest of North America |
| | Europe | United Kingdom Germany Spain France Italy Russia Rest of Europe |
| Geography | Asia-Pacific | China Japan India Australia Rest of Asia-Pacific |

| | |
|------------------------|--|
| South America | Brazil Argentina Rest of South America |
| Middle East and Africa | United Arab Emirates South Africa Rest of Middle East and Africa |

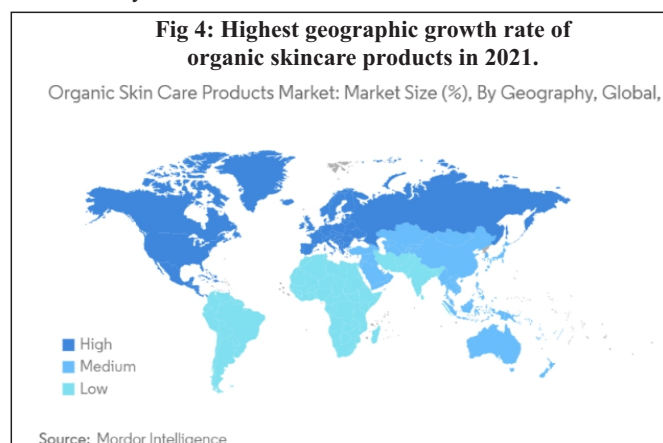
<https://www.mordorintelligence.com/industry-reports/organic-skin-care-market>

Fig 3:



<https://www.mordorintelligence.com/industry-reports/organic-skin-care-market>

he most commonly used preservatives in pharmaceutical and cosmetic products are parabens. Owing to its numerous adverse effects, consumers are increasingly worried about avoiding parabens as a component in their skincare products. They can irritate the skin and interfere with hormones. Synthetic chemicals such as propylparaben and butylparaben are no longer regarded as safe due to the rise of organic products. The phrase "free from parabens" will often appear on a product's label if it is paraben-free. The lack of parabens is also indicated by labels such as isobutyl paraben and isopropyl paraben. Nevertheless, in the beauty sector, items containing parabens and other unfavourable compounds account for a sizeable portion of sales in several categories. These categories are now being replaced by skincare products without parabens. Renee Cosmetics introduced premium face oils in January 2021.



<https://www.mordorintelligence.com/industry-reports/organic-skin-care-market>

In terms of several popular categories, such as skin care, sun care, hair care, colour cosmetics, deodorants, and perfumes, which are the most widely used in this region, Asia-Pacific is one of the most diverse and active marketplaces in the global cosmetics business. As a result, this area continues to hold promise as a global market for organic skincare goods. During the projection period, the Asia-Pacific region is anticipated to experience the fastest growth. The demand for organic skincare in this area is driven by an aging population, rising millennial populations, a growing awareness of organic products, and an increase in the number of working women. With advertising and discounts, market actors entice consumers to purchase organic goods. Given the market's need, they are growing their portfolios.

2. Scope & challenges

A revived system of conventional medicine, encompassing organic, natural, Ayurveda, etc., comes from India, as was already said. Because of the rich flora in these systems, plants have been used for straightforward treatment since ancient times. Traditional medicine practitioners and local believers have tried to preserve the appearance, texture, and beauty of their patients' skin by employing native flora in cosmetics in various parts of India.

- Currently, 80% of the world's population still uses organic products because they are in harmony with nature and pose no health risks; several of them have traditional and scientific justifications that are based on animal experimentation and ethnobotanical research, and by consulting well-known, verified, and widely acknowledged books on natural systems of medicines and cosmetics, where the effects and safety are time-tested. Based on recent claims and conclusions reported in the literature review, the plants chosen for the current investigation were.
- It promotes a healthy life for the human skin.
- It is used to upgrade the texture of the skin to avoid chemical reactions.
- This supports the environmental concern.

3. Suggestions and Discussion

Analysing the growth trends and future of the organic skincare cosmetic industry and e-commerce requires the consideration of various factors, including consumer preferences, market dynamics, sustainability trends, and technological advancements. Here is an analysis of these aspects:

1. Consumer Shift Towards Organic and Natural Products

Consumers are becoming increasingly conscious of the ingredients in skincare products, leading to a growing demand for organic and natural alternatives. This trend is driven by concerns about the environment and personal health.

The organic skincare industry is expected to benefit from this shift as consumers seek products with fewer chemicals, preservatives, and artificial additives.

2. Sustainability and Eco-friendly Practices

Sustainability and eco-friendliness have become integral to the organic skincare industry. Companies are focusing on sustainable sourcing, eco-friendly packaging, and reducing their carbon footprint.

Brands that prioritise sustainable practices are likely to gain a competitive edge and attract environmentally conscious consumers.

3. E-Commerce Growth:

E-commerce plays a crucial role in the growth of the organic skincare industry. It provides consumers with convenient access to a wide range of products and allows smaller niche brands to reach a global audience.

The COVID-19 pandemic further accelerated the shift towards online shopping, making e-commerce an essential distribution channel for skincare products.

4. Digital Marketing and Social Media Influence

Digital marketing and social media have become powerful tools for promoting organic skincare products. Brands leverage influencers, user-generated content, and educational content to engage and inform consumers.

Social media platforms such as Instagram and TikTok have become platforms for showcasing skincare routines and product recommendations.

5. Technological Advancements

Technology is driving innovation in the organic skincare industry with the development of clean beauty apps and tools for personalised skincare routines.

Advancements in product formulations, such as the use of AI and data analytics for personalised skincare regimens, are likely to reshape the industry.

6. Regulatory Environment:

The organic skincare industry is influenced by regulations and certifications such as USDA Organic and COSMOS Organic. Compliance with these standards is crucial for building trust among consumers.

7. Market Expansion and Diversification

The organic skincare industry is likely to expand beyond traditional skincare products to areas such as hair care, makeup, and personal hygiene.

Diversification into new product categories allows companies to capture a broader market share.

8. Challenges:

Despite its growth potential, the organic skincare industry faces challenges related to supply chain sustainability, ingredient sourcing, and premium price points for organic products.

Competition in e-commerce is intense and requires brands to invest in

marketing and customer engagement.

5. Future Outlook:

The organic skincare cosmetic industry is poised for sustained growth driven by consumer demand for clean and sustainable products. E-commerce remains a key driver, with brands leveraging digital marketing and technology to connect with consumers. Sustainable practices continue to be a crucial factor for success. The industry's future will likely see further innovation in product formulation, packaging, and a broader range of organic and natural products.

To thrive in this dynamic landscape, companies should prioritise transparency and sustainability and adapt to changing consumer preferences. Moreover, regulatory compliance and international market expansion will play pivotal roles in shaping the future of the organic skincare and e-commerce sectors.

6. Conclusion

As per the data retrieved from various websites and research papers, it can be concluded that regardless of price, people from a variety of socioeconomic groups frequently choose organic skincare products. Free samples, environmental concerns, and marketing are key factors that influence consumer decisions to buy organic skincare products. According to the evaluation and analysis, the market for organic skincare products will grow to \$9.07 billion in 2019 and to even higher levels by 2025. Predicted growth of organic cosmetics, moisturisers, anti-pollution products, and other skincare products. China shipped the most organic skincare products in 2021. Hence, the findings revealed that the majority of buyers usually preferred to shop for the products of their choice, mostly through e-commerce, as this is the easiest process for shopping and taking the details of anything very easily.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Exploring the Emerging Perspectives from the NEP on the Integration of AI in Higher Education

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A b s t r a c t

India's National Education Policy, launched in July 2020, emphasises five elements for education enhancement: affordability, equity, accountability, accessibility, and quality. It intends to enhance the structure of online education, open and distance learning, and expand technological adoption in education, which will further lead to the development of the complete persona and mindset of students. NEP is an inclusive framework aimed at the elementary-level of education to higher education in the country. New circumstances and realities require initiatives. The recent pandemic has entailed the substitution of typical in-person modes of education with modes of quality education. The use of technology in education would alter traditional classroom teaching, which would facilitate moulding the education scenario as a whole. NEP intends to adopt the use and integration of technology to enhance various aspects of education. To facilitate effective ed-tech tools in all dimensions of teaching and learning, NEP is supposed to institute the National Education Technology Forum (NETF). This paper intends to provide a theoretical background on the NEP's vision of the adoption of technology in higher education in India.

Keywords: National Education Policy, Technology, Higher Education

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1. Introduction

India's accomplishments in terms of enhancing access to quality education, increasing elementary school enrolment, increasing the number of students in schools and reducing number of out-of-school children are phenomenal (Mukherjee, D. 2010; Samariya, A. K. 2020). However, as per the 75th round household survey by NSSO in 2017-18, 50% of the primary school-going children which constituted around 50 million children, did not achieve grade-appropriate learning levels, according to the National Achievement Survey, NCERT 2017. When it comes to higher education, India's Gross Enrolment Ratio (GER) is only 25.2% (Govinda, R., & Bandyopadhyay, M. 2008). India has the world's third largest higher education system in terms of students. The country has seen the establishment of a number of higher education institutions in recent years (Kumar, A. K., & Rustagi, P. 2010). However, only three Indian institutions could make it to the list of top 200 institutes of the prestigious Quacquarelli Symonds (QS) World University Rankings 2020 (Bajpai, N., & Goyal, S. 2004). This is because the education system in India has become obsolete and lacks employability and skill development owing to the low quality of education. In the view of wading through the above problems, it was crucial to reboot the education system of India (Hill, S., & Chalaux, T. 2011). For this purpose, when the whole world was going through the pandemic era, India launched its new National Education Policy in July 2020. NEP is an inclusive framework aimed at the elementary-level of education to higher education in the country. It emphasises five elements for education enhancement: affordability, equity, accountability, accessibility, and quality. NEP 2020 recommends the collaboration of technology with education in order to enhance the quality of education (Govinda, R. 2020). This paper intends to provide a theoretical background on the NEP's vision of the adoption of technology in higher education in India.

2. National Education Policy

Educational policy stresses the cultivation of personal artistic talent. A person's emotional, social, and ethical capacities and attitude and their cognitive skills are moulded by education. India's national education policy, launched on 29th July 2020, is the third NEP since India's independence (Kumar, A. 2021). NEP 2020 is based on five foundation pillars: affordability, equity, accountability, accessibility, and quality. The NEP envisions an education system that can espouse the evolution of India having a society with equitable and vibrant knowledge by giving it high-quality education. It aims to transform India into a worldwide powerhouse of wisdom by making education (both school and college) more versatile, detailed, and holistic, aiming to emphasise the exclusive abilities of each student (Kalyani, P. 2020). This policy is in alignment with the 2030 Agenda for sustainable development that has global education development as one of its goals that seeks to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" by 2030 (Saxena, A. 2021). Such a soar

goal would have required the reconstruction of the entire education system to aid and promote learning. The NEP accentuates digital literacy, problem-solving, multidisciplinary, logical-reasoning, written communication, and vocational exposure in the document. The policy foresees that a profound sentiment of regard towards the fundamental duties and patriotic values must be evolved among the students by the institutions (Venkateshwarlu, B. 2021). The vision of the policy is to develop knowledge, skills, values, dispositions and a sense of pride in being an Indian to aid responsible commitment towards human rights, sustainable development and global well-being (Smitha, S. 2020).

3. Salient functions of NEP 2020

- Ensuring maximum enrolment of children at the school level: Ensuring maximum enrolment of children and their attendance at school must be the primary objective of the schooling system. Recently, it was noticed that many students are dropping out of school, and the most effective way of keeping these students enrolled at school is to provide efficient and sufficient infrastructure to ensure access to safe and engaging school education to all the students from pre-primary to Class 12. Schools must provide quality and equitable education by providing efficient counsellors and teachers (Mehta, A. C. 1994).
- Early childhood care and education with a new curricular and pedagogical structure: development of a child's cumulative brain up to 85% occurs before the age of six. This leads to the need for proper nurturing and activation of the brain in the initial years of learning, ensuring the growth of sound and a healthy brain. ECCE includes learning through creative and flexible play-based and activity-based methods. It also comprises developing social, ethical, and overall personality traits of the students. The MHRD will be in charge of the ECCE curriculum and pedagogy to ensure a keen observation of the foundational aspects of education. (Filmer, D. 2007; Handa, S. 2002).
- Attaining foundation literacy and numeracy: Foundational literacy and numeracy refer to the fundamental capacity of being able to read and understand texts and numbers and solve analogical problems. This is a crucial foundation and a vital requirement for lifelong learning. That is why it will be the priority of the government to achieve universal foundational literacy and numeracy by 2025. To serve this purpose, a National Mission on Foundational Literacy and Numeracy will be instituted by the Ministry of Human Resource Development (MHRD). (Laxman, R. 2024; Evans, D. K., & Hares, S. 2021; Duckworth, K., & Schoon, I. 2010).
- Amendments in school curricula and pedagogy: A 5+3+3+4 design is formulated to direct the framework for school education curricula. The structure can be understood with the help of the following table:

Table 1:5+3+3+4 design to direct the framework for school education curricula

| STAGE | CLASS | CURRICULUM |
|------------------------------|---|---|
| Foundational stage (5 years) | 3 years- pre-primary 2 years- grade 1-2 | Flexible, multilevel, play/activity-based learning |
| Preparatory stage (3 years) | Grades- 3-5 | Play, discovery, activity-based, light text books, aspects of more formal but interactive classes |
| Middle stage (3 years) | Grades- 6-8 | Pedagogical and curricular style of foundational stage and introducing subjects for more abstract and unknown knowledge |
| Secondary stage (4 years) | 2 years- grades 9-10 2 years- grades 11-12 | Multidisciplinary study, pedagogical and curricular style of middle stage but with greater depth, critical thinking, greater flexibility and students' choice of subjects |

- Multilingualism language and the power of language:** It has been observed that children grasp concepts more efficiently and quickly when they are taught the same in their mother tongue. The interactions in the classroom will be done in the mother tongue or local language of the students. The textbooks will be made available in multiple languages, including local languages. Teachers are encouraged to use a bilingual approach. The government will adopt a three-language system which will depend on the personal choice of languages of the state, and no particular language will be imposed on any state or region. Sanskrit, along with foreign languages, will also be included in the curriculum. All languages will be taught using creative, fun, experiential, and innovative methods. Indian Sign Language will be standardised across countries for students with hearing impairment (Marian, V. 2023; García, O. 2014; Grutman, R. 2019).

Equitable and inclusive education: this policy aims of bridging the social category gaps in accessing, participating and learning outcomes in school education (Shaeffer, S. 2019; Stenman, S., & Pettersson, F. 2020). Despite all the achievements in bridging gender and societal gaps at all levels of education of the Indian Education System and progressive government policies, there are still some disparities, specifically for Socio-Economically Disadvantaged Groups (SEDGs) which can broadly be categorised as:

- gender groups (particularly female and transgender individuals),
- socio-cultural groups (such as Scheduled Castes, Scheduled Tribes, OBCs, and minorities),
- geographical groups (such as students from villages, small towns, and aspirational districts),
- disabled individuals (physical and intellectual)

Teachers–Their recruitment and deployment: Teachers occupy the most respectful position in Indian society because of their excellent knowledge and skills. However, the quality and motivation of teachers were not up to the mark. The system required a better quality of

teacher’s education, training, recruitment, deployment, work-life conditions, and empowerment. To ensure the recruitment of best quality teachers, scholarships will be provided to complete the four-year B. Ed program efficiently. To ensure the best test material, both in terms of content and pedagogy, Teacher Eligibility Tests (TETs) will be fortified. An adequate number of teachers for all subjects in schools will be ensured. Teachers’ education and training programs will be aligned with the required skills.

Standard-setting and accreditation of school education: The government must aim for complete transparency and disclosure of all finances, procedures, and educational outcomes in order to ascertain the excellence and integrity of the educational system. This is ensured by NEP, which will help in the acculturation of such structures that will aid educational institutions, teachers, and employees with sufficient aid as well as avail high quality and standard education to students of all sections of society.

4. Functions of NEP in Higher Education

A 50% increment in GER by 2035: NEP 2020 aims to augment the Gross Enrolment Ratio in higher education from 26.3% in 2018 to 50% by 2035. Higher education institutions will be aided by 3.5 Crore new seats.

Holistic and Multidisciplinary Education: Holistic and multidisciplinary education is required to lead Indian education to the 21st century and the fourth industrial revolution. It sights to evolve the intellectual, aesthetic, social, physical, emotional, and moral abilities of individuals in a consolidated manner. Such education would help to evolve students who inherit the 21st century capabilities of creativity, innovation, critical thinking, high-order thinking, problem solving, communication, and in-depth learning in the fields of arts, humanities, languages, sciences, and social sciences. India has a rich heritage of holistic and multidisciplinary education from the historical universities of Nalanda and Takshashila, which comprised learning by combining art with subjects. NEP aims to establish Departments in all fields to stimulate multidisciplinary education in India (Shukla, B., Joshi, M., Sujatha, R., Beena, T., & Kumar, H. 2022; Roy, M. A. N. O. J. I. T. 2022).

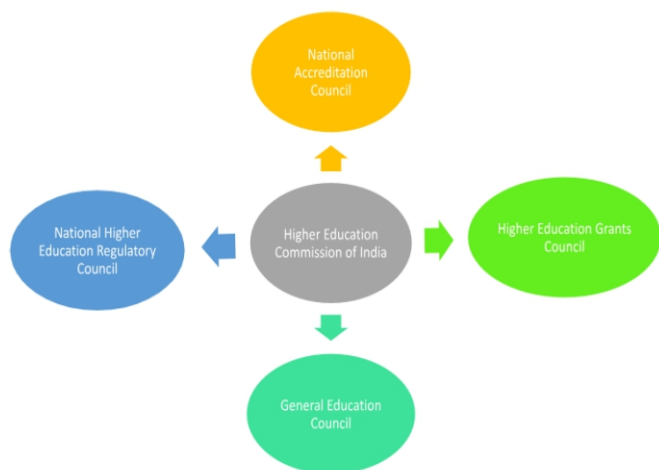
The Structure and lengths of the degree programs under NEP Under Graduate Programs

| Duration of Degree | Structure |
|--------------------|---|
| 3-Year program | <ul style="list-style-type: none"> After completing 1 year in a field: a certificate after completing 2 years in a field: a diploma after completing 3 years: a degree |
| 4-year program | Enables to explore whole range of holistic & multidisciplinary education along with the chosen subjects |

Post Graduate Program

| Duration of degree | Structure |
|----------------------------|---|
| 2-year program | For 3-year bachelor’s program degree holders, the 2 nd year will be wholly dedicated to research |
| 4 years bachelor’s program | One year Master’s program for the 4-year Bachelor’s program degree holders |
| Integrated 5-year program | Merge both bachelor’s and master’s program |

- **Regulation:** The regulatory system of education is quite monotonous and disempowering which leads to limited individuals exercising immense power and lacking accountability for their actions. To tackle these issues, various functions will be carried out by different, independent, and empowered bodies under the new regulatory system of higher education in NEP. These four functions will be performed by four different constructions under a common head, that is, the Higher Education Commission of India (HECI).



- **Motivated, energised, and capable faculty:** the existence of magnificent and passionate faculty that foster excellence, creativity, and innovation is the need of the hour. For this purpose, it is crucial that the faculty be elated, passionate, involved, and ambitious to enhance their students, institutions, and professions. To achieve this, the NEP recommends the following initiatives:
 - a) Higher education institutions will provide a better work-life environment by providing amenities such as drinkable water, sanitation facilities, stationery, libraries, labs, and comfortable classroom spaces and campuses.
 - b) To reduce the burden on teachers, there will not be excessive teaching duties, and student-teacher ratios will be kept low. This will make teaching pleasant, and the teachers can invest sufficient time in the students which can enhance communication between them.
 - c) Institutions will be independent in terms of designing their own curricular and pedagogical approaches within the approved framework.
 - d) Incentives will be provided for outstanding performance in the form of rewards, promotions, recognition, and movement into institutional leadership.
- **Financial support for students:** Various measures to provide financial support to students will be adopted under the NEP. Incentives will be provided for the wellness of students belonging to underprivileged socio-cultural and socio-economic groups.
- **Setting high standards of scholarly research in all fields with the help of a new National Research Foundation:** To grow and sustain a giant and developing economy, elevating society, and an excellent country, research and knowledge creation is required. In addition to outstanding science and technology, it is crucial to have

the socio-cultural and environmental dimensions of the country to find solutions to various societal obstacles. Any country's identity, enrichment, spiritual/intellectual satisfaction, and creativity lie in the research and development of its history, art, language, and culture. NEP envisages enhancing the quality and quantity of research in India. To this end, the policy envisions a focus on scientific methods and critical thinking in learning, career counselling in schooling, promoting research in universities (including research and internships in the undergraduate curriculum), and the governance and regulatory system to promote research innovation. A National Research Foundation (NRF) will be established for the purpose of research growth and development.

- **Promotion of Indian languages, Arts and Culture:** It crucial to conserve and elevate the cultural wealth of India for the sake of the nation's identity and economy. Billions of people enjoy India's treasure trove of culture by visiting India for tourism, experiencing hospitality, admiring and shopping for Indian handicrafts, participating in Indian festivals, yoga and meditation, etc. It is essential for the promotion of students' capabilities to have cultural awareness and expression. Language is an inseparable part of culture. Language influences the way people from a particular culture communicate with others. It affects the tone, discernment of experience, and familiarity that is innate in communication among speakers of a common culture. Therefore, it is important for culture to preserve and promote its language. However, Indian languages have been neglected over a period of time, with 220 languages extinct, 197 endangered, and many severely endangered. For the purpose of preserving our treasure of languages, several steps will be taken by the policy, that is, hiring skilled language teachers both at school and college level, NRF will be funding for quality research in these areas, use of mother tongue in HEIs, and an Indian Institute of Translation and Interpretation (IITI) will be established to expand India's translation and interpretation to make high-quality study material.

Use of technology and its integration: This will be discussed in detail in the next section.

5. Use of Technology in Higher Education

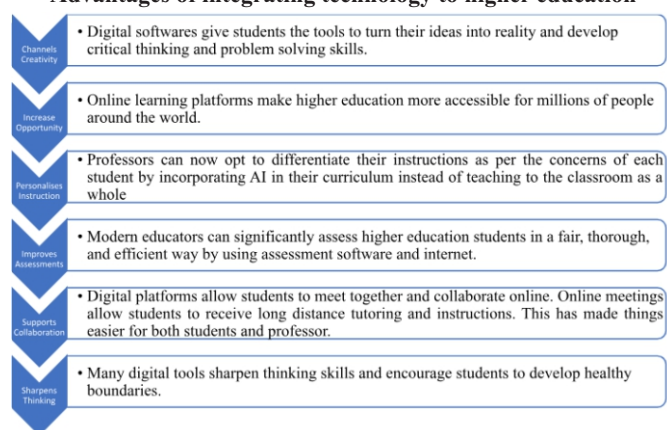
Technology has the ability to revolutionise traditional learning and teaching processes. It eliminates the factors of space and time that hedge the education process which means it is required for the students to be in a particular place at a particular time to learn from the teacher. Computers and telecommunications have played a vital role in reforming higher education. Upgradation in technologies has led to alterations in the regular operations of colleges and institutions, and they are expanding their missions for the same. There has not been a single aspect of higher education that was not affected by the technological developments of the 1980s and the 1990s.

Traditionally, information was conveyed through lectures in classrooms

by professors and is discussed later. However, in the era of technology, this teaching method has become antiquated and inefficient. According to Gregory Farrington, the Web can be used to deliver a variety of information to students. This can prove to be more efficient and cost-effective. The use of technology in education can lead to a more informal environment and flexible discussions serving students' interests and queries. The application of technology would lead to active learning which enhances the learning quality of students. Technology can make teaching and learning more interactive and inspired. Technology can also make things easier for different collaborative learning groups and students who do not reside in the same geographic area and thus cannot meet in person. Technology is capable of rendering large quantities of information to the masses. This quality of technology facilitates individualisation of educational programs according to the concerns of the learner. Matthews suggests that with the technology mode of education, traditional lectures and rigid curricula have become obsolete because of their ability to personalise education according to learning interests and needs.

With the passing of the twenty-first century, there is more integration of technology in higher education. This revamped the role of professors. Professors nowadays use technology to deliver lectures, conduct research, and communicate with their students in a distant land. Professors in technology-mediated education have become more of a motivator for students to build an environment that instigates learning. They have turned into consultants and coaches. Students have to take more responsibility for their learning rather than passively absorbing information from a professor. The duties of the twenty-first century professor include the effective utilisation of instructional technology.

Advantages of integrating technology to higher education



6. New insights of the NEP 2020 for the use of technology in Higher Education

India is transforming into a digitally capable country and knowledgeable economy with the help of the Digital India Campaign. This can be achieved by collaborating education with technology. Technology improves the quality of education. In addition, technology can impact the ways students learn in classrooms with the help of new technologies. Therefore, extensive research in this area is required. To provide a platform for the free flow of ideas regarding the use of

technologies in education, NEP 2020 has envisioned an autonomous body, the National Education Technology Forum (NETF). NETF will build institutional and intellectual capabilities in technology-driven education, envisage strategic thrust in the area, forward new directions for research and innovation in the field, and provide evident-based advice to the government.

NEP recommends the following key initiatives to amalgamate technology with education at all levels (school and higher education):

Online teaching platform: The available e-learning platforms in India, such as SWAYAM and DIKSHA, will be updated to assess teachers' monitoring of student performance by providing them with an organised, appealing, and efficient set of assistive tools. Online education has gained immense popularity in recent years, and is likely to continue in the upcoming years.

Virtual labs: To help students have equal access to quality practical and hands-on experiment-based learning experiences, existing e-learning platforms such as SWAYAM, DIKSHA, and SWAYAMPURABHA will be authorised for creating virtual labs.

Pilot studies for online education: agencies, such as the NETF, CIET, NIOS, IGNOU, IITs, NITs, etc. will be regulated to conduct a series of pilot studies, in order to evaluate the advantages of collaborating education with online education while considering the downsides and also to study related areas, such as student device addiction, most preferred formats of e-content, etc. The results of these studies will be used for further improvements.

Content creation and digital depositories: NEP encourages the development of a digital depository of content which includes the creation of coursework, Learning Games & Simulations, Augmented Reality and Virtual Reality, with proper systems to receive feedback for efficiency and quality. For fun-based learning, student-appropriate tools like apps, gamification of Indian art and culture, in multiple languages, with clear operating instructions, will also be created. A reliable backup mechanism for disseminating e-content to students is provided.

Online assessment and examinations: assessment frameworks will be implemented by authorised bodies such as the proposed National Assessment Centre or PARAKH, School Boards, NTA, and other identified bodies. Research will be undertaken to find new ways to assess students using modern technologies.

Digital Infrastructure: The government has established DIKSHA which is Digital Infrastructure for Knowledge Sharing. It includes courses for teachers, quizzes, and e-content which will be aligned with the curriculum.

Adapting to artificial intelligence: The use of artificial intelligence has arisen many problems which will be kept in pace by the policy. NETF will recognise the emerging technologies and keep track of their development, potential, and disruption, and will present this report to the Education Ministry. The policy recommends creating awareness regarding the disruptive behaviour of various technologies, as well as concerns about data handling and security.

Blended models of learning: Technology learning and online

education should not replace traditional face-to-face learning. They should work complementary to each other, not as substitutes.

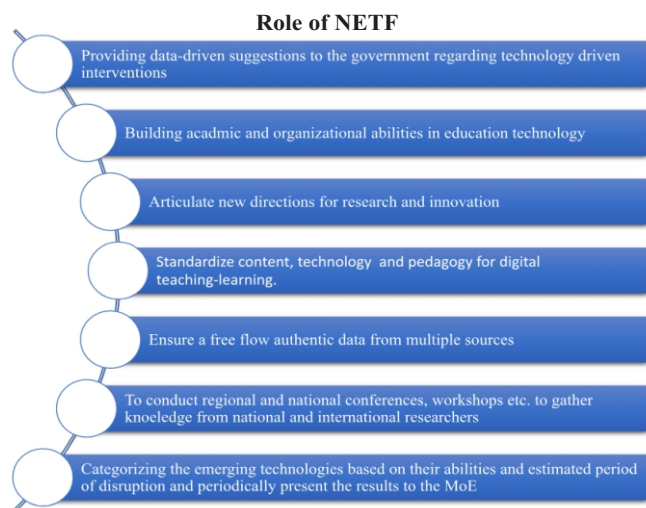
Addressing the digital divide: The vast population of India has limited access to digital platforms, which can make technological education difficult for them. That is why the government started educational programs which will be telecasted 24/7 on available media, such as television, radio, and community radio. These programs will be made keeping in mind all Indian languages.

Setting standards: The policy would set standards for the technology, content, and curriculum for digital learning in States, Boards, schools and school complexes, HEIs, etc.

Training and incentives for teachers: Teachers will need to reboot their ways of teaching as education shifts from traditional to technologically advanced methods. They would require training to integrate various technologies with education. Better working conditions and an increase in perks and perquisites will also encourage them to work harder as their roles have increased and credit will be taken by the technologies. That is why they have to get better with their roles.

7. National Education Technology Forum

The National Education Technology Forum (NETF) is an autonomous body that is envisioned under the National Education Policy 2020 to have feedback and views about the idea of integrating technology with education. NETF will aid in choosing a course of action in terms of the initiation and implementation of technology in education by providing the required knowledge and research to the leadership of education institutions, State and Central Governments and other Stakeholders.



8. Conclusion

The paper concluded that the recent pandemic outbreak has made us realise the importance of innovative non-traditional academic pathways when archaic in-person learning was not possible. In the period when the students could not make it to their schools and colleges, technology helped to cope with the studies and the curriculum. While realising the importance of technology in education, NEP 2020 has enlisted various initiatives for the integration of technology with

education at the higher education level. It is evident from the interventions that education in the upcoming era is going to be completely different from the archaic education we had for a very long time. Digital technologies and the Internet are going to replace traditional classrooms. To manage the difficulties of space and time, online meetings and conferences will be conducted. Web and digital technologies will create a pool of valuable content for students, which will provide them with more exposure and better understanding. This policy envisions the promotion of research and innovation in technology-based education, which will further broaden the concept. The role of professors is going to be of utmost importance as they have to be trained for the upcoming technology-driven teaching and create awareness among the students for the adverse effects of artificial intelligence and disruptive technologies. The use of technology in education is going to create various challenges for both the institution and professors. On the one hand, technology can make studies more consuming, and it can be addictive as well. Professors need to ensure that students make the right use of technology to make them well rounded for adulthood. It will become difficult for professors to communicate with students in this type of education as technology excises social interaction; they have to be cautious as they are not making bots. The policy envisages the establishment of an autonomous body, the National Education Technology Forum (NETF), that will aid in choosing a course of action in terms of initiation and implementation of technology in education by providing the required knowledge and research to the leadership of education institutions, State and Central Governments and other Stakeholders.

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