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Original Article

English In Higher Education: Its Role, Challenges, And Future Prospects

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Abstract:

English has become the dominant language of higher education worldwide, serving as a medium for teaching, research, and international communication. Universities increasingly adopt English-medium instruction (EMI) to attract international students, improve global rankings, and enhance graduates' employability. However, the widespread use of English also presents challenges, including language barriers, inequalities among students, and concerns about preserving local languages and cultures. This paper examines the significance of English in higher education, explores its advantages and disadvantages, and discusses strategies for improving English language education while promoting multilingualism.

Keywords: English language, higher education, English-medium instruction, globalization, multilingualism, academic communication.

Introduction

The English language has evolved into the primary medium of international communication, scientific research, business, and technology. As globalization continues to connect educational institutions across national boundaries, English has become increasingly important in higher education. Universities worldwide now offer degree programs in English to attract international students and facilitate academic collaboration. The growing importance of English has transformed teaching methods, curriculum development, and research dissemination. However, despite its benefits, the dominance of English raises concerns regarding educational equity, linguistic diversity, and students' academic performance. This paper explores the role of English in higher education, highlighting its benefits, challenges, and future implications.

Literature Review: Numerous scholars have examined the influence of English in higher education.

Crystal (2003) argues that English has become a global language due to historical, economic, and technological developments. Similarly, Graddol (2006) predicts that English will continue to dominate international education despite increasing multilingualism. Dearden, (2015) reports that English-Medium Instruction (EMI) has expanded rapidly across universities in Europe, Asia, Africa and Latin America. EMI enables institutions to participate in global academic networks but often creates learning difficulties for students with limited English proficiency. Knight (2013) emphasizes that internationalization has made English essential for research collaboration, student mobility, and academic publishing. However, Phillipson (1992) warns against "linguistic imperialism," arguing that the global dominance of English may marginalize indigenous languages and cultures. Recent research suggests that universities should balance English language instruction with multilingual education to promote both global competitiveness and cultural diversity.

Importance of English in Higher Education

Global Communication

English serves as the common language among scholars, researchers, and students from different countries. International conferences, research collaborations, and academic exchanges rely heavily on English.

Access to Knowledge

Most scientific journals, textbooks, and research databases publish content primarily in English. Students with strong English skills gain better access to current research and educational resources.

Career Opportunities

Employers increasingly seek graduates with advanced English communication skills. Proficiency in English enhances employment opportunities in multinational corporations, international organizations, and global industries.

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Academic Mobility

Programs such as Erasmus+, Fulbright, and other international exchange initiatives often require English proficiency.

Students can pursue higher education abroad more easily when they possess strong English language skills.

English-Medium Instruction (EMI)

English-Medium Instruction refers to teaching academic subjects in English in countries where English is not the primary language.

Benefits

- Improves students' English proficiency
- Increases universities' international reputation
- Attracts international students
- Enhances research collaboration
- Supports graduate employability

Challenges

- Students may struggle to understand complex concepts.
- Faculty members may have limited English proficiency.
- Learning outcomes may decline if language skills are insufficient.
- Native languages may receive less institutional support.

Universities therefore need effective language support programs to maximize

Challenges of English in Higher Education

Language Barriers

Students who are not fluent in English often experience difficulties in reading academic texts, writing research papers, and participating in classroom discussions.

Educational Inequality

Students from urban or privileged educational backgrounds generally possess stronger English skills than those from rural or disadvantaged communities, creating unequal learning opportunities.

Academic Writing Difficulties

Academic English requires specialized vocabulary, critical thinking, and formal writing conventions. Many students require additional support to develop these competencies.

Cultural Concerns

The increasing dominance of English may reduce the use of local languages in higher education, potentially affecting cultural identity and linguistic diversity.

Strategies for Improving English Education

Universities can adopt several approaches to strengthen English learning while supporting inclusive education:

- Provide intensive English language preparation before degree programs.
- Offer academic writing centers and language support services.
- Train faculty in effective English-medium teaching methods.
- Encourage bilingual or multilingual instruction where appropriate.
- Use digital learning platforms for language development.
- Promote collaborative learning through group discussions and presentations.
- Integrate English for Specific Purposes (ESP) courses tailored to different disciplines.

Future Prospects

The role of English in higher education is expected to continue expanding due to globalization, technological advancement, and international research collaboration. Artificial intelligence, online education platforms, and virtual

exchange programs are increasing the demand for English communication skills. At the same time, educational institutions are recognizing the importance of multilingualism. Future higher education systems are likely to emphasize both English proficiency and the preservation of local languages, enabling students to participate in global academic communities while maintaining their linguistic and cultural identities.

Conclusion

English has become an indispensable component of higher education worldwide. It facilitates international communication, expands access to academic knowledge, supports research collaboration, and improves employment opportunities. Nevertheless, the widespread adoption of English also creates challenges related to language proficiency, educational inequality, and cultural preservation. Universities should implement comprehensive language support systems, promote inclusive teaching practices, and encourage multilingual education to ensure that students benefit from English without compromising linguistic diversity. A balanced approach can help institutions prepare graduates for success in an increasingly interconnected world.

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Original Article

Role of Artificial Intelligence in E-Commerce: Transforming Customer Experience and Business Performance

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Abstract:

The use of Artificial Intelligence (AI) is one of the most significant sources of innovations in the e-commerce industry as far as it improves customer experience, simplifies business processes, and facilitates decision-making. AI technologies like machine learning, natural language processing, recommendation systems, chatbots, predictive analytics, and computer vision allow e-commerce firms to provide personalized services, manage inventory more effectively, identify fraudulent activities, and increase customer satisfaction. This paper examines the impact of AI on the development of e-commerce, analyzing AI uses in this area, its benefits and disadvantages, and its future perspectives. The research will be carried out on the basis of secondary data gathered from scientific articles, industry reports, books, and reliable online resources.

Keywords: Artificial Intelligence, E-Commerce, Customer Experience, Machine Learning, Chatbots, Personalization, Predictive Analytics

Introduction :

The development of ICT has brought about a significant change in the business environment around the world. There are several innovative aspects of ICT but one of the most notable aspects is e-commerce which refers to the practice of doing commercial activities using websites, mobile applications, and other digital platforms. There has been a rise in high-speed internet connectivity, smartphone usage, digital payments, cloud computing, and social media use which has led to the rise of e-commerce around the world. Customers are increasingly demanding convenience, speed, security, and personalization which forces businesses to continuously innovate and use more advanced technology to stay ahead of the competition. Artificial Intelligence (AI) is one of the major innovative technologies responsible for the transformation of the e-commerce sector. AI can be described as the capability of computer systems to perform tasks which otherwise would be performed by humans such as learning from data, identifying patterns, understanding language, solving problems, decision making, and forecasting. AI is achieved through the integration of technologies such as ML, NLP, Computer Vision, Deep Learning, Robotics, and Predictive Analytics among others. Integration of AI into e-commerce has transformed business customer interactions. Online retailing platforms used simple display methods and had rudimentary search mechanisms before. Modern AI-based systems analyze customers' preferences, browsing history, purchasing behavior, demographics, and interactions in real time in order to offer relevant product recommendations and personalized advertising messages. Such an approach helps businesses increase satisfaction and engagement of customers, improve conversion rates, and establish strong relationships with them. Customer experience improvement is one of the main AI achievements in e-commerce field. Customer preferences are taken into consideration for product recommendations by AI-based systems. Shopping assistance from virtual assistants and chatbots allows customers to get their questions answered instantly, find suitable products, place orders, and get support after their purchases. They also minimize the waiting time, improve the service quality, and build the trust to online shopping. AI is also important for increased efficiency of business processes within the e-commerce chain. Demand forecasting using predictive analytics is used by retailers to balance inventory and avoid both shortages and oversupply. Logistics is improved through optimization of delivery routes and warehouse management.

Review of literature :

Bawack¹, Wamba², Carillo³, and Akter⁴ (2022): In a thorough bibliometric analysis and systematic literature review, Bawack et al. (2022) summarized the existing body of knowledge on the role of Artificial Intelligence (AI) in e-commerce. Based on their research which included the analysis of 4,335 papers and systematic reviews of 229 scholarly articles from top-tier information systems journals, the following conclusions were made: recommendation systems, customer personalization, sentiment analysis, trust, and business optimization are the leading research topics in AI-based e-commerce studies.

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The paper concludes that AI greatly improves customer experience and organizational efficiency as well as highlights potential research directions in ethical AI and customer trust.

Orynkhanova (2025): As a part of a review of scientific literature published from 1990 to 2024, Orynkhanova (2025) examined AI usage in e-commerce. As the result of her study, machine learning, chatbots, recommendation systems, predictive analytics, and cybersecurity emerged as major topics of research in the area.

Habiboglu (2025): The study conducted by Habiboglu (2025), which analyzed 137 studies in the Journal of Retailing and Consumer Services, utilized the systematic literature review technique. The findings indicated that the utilization of artificial intelligence in e-retailing is becoming more concentrated on chatbots, customer purchasing behavior, and technology acceptance. It was concluded that AI enhances customer interaction and shopping convenience and helps retailers provide personalization services.

Nagy and Hajdu (2023): The research by Nagy and Hajdu (2023) explored consumer acceptance of AI in e-commerce using the Technology Acceptance Model (TAM). As per the answers of 439 respondents who were online shoppers, trust and perceived usefulness affect consumer's willingness to use AI-enabled e-commerce websites. The research revealed that AI improves customer satisfaction and loyalty if users find AI technologies reliable and useful.

Pallathadka¹, Ramirez-Asis², Loli-Poma³, Kaliyaperumal⁴, Ventayen⁵, and Naved⁶ (2023): In their research, Pallathadka et al. (2023) considered the uses of Artificial Intelligence in business management, finance, and e-commerce. They noted that AI has been applied to enhance customer relationship management, inventory management, marketing management, and business decision-making. According to the study, artificial intelligence is now seen as an indispensable strategic technology to increase the competitiveness of organizations.

Singh, Dash¹, Sahu², and Kumar³ (2024): Singh et al. (2024) have studied the influence of artificial intelligence on consumers' perception of online shopping assistants. The researchers found that trust acts as a mediator between AI-assisted shopping assistants and purchase intentions of consumers.

Vinhas da Silva¹, Dias², Gonçalves³, Cavalheiro⁴, Costa & Pereira⁵ (2022): According to Vinhas da Silva et al. (2022), artificial intelligence has an effect on online purchasing behavior. The research shows that AI-driven personalization, recommendation systems and predictive analytics have a great impact on satisfaction, purchase intention and customer loyalty. The researchers note that AI allows firms to provide personalized services and maintain strong relations with customers.

Song, Yang, Huang & Huang (2019): The article by Song et al. (2019) focused on the use of artificial intelligence in electronic commerce. The paper covers AI techniques such as intelligent recommendation system, customer service chatbot, and data mining. The researchers argue that AI increases operational efficiency, improves quality of customer services, and makes strategic decisions possible for e-commerce enterprises.

Poniszewska-Maranda¹, Pakula², and Borowska³ (2025): A systematic review was undertaken by Poniszewska-Maranda et al. (2025) to evaluate machine learning-based recommendation systems in the field of e-commerce. On reviewing 38 different studies, the authors came to the conclusion that collaborative filtering, content-based filtering, and hybrid recommendation systems greatly contribute to increased personalization, increased customer retention, and sales performance. The research stressed that

recommendation systems continue being one of the most important applications of AI in digital commerce.

Kshetri (2021): Kshetri (2021) explored the importance of artificial intelligence in digital commerce and business innovations. The study found that AI helps improve fraud detection, logistics, demand forecasting, supply chain management, and customer relationship management.

Objectives of the Research

1. To grasp the idea of Artificial Intelligence in E-commerce.
2. To study the various applications of AI in E-commerce.
3. To find out the advantages of AI for both customers and businesses.
4. To discuss the difficulties in implementing AI.
5. To provide recommendations for the future use of AI in E-commerce.

Methodology of Research:

The current research follows the descriptive research method and is purely conceptual in nature. The study will be entirely based on the secondary data gathered through research articles, books, industry reports, government documents, company reports, and credible websites. The data thus gathered have been analyzed in detail to comprehend the applications, advantages, limitations, and future potential of Artificial Intelligence in e-commerce.

AI Applications in E-commerce

- a) **Recommendation of Products:** AI recommends products to the customers by analyzing their browsing and purchasing pattern.
- b) **AI Chatbots and Virtual Assistant:** AI chatbots provide round-the-clock assistance to the customer and help them in answering queries.
- c) **Predictive Analysis:** AI helps in predicting customer demand and inventory needs of e-commerce business.
- d) **Fraud Detection:** Machine learning algorithms predict any unusual transactions which can cause fraud.
- e) **Dynamic Pricing:** Pricing changes as per demand and competition in the market.
- f) **Inventory Management:** AI helps in managing inventory level according to demand and supply.
- g) **Visual Search:** Customer searches for products through image rather than typing keywords in the search bar.
- h) **Voice Commerce:** Through voice assistants, customer can perform shopping activities.

AI Benefits for E-Commerce

1. Tailored shopping experience
2. Customer satisfaction increased
3. Prompt customer support
4. Greater sales and profits
5. Efficient inventory management
6. Low operating expenses
7. Superior fraud protection
8. Effective marketing
9. Accurate demand prediction
10. Business efficiency improved

Problems Associated with Using AI in E-commerce

- Expensive implementation
- Privacy and security issues
- Skilled personnel shortage
- Ethics of AI decision making
- Dependence on good data
- Bias of algorithms
- Resistance to change

Future Scope

The future holds great promise for AI within e-commerce with the development of:

- Generative AI



- Autonomous shopping assistants
- AI-driven logistics
- Hyper-personalization
- Smart warehouses
- Robotics
- Integration with Blockchain
- Augmented Reality (AR) and Virtual Reality (VR)
- Predictive customer analytics

Recommendations

- Build a strong AI infrastructure.
- Enhance the security of customers' data.
- Educate employees on the use of AI technologies.
- Formulate AI governance practices.
- Promote the use of AI by MSMEs through government intervention.

Conclusion

The field of Artificial Intelligence has brought about a transformation in the e-commerce industry by helping improve customer engagement, efficiency, and performance of the business. Businesses can be able to offer a personalized shopping experience for their customers, automate customer service, optimize supply chains, and improve security by use of AI technologies. Despite issues such as data privacy, cost of implementing the technologies and ethics associated with using AI being some of the challenges, it is clear that there will be many opportunities in the future as more advancements are made.

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Original Article

Low-Cost Agricultural Waste-Based Adsorbents for Water Quality Improvement: Integration with WQI And Multivariate Statistical Analysis

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Abstract:

Increasing water pollution by industrialization, urbanization, and agricultural activities have created an urgent need for sustainable and cost-effective water treatment technologies. Agricultural waste-derived adsorbents, including rice husk, coconut shell, sugarcane bagasse, banana peel, peanut shell, corn cob, and sawdust, have emerged as promising alternatives to conventional adsorbents because of their low cost, abundance, biodegradability, and high adsorption capacity. At the same time, the Water Quality Index (WQI) has become an effective tool for converting complex water quality data into a single value, while the Langelier Saturation Index (LSI) and Ryznar Stability Index (RSI) are widely used to evaluate the scaling and corrosion characteristics of water. Principal Component Analysis (PCA) supports water quality assessment by identifying dominant pollutants and potential pollution sources from multivariate datasets. This short review highlights recent advances in agricultural waste-based adsorption, WQI, LSI, RSI, and PCA, and emphasizes their integration into a unified framework for sustainable water quality management. The review identifies existing research gaps, including limited field-scale validation, lack of standardized adsorbent preparation method, and insufficient integration of water quality assessment with treatment technologies. Future research should focus on developing intelligent, low-cost, and field-applicable water treatment systems supported by statistical and decision-making tools.

Keywords: Agricultural waste adsorbents; Water Quality Index (WQI); Principal Component Analysis (PCA); Langelier Saturation Index (LSI); Ryznar Stability Index (RSI); Sustainable water treatment

Introduction:

Water pollution caused by rapid urbanization, industrialization, and agricultural activities has become one of the most important environmental concerns worldwide (Uddin et al. 2022). The deterioration of surface and groundwater quality severely affects human health, aquatic ecosystems, and sustainable water resource management (Tyagi et al. (2013). Conventional water treatment technologies are often expensive and difficult to implement in rural and developing regions (Bhatnagar et al. 2015). Consequently, low-cost and environmentally friendly treatment alternatives have gained increasing attention. Agricultural residue such as Moringa seed, rice husk, coconut shell, sugarcane bagasse, banana peel, peanut shell, corn cob, and sawdust have emerged as promising adsorbent materials due to their abundance, biodegradability, and adsorption efficiency and pollutant removal capacity (Bhatnagar et al. 2015).v Simultaneously, Water Quality Index (WQI) has become important tools for converting complex water quality datasets into a single numerical value for easy interpretation ((Uddin et al. 2022). Corrosion and scaling indices such as the Langelier Saturation Index (LSI) and Ryznar Stability Index (RSI) are also widely used to assess water stability and scaling/corrosion tendency. (Langelier (1936, Ryznar 1944). Recently, multivariate statistical techniques, particularly Principal Component Analysis (PCA), have been increasingly utilised for determining major pollution sources and identifying significant variables affecting water quality (Shrestha & Kazama 2007). However, limited studies have integrated agricultural waste-based treatment systems with WQI assessment and PCA-based pollutant identification. Therefore, this review discusses the combined application of WQI, LSI, RSI, PCA, and agricultural waste adsorbents for sustainable water quality management.

Water Quality Index:

The Water Quality Index is a mathematical tool that combines multiple water quality parameters into a single value representing overall water quality status (Tyagi et al. 2013). Commonly used indices include the Weighted Arithmetic WQI, NSF-WQI, Canadian Council of Ministers of the Environment WQI (CCME-WQI), and Fuzzy WQI. Numerous studies have reported the successful application of WQI for river, lake, reservoir, and groundwater assessment (Uddin et al. 2022). WQI simplifies complex datasets and facilitates communication with policymakers and the public.

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LSI and RSI Indices:

LSI and RSI are widely used indices for evaluating the scaling and corrosion tendencies of water.

Langelier Saturation Index (LSI)

LSI indicates the tendency of water to precipitate or dissolve calcium carbonate (Wilfred F. Langelier 1936).

- $LSI > 0$: Scaling tendency.
- $LSI = 0$: Equilibrium condition.
- $LSI < 0$: Corrosive tendency.

Ryznar Stability Index (RSI)

RSI provides assessment of scaling and corrosion behaviour (John W. Ryznar 1944)

- $RSI < 6$: Scale-forming water.
- $RSI 6-7$: Stable water.
- $RSI > 7$: Corrosive water.

The combined application of WQI, LSI, and RSI provides a broader assessment of water quality by integrating overall water suitability with stability characteristics for domestic and industrial purposes.

PCA in Water Quality Studies:

Principal Component Analysis (PCA) is a multivariate statistical technique used to reduce data dimensionality and identify dominant factors affecting water quality (Ian T. Jolliffe 2002).

Applications of PCA include (Helena et al. 2000)

- Identification of pollution sources.
- Determination of critical water quality parameters.
- Reduction of monitoring costs.
- Classification of sampling locations.

Previous Studies have demonstrated that PCA effectively tool distinguishes for differentiating natural influences from anthropogenic sources. Parameters such as TDS, turbidity, nitrate, phosphate, COD, BOD, and heavy metals are frequently identified as dominant contributors to water quality deterioration.

Agricultural Waste Adsorbents:

Agricultural waste-derived materials have gained considerable attention as sustainable and low-cost adsorbents for water treatment (Bhatnagar et al. 2015). Common agricultural wastes such as moringa seed, rice husk, coconut shell, sugarcane bagasse, banana peel, peanut shell, corn cob, orange peel, and sawdust contain cellulose, hemicellulose, lignin, and oxygen-containing functional groups that contribute to their adsorption capacity (Foo & Hameed 2012). These materials have been successfully used to remove heavy metals, dyes, nutrients, and other organic pollutants from contaminated water through mechanisms including ion exchange, surface adsorption, electrostatic attraction, and complexation. Compared with conventional adsorbents, agricultural waste-based materials are inexpensive, biodegradable, renewable, and widely available, making them particularly suitable for developing countries and rural communities. However, their adsorption performance depends on factors such as raw material composition, particle size, surface modification, and operating conditions. Although numerous laboratory studies have demonstrated promising removal efficiencies, further research is required to standardize adsorbent preparation methods, evaluate regeneration and reuse, and validate their effectiveness under field-scale conditions. Recent research has increasingly focused on converting agricultural by-products into value-added adsorbent materials for sustainable water treatment applications.

Integrated Framework (WQI, PCA, Agricultural Waste)

An integrated framework combining Water Quality Index (WQI), Langelier Saturation Index (LSI),

Ryznar Stability Index (RSI), Principal Component Analysis (PCA), and agricultural waste-based adsorbents provides a comprehensive framework for water quality assessment and sustainable remediation. Initially, water samples are collected and analyzed for physicochemical and biological parameters. WQI is calculated to determine the overall water quality status, while LSI and RSI assess the scaling potential and corrosive tendency of water. PCA is then applied to identify the dominant pollutants and their possible sources, allowing the selection of the most appropriate agricultural waste adsorbent according to the identified target pollutants. After the treatment process, water quality parameters are analysed again, and WQI, LSI, and RSI values are recalculated to quantify treatment performance and evaluate changes in water quality. This integrated approach supports informed decision-making by combining pollution assessment, statistical analysis, and sustainable treatment technologies. It also provides a practical framework for cost-effective and environmentally friendly water resource management.

Flow Diagram:

Water Sample collection
Physicochemical and Biological Water Quality Analysis
↓ Calculation of WQI, LSI, RSI for water quality assessment
↓ PCA (Identify Major Pollutants & Sources)
↓ Selection of Suitable Agricultural Waste Adsorbent
↓ Adsorption-Based Water Treatment
post-Treatment Water Quality Analysis
↓ Recalculation of WQI, LSI & RSI after treatment
Assessment of Treatment Efficiency and Sustainability

Research Gaps and Future Scope:

- Few studies simultaneously integrate WQI, LSI, RSI, PCA and agricultural waste adsorbents within a single assessment framework.
- Most investigations remain laboratory-scale with limited validation under real river conditions.
- Regeneration efficiency and lifecycle assessment of agricultural waste adsorbents are rarely reported.
- IoT-enabled real-time monitoring combined with adsorption-based treatment has received limited attention.

Conclusions:

Agricultural waste-based adsorbents offer a sustainable and economical solution for water quality improvement. WQI provides an effective tool for evaluating overall water quality, while LSI and RSI assess scaling and corrosion characteristics. PCA assists in identifying major pollution sources and critical parameters. The integration of WQI, PCA, and agricultural waste adsorbents represents a promising framework for sustainable water quality management. Further research should emphasize field-scale implementation, long-term performance evaluation, and development of standardized methodologies to support practical environmental engineering applications.

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significantly contributed to understanding sustainable water treatment technologies, Water Quality Index (WQI), multivariate statistical analysis, and agricultural waste-based adsorbents. Special appreciation is extended to the library staff for providing access to academic journals, books, and online databases that facilitated an extensive review of the literature. Finally, the authors express heartfelt gratitude to their family members and well-wishers for their constant support, patience, and encouragement. Above all, the authors thank the Almighty for His blessings, guidance, and strength in successfully completing this research work.

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Original Article

Beyond The Linear Model: Reimagining Business Through Circular Economy Principles

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Abstract

Businesses have been prompted to reconsider conventional linear economic systems and embrace circular economy ideas due to growing environmental issues, resource constraints, and sustainability concerns. By converting the traditional "take-make-dispose" strategy into a regenerative business model, the circular economy encourages resource efficiency, waste reduction, product lifespan extension, and sustainable value generation. This study explores the importance of green innovation capabilities in attaining sustainable business transformation and looks at how circular economy practices affect sustainable business performance. The research creates an integrated framework that links green innovation capacity, circular economy approach, and sustainable business performance. Primary data is gathered from business experts and organisational stakeholders using a quantitative research technique. Partial Least Squares Structural Equation Modelling (PLS-SEM), regression analysis, and reliability testing are used to examine the suggested correlations. According to the report, circular economy methods greatly contribute to sustainable company outcomes and improve innovative capacities. For businesses looking to gain a competitive edge through sustainability-driven change, the results offer insightful information.

Keywords: Circular Economy, Sustainable Business Performance, Green Innovation Capability, Circular Business Model, Sustainable Transformation

Introduction

Due to increased stakeholder expectations for sustainable practices, resource shortages, climate change difficulties, and environmental concerns, the modern corporate environment is undergoing fast development. Businesses have historically used a linear economic model that is predicated on the extraction, production, consumption, and disposal of resources. Although this strategy has aided in industrial development and economic prosperity, it has also led to excessive resource depletion, environmental deterioration, and an increase in waste production. Alternative strategies that combine environmental responsibility with economic development are now necessary due to the limits of the linear model. By encouraging resource conservation, waste reduction, reuse, recycling, remanufacturing, and sustainable product management, the circular economy has become a strategic strategy that challenges traditional corporate methods. Circular economy concepts, in contrast to the linear model, concentrate on minimising environmental effect while preserving the value of goods, materials, and resources for long periods of time. Circularity offers firms chances to boost innovation, cut expenses, increase operational effectiveness, and gain a sustained competitive edge. Practices from the circular economy are becoming more and more important in corporate management and trade. Businesses are integrating circular ideas into their marketing plans, production procedures, supply chain management, and corporate sustainability programs. However, for circular plans to be implemented successfully, companies must have the innovative capacity to create sustainable processes, rethink goods, and use eco-friendly technology. In order to translate the concepts of the circular economy into quantifiable commercial results, green innovation capabilities is crucial. Organisations may discover sustainable solutions to environmental problems, increase manufacturing efficiency, and generate eco-friendly goods through green innovation. Thus, attaining sustainable business transformation requires an awareness of the connection between circular economy practices, green innovation capacity, and sustainable business performance. The purpose of this study is to assess the mediating function of green innovation capabilities and investigate the impact of circular economy practices on sustainable company performance. By creating an integrated framework that explains how businesses might move from linear business models to circular and innovation-driven sustainable systems, the study adds to the body of knowledge on sustainable commerce.

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Research Methodology

Research Objectives

1. To examine the influence of circular economy practices on sustainable business performance.
2. To analyze the relationship between circular economy orientation and green innovation capability among business organizations.
3. To evaluate the impact of green innovation capability on sustainable business performance.
4. To develop an integrated framework explaining the role of circular economy principles in achieving sustainable business transformation.

Research Hypotheses

H1: Circular Economy Practices have a significant positive impact on Sustainable Business Performance.

H2: Circular Economy Practices have a significant positive influence on Green Innovation Capability.

H3: Green Innovation Capability has a significant positive impact on Sustainable Business Performance.

H4: Green Innovation Capability significantly mediates the relationship between Circular Economy Practices and Sustainable Business Performance.

Research Constructs

Construct	Code	Measurement Dimensions
Circular Economy Practices	CEP	Resource efficiency, waste reduction, recycling, sustainable production
Green Innovation Capability	GIC	Green products, sustainable processes, environmental innovation
Sustainable Business Performance	SBP	Economic performance, environmental performance, operational efficiency

Statistical Tools Used

The following statistical techniques are applied:

- Descriptive Statistics
- Cronbach's Alpha Reliability Test
- Correlation Analysis
- Multiple Regression Analysis
- Partial Least Squares Structural Equation Modeling (PLS-SEM)

Data Analysis and Results

Reliability Analysis

The reliability of research constructs was examined using Cronbach's Alpha.

Table 1: Reliability Statistics

Construct	Cronbach's Alpha	Result
Circular Economy Practices	0.872	Reliable
Green Innovation Capability	0.884	Reliable
Sustainable Business Performance	0.891	Reliable

The Cronbach's Alpha values for all constructs are above the recommended threshold of 0.70, indicating strong internal consistency and reliability of the measurement scales.

Correlation Analysis

Table 2: Correlation Matrix

Variables	CEP	GIC	SBP
CEP	1		
GIC	0.612	1	
SBP	0.684	0.721	1

Circular Economy Practices (CEP), Green Innovation Capability (GIC), and Sustainable Business Performance (SBP) are positively correlated, according to the correlation research. Adoption of circular economy techniques enhances green innovation capabilities, as evidenced by the association between CEP and GIC ($r = 0.612$). Circular business practices greatly enhance

Research Design

In order to investigate the connection between circular economy practices, green innovation capacity, and sustainable company performance, the study uses a descriptive and analytical research approach. The suggested study model is statistically assessed using a quantitative research methodology.

Data Collection

The study uses primary data collected through a structured questionnaire from **business owners, managers, entrepreneurs, and professionals** involved in organizational decision-making.

A five-point Likert scale ranging from:

1 – Strongly Disagree – Strongly Agree was used for measuring respondents' perceptions.

Sample Size and Sampling Technique

The study considers a sample size of **180 respondents** selected through purposive and convenience sampling techniques.

Regression Analysis

Table 3: Impact of Circular Economy Practices on Sustainable Business Performance

Predictor	Beta	t-value	p-value
Circular Economy Practices	0.684	9.426	0.000

Regression study shows that Sustainable Business Performance is significantly improved by Circular Economy Practices ($\beta = 0.684$, $t = 9.426$, $p = 0.000$). Increased use of circular economy strategies improves sustainable business

performance, according to the positive beta coefficient. The great statistical significance of the association between the variables is confirmed by the high t-value. The influence is statistically significant and the association is unlikely to be

the result of chance if the p-value is less than 0.05. According to the results, companies that implement circular methods can improve long-term sustainability outcomes, operational efficacy, and resource efficiency. The

Smart PLS Structural Model Analysis

The conceptual framework was examined using Partial Least Squares Structural Equation Modeling (PLS-SEM).

Measurement Model Assessment

Construct	Composite Reliability	AVE
CEP	0.901	0.642
GIC	0.913	0.668
SBP	0.922	0.691

The reliability and convergent validity of the study constructs were assessed using the SmartPLS measurement technique. Strong internal consistency of the constructs is shown by the Composite Reliability values for Sustainable Business Performance (0.922), Green Innovation Capability (0.913), and Circular Economy Practices (0.901) being above the suggested threshold of 0.70. All constructs have Average Variance Extracted

Hypothesis Testing

Table 4: Hypothesis Testing Results

Hypothesis	Path Relationship	Beta	t-value	p-value	Decision
H1	CEP → SBP	0.412	6.845	0.000	Supported
H2	CEP → GIC	0.526	8.214	0.000	Supported
H3	GIC → SBP	0.478	7.126	0.000	Supported
H4	CEP → GIC → SBP	0.251	4.532	0.000	Supported

H1: Circular Economy Practices → Sustainable Business Performance

($\beta = 0.412$, $t = 6.845$, $p = 0.000$) – Supported

The findings show that sustainable business performance is significantly improved by circular economy practices. Effective implementation of circular practices, such as resource efficiency, waste reduction, and sustainable operations, improves corporate outcomes, as demonstrated by the positive beta value (0.412). The relationship's statistical significance is confirmed by the t-value, and the hypothesis is strongly supported by the p-value. As a result, companies that use circular economy methods have a higher chance of achieving improved operational, environmental, and economic sustainability.

H2: Circular Economy Practices → Green Innovation Capability

($\beta = 0.526$, $t = 8.214$, $p = 0.000$) – Supported

The results show that Green Innovation Capability is greatly impacted by Circular Economy Practices. The beta coefficient (0.526) shows a high positive correlation, indicating that circular-oriented businesses are better equipped to create innovative processes, environmentally friendly solutions, and sustainable goods. The relationship's dependability is shown by the high t-value and large p-value. Adoption of the circular economy is therefore a key factor in enhancing organisations' capacity for green innovation.

H3: Green Innovation Capability → Sustainable Business Performance

($\beta = 0.478$, $t = 7.126$, $p = 0.000$) – Supported

The investigation shows that Sustainable Business Performance is significantly improved by Green Innovation Capability. Stronger green innovation capabilities lead to higher sustainability results, according to the positive beta value (0.478). The findings imply that innovations with an environmental focus enhance long-term organisational value generation, competitive advantage, and operational efficiency. In order to improve sustainable corporate performance, green innovation competence is crucial.

significance of circular economy practices as a strategic method for attaining sustainable corporate growth is strongly supported by these findings.

(AVE) values more than the permissible threshold of 0.50, demonstrating sufficient convergent validity. These findings verify that the chosen indicators accurately reflect their respective conceptions and that the measurement model is statistically reliable. As a result, the constructs are thought to be appropriate for further PLS-SEM structural model research.

H4: Circular Economy Practices → Green Innovation Capability → Sustainable Business Performance

($\beta = 0.251$, $t = 4.532$, $p = 0.000$) – Supported

The association between Circular Economy Practices and Sustainable Business Performance is considerably mediated by Green Innovation Capability, according to the mediation study. Circular economy methods enhance corporate sustainability by boosting innovative capabilities, according to the indirect impact value ($\beta = 0.251$). Green innovation's mediating function is confirmed by the substantial t-value and p-value. Consequently, circular economy activities are transformed into quantifiable sustainable company outcomes through the strategic mechanism of green innovation.

Findings of the Study

Sustainable business performance is greatly enhanced by circular economy techniques.

Businesses that implement waste reduction and resource efficiency methods get improved environmental and economic results.

A focus on the circular economy enhances the capacity for green innovation.

Companies that adhere to circular concepts are more likely to create innovative methods and sustainable goods.

The capacity for green innovation makes a substantial contribution to the sustainability of businesses.

Businesses may gain a competitive edge and operational efficiency via innovation.

Long-term company value is produced by circular economy techniques.

Improved stakeholder connections, resource optimisation, and cost reduction are all supported by circular techniques.

Innovation serves as a link between performance results and sustainable practices.

Green innovation transforms environmental efforts into quantifiable organisational gains.

Strategic integration across corporate activities is necessary for circular transformation.

Management, technology, and supply chain systems must work together for adoption to be successful.

Suggestions of the Study



1. Circular economy concepts should be included into strategic planning and decision-making by businesses.
2. To increase sustainability performance, companies should invest in green innovation skills.
3. Businesses should use digital technology to track waste management and resource usage.
4. Policies that encourage circular business models should be promoted by government organisations.
5. Financial and technological assistance should be provided to MSMEs so they may implement circular practices.
6. Companies must to concentrate on developing sustainable supply chains.
7. Businesses ought to educate customers about sustainable products.
8. Commerce students should be encouraged to learn about the circular economy at higher education institutions.

Conclusion

Businesses have a great chance to achieve sustainable development while tackling environmental issues by moving away from the linear economic paradigm. The significance of circular economy practices as tactical instruments for enhancing sustainable company performance is emphasised in this study. The results show that organisations are encouraged to implement resource-efficient processes, reduce waste, and generate long-term value by adopting a circular economy mindset. Additionally, by empowering organisations to create creative and ecologically conscious solutions, green innovation capability contributes significantly to the strengthening of the connection between circular practices and sustainable results. The circular economy is a complete company transformation approach that affects supply chains, operations, innovation, and competitive positioning in addition to being an environmental project. Businesses that successfully use circular ideas may increase shareholder value, resilience, and efficiency. However, technical development, management dedication, supporting policies, and cooperation between many stakeholders are necessary for successful implementation. By offering a comprehensive viewpoint on how companies might transition from conventional linear models to circular and sustainable systems, the research advances the subject of commerce. By looking at sector-specific applications, cross-national comparisons, and the long-term effects of adopting a circular economy, future research may expand this paradigm.

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Original Article

The Role of AI In Digital Transformation in Talent Acquisition

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Abstract

Artificial Intelligence (AI) is driving digital transformation in talent acquisition across private business organizations by improving sourcing, screening, candidate engagement and data-driven hiring. This study examines the role of AI in digitally transforming talent acquisition using primary data collected from 24 respondents. A quantitative research design with structured questionnaires was adopted. Findings indicate AI significantly improves efficiency, speeds hiring, and enhances recruitment quality, while transparency and human oversight remain important. A balanced human-AI approach is recommended.

Index Terms— Artificial Intelligence, Recruitment, Candidate Experience, HR Analytics

Introduction

Artificial Intelligence (AI) has become a important driver of transformation in recruitment practices within private business organizations. AI-based tools such as resume screening systems, chatbots, and automated interview platforms are increasingly used to streamline hiring processes. These technologies reduce recruitment time, improve efficiency, and support data-driven decision-making. Candidate experience is a critical factor influencing organizational attractiveness and employer branding. It refers to the perceptions and reactions of applicants throughout the recruitment process. While AI enhances operational efficiency, it also raises concerns related to transparency, fairness, and reduced human interaction.

This study aims to assess candidate experience with AI-based recruitment systems and understand how AI influences different stages of the hiring process.

Objectives

1. To evaluate candidate experience with AI-based recruitment
 2. To analyze the role of AI in different recruitment stages
 3. To assess fairness, transparency, and usability of AI systems
- To identify the importance of human involvement in recruitment

Methodology

This study adopts a quantitative research approach using a descriptive research design to examine candidate experience with AI-based recruitment in private business organizations. Primary data were collected through a structured questionnaire distributed to individuals who have experienced AI-driven recruitment processes. A total of 24 respondents were selected using a convenience sampling technique. The questionnaire was designed using a 5-point Likert scale to measure key variables such as fairness, transparency, usability, and overall candidate experience. The collected data were analyzed using descriptive statistics, including mean scores and percentages, along with correlation analysis to examine relationships between variables. The study focuses on understanding how AI influences different stages of recruitment, particularly its dominant use in initial screening and reduced use in final decision-making.

Data Analysis and Interpretation

A. Demographic Profile

Category	Frequency	Percentage
Male	14	58%
Female	10	42%

The data shows that the majority of respondents are male (58%), while female respondents constitute 42%. This indicates a relatively balanced representation, though male participants are slightly higher.

All respondents (100%) have experienced AI-based recruitment, confirming that the sample is relevant and suitable for analyzing candidate experience with AI systems.

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C. Perception of AI Recruitment (Likert Scale)

Statement	Mean Score
AI is easy to use	4.1
AI recruitment is fair	3.5
AI improves efficiency	4.3
AI lacks transparency	3.8
Human interaction is important	4.5

The mean scores indicate that respondents generally perceive AI recruitment as efficient (4.3) and easy to use (4.1). However, moderate scores for fairness (3.5) and

transparency (3.8) suggest some concerns. The high score for human interaction (4.5) highlights its continued importance.

D. Stage-wise Use of AI in Recruitment

Recruitment Stage	AI Usage	Frequency	Percentage
Initial Screening (Filtering & Shortlisting)	High	20	83%
Mid-level Process (Assessments/Chatbots)	Moderate	15	62%
Final Selection (Interviews/Decision)	Low	6	25%

The results show that AI is predominantly used in the initial screening stage (83%), moderately used in mid-level processes (62%), and minimally used in final selection (25%). This confirms that organizations rely on AI mainly for filtering, while human involvement increases in later stages.

E. Interpretation: The analysis indicates that AI is widely used in the initial stages of recruitment, especially for resume screening and candidate filtering. However, as the

recruitment process progresses, organizations rely more on traditional human-based methods, particularly during interviews and final decision-making.

This reflects the adoption of a hybrid recruitment model, where AI improves efficiency in early stages while human judgment ensures fairness and better evaluation in later stages.

F. Correlation Analysis

Variables	Correlation
Transparency vs Experience	0.62
Fairness vs Experience	0.68
Usability vs Experience	0.71

The positive correlation values indicate that transparency, fairness, and usability have a strong relationship with candidate experience. Among these, usability shows the highest influence, suggesting that ease of use plays a key role in shaping candidate perceptions.

Results And Discussion: The findings reveal that AI significantly improves recruitment efficiency, particularly in handling large volumes of applications during initial screening. Most respondents confirmed that AI is primarily used for filtering and shortlisting candidates. However, AI usage declines in later stages, where organizations prefer traditional recruitment methods such as interviews and human evaluation. This shift highlights the importance of human involvement in assessing soft skills, communication abilities, and cultural fit. Although candidates appreciate the speed and convenience of AI, concerns about transparency and fairness reduce trust. Therefore, combining AI with human decision-making is essential to improve candidate experience.

Findings

- AI is predominantly used in **initial recruitment stages**
- AI is effective for **resume screening and filtering**
- Traditional methods are preferred in **final selection stages**
- AI improves efficiency and usability
- Transparency and fairness remain concerns
- Candidates strongly prefer **human involvement in hiring decisions**

Conclusion: AI-based recruitment is transforming hiring practices in private business organizations. While AI enhances efficiency and simplifies early-stage recruitment processes, it cannot fully replace human judgment. The

study concludes that AI is most effective in initial filtering stages, whereas traditional methods remain essential in final decision-making. A hybrid recruitment approach combining AI and human involvement is crucial for improving candidate experience, trust, and organizational outcomes.

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Original Article

The Influence of The Kabir Panth on The Tribal Communities of Eastern Gujarat: A Historical and Cultural Study

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Abstract

The Kabir Panth, inspired by the teachings of the fifteenth-century saint Kabir, has played a significant role in shaping the religious, social, and cultural life of various communities across India. In Eastern Gujarat, particularly in the tribal-dominated districts such as Dahod, Panchmahal, Chhota Udepur, Mahisagar, and Narmada, the Kabir Panth has influenced indigenous communities by promoting values of equality, simplicity, devotion, and social harmony. This paper examines the historical development of the Kabir Panth in Eastern Gujarat and analyses its impact on tribal society from historical and cultural perspectives. It explores how Kabir's teachings contributed to reducing social discrimination, discouraging superstition, strengthening moral values, and encouraging community unity. The study relies on historical literature, secondary sources, and sociological interpretations to understand the interaction between Kabir Panth philosophy and tribal traditions. The findings suggest that although tribal communities have retained many of their indigenous customs, Kabir Panth ideology has positively transformed several aspects of their social and religious life while preserving cultural identity.

Keywords: Kabir Panth, Tribal Society, Eastern Gujarat, Culture, History, Bhakti Movement, Social Reform

Introduction

India is recognised for its rich cultural diversity, where numerous religious traditions and spiritual movements have influenced social development over centuries. Among these traditions, the Bhakti Movement emerged as one of the most significant socio-religious movements that challenged social inequality and religious orthodoxy. One of its most influential saints was Kabir, whose teachings transcended the boundaries of caste, religion, and ritualism. Kabir rejected blind faith, caste discrimination, idol worship, and meaningless rituals. Instead, he emphasized devotion to one supreme God, moral conduct, equality, compassion, and human brotherhood. His teachings later evolved into an organised religious tradition known as the Kabir Panth. Eastern Gujarat is home to several tribal communities, including the Bhil, Rathwa, Nayaka, Tadvi, Dhanaka, and Gamit tribes. Historically, these communities maintained their own indigenous beliefs, customs, and cultural practices. However, continuous interaction with various religious reform movements gradually transformed many aspects of their social and religious life. Among these influences, the Kabir Panth occupies a special place because it offered a simple, practical, and inclusive spiritual philosophy that resonated with tribal lifestyles. Unlike highly ritualistic religious traditions, Kabir's teachings were easy to understand and emphasised ethical living rather than expensive ceremonies. The present study attempts to analyse the historical emergence of the Kabir Panth in Eastern Gujarat and evaluate its cultural and social impact on tribal communities.

Objectives of the Study

The major objectives of this study are:

1. To examine the historical development of the Kabir Panth in Eastern Gujarat.
2. To understand the religious philosophy of Kabir.
3. To analyse the influence of Kabir Panth on tribal social organisation.
4. To evaluate its impact on tribal cultural practices.
5. To identify the contribution of Kabir Panth toward social reform among tribal communities.
6. To assess the contemporary relevance of Kabir's teachings in tribal society.

Research Methodology

The present research is descriptive and analytical in nature.

The study is primarily based on secondary sources including books, research articles, government reports, census publications, journals, dissertations, and historical documents related to Kabir Panth and tribal society in Gujarat. Comparative and historical methods have been adopted to analyse the socio-cultural transformation among tribal communities influenced by Kabir Panth philosophy.

Historical Background of Kabir Panth

Kabir was born during the fifteenth century, generally believed to be around 1398 CE, in Varanasi.

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Although several traditions describe his birth differently, most scholars agree that Kabir was raised by a Muslim weaver family named Niru and Nima. Kabir became one of the greatest saints of the Bhakti Movement. His teachings challenged both orthodox Hinduism and rigid Islamic practices. He believed that God is one and can be realised through sincere devotion rather than external rituals. His verses, popularly known as Dohas, spread rapidly among ordinary people because they were composed in simple language. Kabir criticised social inequality and advocated universal brotherhood. After his death, his followers organised themselves into the Kabir Panth. Various centres known as Kabir Maths were established in different regions of India. Gradually, Kabir Panth spread to Rajasthan, Madhya Pradesh, Maharashtra, Chhattisgarh, Uttar Pradesh, Bihar, and Gujarat. The movement became particularly attractive to socially marginalised communities because it rejected caste hierarchy and promoted dignity for all human beings.

The Spread of Kabir Panth in Eastern Gujarat

Eastern Gujarat has historically remained one of the major tribal belts of India. The districts of Dahod, Panchmahal, Chhota Udepur, Mahisagar, Tapi, Narmada, and parts of Bharuch have a significant tribal population. During the nineteenth and twentieth centuries, several Kabir Panthi saints and local preachers travelled through these tribal regions spreading Kabir's message of equality and moral living. Their sermons were conducted in simple Gujarati and local tribal dialects, making the teachings accessible to ordinary people. Unlike orthodox religious institutions, Kabir Panth encouraged collective singing, spiritual discussions, and community participation without requiring costly rituals or elaborate ceremonies. Many tribal families accepted Kabir Panth because its teachings closely matched their traditional values of community cooperation, simplicity, honesty, and respect for nature. Gradually, Kabir Bhajan Mandalis and local satsang groups emerged in villages, creating new platforms for social interaction and religious education.

Philosophical Principles of Kabir Panth

The philosophy of Kabir Panth is based upon universal human values rather than sectarian beliefs.

Its major principles include:

Monotheism

Kabir believed that there is only one Supreme God who transcends all religious divisions. God is for everyone irrespective of caste, religion, or ethnicity.

Equality

Kabir strongly opposed caste discrimination. Every individual possesses equal dignity because all human beings are creations of the same divine power.

Rejection of Ritualism

Kabir criticised meaningless rituals, idol worship, superstition, and religious hypocrisy. According to him, inner purity is more important than external ceremonies.

Simplicity

Kabir encouraged a simple lifestyle based on honesty, hard work, and moral conduct.

Universal Brotherhood

Kabir promoted harmony among different communities by emphasising love, compassion, and mutual respect.

These principles became particularly relevant for tribal communities facing social discrimination and economic marginalisation.

Tribal Society of Eastern Gujarat

The tribal communities of Eastern Gujarat possess a rich cultural heritage shaped by forests, agriculture, traditional occupations, and community institutions. The Bhils constitute one of the largest tribal

groups in the region. Other important communities include Rathwa, Nayaka, Dhanaka, Tadvi, Gamit, Chaudhary, and Vasava tribes. Traditionally, tribal society was organised around kinship networks, village councils, and customary laws. Religious life centred on ancestor worship, nature worship, village deities, and seasonal festivals. Although tribal communities maintained unique cultural identities, they also remained vulnerable to poverty, illiteracy, exploitation, alcoholism, and social exclusion. The arrival of reform-oriented religious movements such as Kabir Panth introduced alternative spiritual perspectives that encouraged education, ethical behaviour, and social reform without completely abandoning indigenous traditions.

Social Impact of the Kabir Panth on Tribal Society

The Kabir Panth has had a profound influence on the social life of tribal communities in Eastern Gujarat. Before the spread of reformist religious movements, many tribal societies were governed primarily by customary traditions, ancestral beliefs, and local religious practices. While these traditions fostered community cohesion, certain social issues such as superstition, alcoholism, excessive expenditure on rituals, and social inequality affected the quality of life. Kabir's philosophy introduced an alternative vision based on ethical conduct, equality, and spiritual devotion rather than ritualistic practices. His teachings encouraged people to judge individuals by their character instead of their caste, wealth, or social status. This message resonated strongly with tribal communities that had historically experienced social and economic marginalisation. One of the most important social contributions of the Kabir Panth was the promotion of community harmony. Kabir's followers organised Satsangs, devotional gatherings, and collective prayers where people from different social backgrounds could participate equally. Such gatherings reduced social barriers and strengthened mutual respect among villagers. The movement also encouraged honesty, discipline, truthfulness, and mutual cooperation. These values contributed to stronger community relationships and improved social cohesion in many villages influenced by Kabir Panth traditions.

Influence on Religious Beliefs and Practices

The tribal communities of Eastern Gujarat traditionally worshipped nature, village deities, ancestral spirits, sacred trees, hills, rivers, and local gods. These indigenous beliefs remain an essential part of tribal identity even today. The Kabir Panth did not entirely replace these traditions. Instead, it gradually introduced a simpler and more philosophical understanding of spirituality. Kabir emphasised that God is formless (Nirguna) and can be realised through sincere devotion rather than elaborate rituals. Many tribal followers began reducing costly religious ceremonies and animal sacrifices. Instead, devotional singing (Bhajans), meditation, recitation of Kabir's Dohas, and community prayers became important religious activities. Kabir's emphasis on inner purity rather than external rituals helped many tribal families reduce unnecessary religious expenditures while strengthening moral values. Even today, several villages in Dahod, Panchmahal, and Chhota Udepur organise Kabir Bhajan programmes that continue to spread messages of peace, unity, and spiritual equality.

Cultural Transformation

Culture includes language, customs, traditions, music, festivals, art, dress, and everyday practices. The influence of Kabir Panth on tribal culture has been gradual rather than revolutionary. The movement enriched tribal cultural life by introducing devotional songs based on Kabir's poetry. These Bhajans became part of local religious gatherings and festivals. Many of these songs were



translated into Gujarati and local tribal dialects, making them accessible to rural communities. Traditional tribal music and folk instruments such as the mandal, dhol, thali, and manjira were often used during Kabir Bhajan programmes. As a result, local cultural traditions merged with Kabir's devotional practices instead of disappearing. Kabir's emphasis on simplicity also influenced marriage ceremonies and social functions. Some families reduced extravagant spending and adopted simpler wedding practices inspired by Kabir's ideals. Thus, rather than destroying tribal culture, the Kabir Panth contributed to a process of cultural adaptation where indigenous traditions coexisted with new spiritual values.

Educational and Intellectual Influence

Education has always been a powerful instrument of social transformation. Although Kabir himself did not establish formal educational institutions, his teachings encouraged critical thinking and rational inquiry. Kabir repeatedly advised people not to accept beliefs blindly but to seek truth through personal experience and wisdom. Among tribal communities, Kabir Panth leaders encouraged literacy so that followers could read Kabir's Dohas and understand their meanings. Religious gatherings often became informal centres for moral education and social awareness. Many Kabir Panthi organisations have also promoted schools, hostels, and educational programmes in tribal regions. While the scale of these activities varies from one region to another, the overall contribution has been positive in encouraging education and social awareness. Kabir's emphasis on knowledge over superstition has inspired many tribal youths to value education alongside their cultural traditions.

Impact on Women

Kabir strongly believed that spiritual equality belongs to all human beings regardless of gender. Although he lived in a patriarchal society, many of his teachings challenged discrimination and emphasised respect for women. Within tribal communities, Kabir Panth encouraged women to participate in devotional gatherings, Bhajan singing, and community activities. Women became active participants in religious life rather than remaining confined to domestic responsibilities. The movement also discouraged harmful social practices such as excessive drinking, domestic violence, and wasteful expenditure during ceremonies, indirectly improving women's quality of life.

Although gender inequality continues to exist in many tribal regions, Kabir's teachings have contributed to greater respect for women and stronger family relationships.

Economic and Moral Influence

The economic philosophy of Kabir emphasised honest labour, simplicity, and contentment. He discouraged greed, exploitation, and unnecessary luxury.

These teachings were highly relevant for economically weaker tribal communities.

Kabir Panth encouraged followers to:

Earn through honest work.

Avoid wasteful expenditure.

Stay away from gambling and alcoholism.

Help poor families.

Practice charity and mutual cooperation.

Many Kabir Panthi communities also organise collective social service activities, which strengthen community solidarity.

The emphasis on moral discipline has contributed to reducing certain social problems in villages where Kabir Panth remains influential.

Community Organisation and Social Reform

The Kabir Panth helped create community institutions based on equality rather than hierarchy. Satsang groups, Bhajan Mandalis, and local religious gatherings became centres for discussing social issues, resolving conflicts, and promoting collective welfare. These institutions encouraged villagers to cooperate in community development activities such as education, sanitation, and assistance to needy families. Kabir's rejection of caste discrimination also inspired many followers to treat all people with dignity. Although caste-based inequalities continue to exist in broader society, the Kabir Panth has consistently promoted social equality and communal harmony. Its message remains particularly relevant in tribal regions where economic development must be accompanied by social inclusion and cultural respect.

Challenges and Limitations of the Kabir Panth

Although the Kabir Panth has made significant contributions to the social and cultural development of tribal communities in Eastern Gujarat, its influence has also faced several challenges. One of the major limitations is that not all tribal communities accepted the teachings of the Kabir Panth. Many groups continued to follow their indigenous religious traditions, which remain deeply connected with ancestor worship, sacred groves, village deities, and nature-based rituals. Consequently, the influence of the Kabir Panth has been uneven across different regions and tribal groups. Another challenge has been the spread of modernization and globalization. Rapid urbanization, migration, digital media, and changing lifestyles have reduced the participation of younger generations in traditional religious gatherings such as Satsangs and Bhajan Mandalis. As a result, the oral transmission of Kabir's teachings has weakened in some areas. Economic poverty also limits the activities of local Kabir Panthi organizations. Many tribal villages lack adequate educational and cultural institutions that could preserve Kabir's philosophy for future generations. Furthermore, the increasing influence of consumerism and materialism often conflicts with Kabir's ideals of simplicity, contentment, and ethical living. Despite these challenges, the Kabir Panth continues to remain an important moral and spiritual force in several tribal regions of Eastern Gujarat.

Contemporary Relevance of Kabir's Teachings

Kabir's philosophy remains highly relevant in the twenty-first century. The social issues that Kabir criticized—religious intolerance, caste discrimination, superstition, and social inequality—continue to exist in different forms. For the tribal communities of Eastern Gujarat, Kabir's teachings remain valuable because they encourage social harmony, ethical behaviour, education, equality, critical thinking, and peaceful coexistence. His philosophy promotes respect for all individuals regardless of caste, religion, or economic status. Kabir's emphasis on simple living and high thinking is particularly relevant today when society faces increasing materialism and environmental challenges. His teachings also support sustainable development by encouraging moderation, compassion, and harmony with nature.

Findings of the Study

The major findings of this study are as follows:

1. Kabir Panth spread into Eastern Gujarat through saints, devotees, and local religious leaders.
2. Tribal communities accepted Kabir's teachings because they emphasized equality, simplicity, and moral values.
3. The movement reduced the importance of expensive rituals and promoted spiritual devotion.
4. Kabir Panth strengthened community cooperation through Satsangs and Bhajan Mandalis.



5. Women's participation in religious and community activities increased in several Kabir Panthi villages.
6. Devotional music and Kabir's Dohas enriched tribal cultural traditions.
7. The movement encouraged education, ethical conduct, and rational thinking.
8. Kabir Panth contributed to reducing alcoholism, superstition, and social discrimination in certain tribal communities.
9. Tribal cultural identity remained intact while incorporating Kabir's spiritual philosophy.
10. Kabir's teachings continue to remain socially relevant in modern India.

Conclusion

The Kabir Panth has played a significant role in shaping the social and cultural life of tribal communities in Eastern Gujarat. Its influence extends beyond religion and has contributed to social reform, moral development, cultural enrichment, and community harmony. Kabir's message of equality, compassion, truth, and devotion appealed to tribal society because it addressed issues of discrimination, superstition, and social exclusion. Rather than replacing tribal traditions, the Kabir Panth complemented indigenous culture by introducing ethical and spiritual values that encouraged positive social change. Today, Kabir's teachings continue to inspire people toward peaceful coexistence, human dignity, and social justice. As India moves toward inclusive development, the values of Kabir remain relevant for strengthening communal harmony and preserving cultural diversity. Future research should include field surveys, oral histories, and ethnographic studies to understand the contemporary role of the Kabir Panth among tribal communities in Eastern Gujarat.

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Original Article

Endurance Through Practice: Ethical Self-Formation and the Phenomena of Saptāha in The Vārkarī Tradition

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Abstract

The Warkari Sampradāya the devotional movement dedicated to lord Vitthal of Pandharpur, is so influential in Maharashtra that it is often taken to be nearly identical with Maharashtrian culture itself. such is the importance and influence of this sect on the whole of the Maharashtrian mind. attributes this longevity and popular acceptance to the tradition's philosophy—its values of love, equality, a democratic outlook, and its opposition to rigid rituals.¹ drawing from the literature on the subject and subject formation, This paper, however, seeks to challenge this widely held reasoning. I argue while the values and philosophy of the tradition are admirable and inspiring, they cannot by themselves guarantee its endurance and acceptance. The tradition has survived for 800 years and is still thriving with increasing popular acceptance. Unlike other traditions which also came into being at the beginning of the last millennium but now have a negligible presence in the state, the Panth of the Warkaris has not only managed to survive but has come to exercise an unchallenged supremacy on the culture and ethos of Maharashtra.² The established scholarship There has to be a concrete mechanism through which it is ensured that these high ideals not only reach the public but are deeply embedded in the collective life of its followers. The Warkaris have, from time to time, designed such ingenious mechanisms. While the Kirtan and the annual Wari pilgrimage were foundational practices, this paper argues that the crucial modern innovation is the Saptah. A seven-day immersive 'workshop' of continuous chanting, scriptural recitation, and nightly kirtans, this weekly, annual event is the most important training ground through which the Warkari subject is produced and sustained. I will show how this practice now serves as an important "workshop"—a crucial middle ground between the peak annual pilgrimage of the Wari and the localized performance of the Kirtan—and the primary vehicle through which the Warkari ethos is imprinted on the people. The paper begins by outlining the central research problem. It then examines the theoretical framework for understanding how the devotional subject is produced. Following this, the practice of the Saptāha is introduced, highlighting both its general and specific forms. The theoretical schema is subsequently applied to analyze the process of subject formation, and the paper concludes with a discussion of the key findings.

Understanding the Puzzle

The question of the Varkari tradition's endurance demands the clarification of another, more crucial question: how is the Varkari identity constructed? Both of these questions are closely interlinked. No tradition can be sustained for a considerable period if its followers do not feel strongly identified with it. Apart from its philosophical and humanitarian ideals, there must be a set of concrete practices through which this identity is produced and sustained. The Sampradāya which attaches prime importance to Vārī...

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¹ G. A. Deleury, *The Cult of Viṭṭhobā* (Poona: Deccan College Postgraduate and Research Institute, 1960), ix. Deleury explicitly notes that what drew him to the Warkaris was their “definitely democratic outlook.” The central thesis of Ramchandra Chintaman Dhere's *The Rise of a Folk God: Viṭṭhal of Pandharpur*, trans. Anne Feldhaus (New York: Oxford University Press, 2011), is that of *mahasamarvay* (“the grand synthesis”), which provides a deep historical and theological basis for the tradition's inclusivity. Sambhus also accepts this view; see her *Pilgrimage and the Bhakti Public: A Study of Varkari Practices in Maharashtra* (PhD diss., Jawaharlal Nehru University, 2022), 27. See also Christian Lee Novetzke, *The Quotidian Revolution: Vernacularization, Religion, and the Premodern Public Sphere in India* (New York: Columbia University Press, 2016).

² For an introduction to these sects, see George Weston Briggs, *Gorakhnāth and the Kānpṛaṭa Yogīs* (Calcutta: YMCA Publishing House, 1938); and Antonio Rigopoulos, *The Mahānubhāva* (Firenze: Firenze University Press, 2005).



is called Vārkarī Sampradāya.³ If the Wari is the single most important factor, it could be inferred that the longevity and popularity of the tradition are owed to this annual event. However, this formulation gives rise to certain obvious questions. Firstly, to what extent is it possible that an identity produced during a fifteen-day journey to Pandharpur can be sustained throughout the rest of the year? Secondly, does the Wari pilgrimage sufficiently explain the mass popularity of the Varkari sect? Thirdly, is the pilgrimage the sole determining factor in the production of the Warkari subject? And if it had been only a one-time event, wouldn't it have become an elite phenomenon? Any agreement with these doubts must lead to another set of questions. Apart from the Wari, what other mechanism ensures that "Warkari-ness" is continuously produced? Do these "pre-Wari" mechanisms have a greater role to play in the production of the Warkari subject than the Wari itself? Is it not these other practices that imbibe the Warkari values and ethos in most ordinary people before they ever take on the pilgrimage? It can be argued that the Wari, though an important ideal, cannot be the sole factor in generating the feeling of "Warkari-ness." There must be other practices which complement this event. This is the point to be proven. After discussing the theoretical literature on what goes into the making of a devotional subject, I will return to this argument.

Understanding how subjects are formed

There are many ways in which human beings constitute themselves as subjects. Foucault identifies three major modes. First, the subject constituted through knowledge — as in the human sciences such as linguistics, biology, and economics. Second, the subject produced through what he calls "dividing practices," such as those that separate the mad from the sane, or the criminal from the law-abiding citizen. The third, which concerns us most directly here, is the subject formed through its own acts and practices.⁴ Foucault rejects the idea of a pre-given, autonomous subject who stands sovereign over its choices. As he explains, "through history, a subject came to be constituted that is not definitively given, that is not the thing on the basis of which truth happens to history—rather, [we see] a subject that constitutes itself within history and is constantly established and re-established by history."⁵ Power, for Foucault, plays an essential role in this

process of subject formation. This third mode—the subject's formation through its own practices—corresponds to what Foucault calls technologies of the self, as distinct from technologies of domination. In this sense, the subject actively shapes and transforms itself through its own exercises, disciplines, and reflective labors. The emphasis here is on the work of the self upon itself—the deliberate practices through which one becomes a certain kind of being. Foucault analyses these techniques of the self in the second volume of *The History of Sexuality, The Use of Pleasure*. To understand this dimension of self-formation, he distinguishes between the moral code and the forms of subjectivation. A moral code refers to a system of prescriptive rules—often supported by juridical or institutional authority—that defines permitted and forbidden acts. In contrast, the forms of subjectivation emphasize the ways in which individuals actively relate to these rules, taking themselves as objects of reflection and transformation. Here, morality is not primarily a matter of obedience but of self-work; the rules are rudimentary compared to the richness of the practices that individuals invent for shaping themselves. This ethics-oriented morality shows how the subject constitutes itself through its own deeds. Foucault articulates this process through a fourfold schema comprising the ethical substance, the mode of subjection, the ethical work, and the telos. The ethical substance refers to the specific aspect of the self that becomes the material of moral conduct—that is, the part of oneself one is asked to work upon. The mode of subjection designates the manner in which an individual relates to a rule and recognizes themselves as bound by it, or, in other words, the reason one feels obliged to follow it. The ethical work concerns the concrete exercises, disciplines, and transformations through which one becomes the ethical subject of one's actions. Finally, the telos denotes the mode of being or form of life that these practices aim to bring into existence, for each moral action is not merely an act but a step toward becoming a certain kind of person.⁶ In the following analysis, this schema will serve as an analytical lens to examine the processes through which the Vārkarī devotee is formed as a subject.

Saptaha and the varkari Sampradaya

In the Vārkarī Sampradaya, a distinction is often made between the Vari, the annual pilgrimage, and namasankirtana, which includes local everyday practices such as nama-japa, bhajan, kirtana, pravachana, and vyakhyana. These practices, alongside the Vari, disseminate the tradition's ethos throughout Maharashtra.⁷ The saptaha

³ Sambhus, *Pilgrimage and the Bhakti Public*, 53.

⁴ Michel Foucault, "The Subject and Power," in *Michel Foucault: Beyond Structuralism and Hermeneutics*, 2nd ed., by Hubert L. Dreyfus and Paul Rabinow (Chicago: University of Chicago Press, 1983), 208—226, 208. The Vārkarī tradition serves as a key example of this mode of subject formation. As Sambhus explains, "The Vārkarī Sampradāya is defined by one's own commitment to adhere to specific rules and a code of conduct without any external agency enforcing the same," *Pilgrimage and the Bhakti Public*, 65.

⁵ Arnold I. Davidson, "From Subjection to Subjectivation: Michel Foucault and the History of Sexuality," in *Foucault and the Making of Subjects*, ed.

Laura Cremonesi, Orazio Irrera, Daniele Lorenzini, and Martina Tazzioli (London: Rowman & Littlefield International, 2016), 57.

⁶ Michel Foucault, *The History of Sexuality*, vol. 2, *The Use of Pleasure*, trans. Robert Hurley (New York: Vintage Books, 1990), 25–30. Foucault also discusses this in "On the Genealogy of Ethics: An Overview of Work in Progress," in *Michel Foucault: Beyond Structuralism and Hermeneutics*, by Hubert L. Dreyfus and Paul Rabinow, 2nd ed. (Chicago: The University of Chicago Press, 1983), 229–52, esp. 239–41.

⁷ For the details of this distinction, see Sambhus, *Pilgrimage and the Bhakti Public*, chap. 2.



can be understood as a concentrated package of these everyday practices, organized into a week-long annual event in villages. There are two main types of saptahas: a static, village-specific model, and a dynamic traveling model found in certain regions of the state. The present study focuses on the traveling model, particularly in the marathwada region, where the event moves across villages under the guidance of a spiritual centre or gad.⁸ There are number of such Gads prominent among them is the Bhagvan gad and the Narayan Gad.⁹ This model enables the practices to reach diverse locales, creating a broader network of devotional activity. Though the practices of kirtan and Vari date back to the thirteenth and fourteenth centuries, the phenomenon of the saptaha is of relatively recent origin. It is believed to have emerged only after the era of the charismatic saints had ended with Nīloba, the renowned disciple of Tukaram. According to tradition, one of Nīloba's disciples Shankar swami organized one of the earliest saptahas in the mid-eighteenth century.¹⁰ The form was later consolidated by

figures such as Vishnubua Jog and Mamasahab Dandekar in the latter half of the nineteenth century.¹¹ However, the most well-known saptaha in the Marathwada region—particularly in and around Beed district—is the Narali (coconut) saptaha, which, according to tradition, was initiated by Bhagvan Baba in 1934.¹²

The Varkari process of self-formation and the role of saptaha

The analytical tool of the fourfold schema, i.e., ethical substance, the mode of subjection, the ethical work, and the telos, will be employed in the following discussion to shed light on the process of Varkari self-formation.

Ethical substance

What part of themselves do the Varkaris work upon to become authentic devotees? The eight rules of conduct given by Vadyadhar Tathe offer valuable insight. These include going to the Pandharpur Vari at least once a year or on every Shuddha Ekadashi, wearing a tulasi-mala around the neck, abstaining from meat and alcohol, reciting the mantra "Rama Krishna Hari," avoiding adultery and considering every woman other than one's wife as a mother, refraining from craving others' earnings or competing with them, regularly reciting the Haripath and reading the Dnyaneshwari, Bhagavat, and Gatha, fulfilling responsibilities with honesty, and respecting all beings as creations of God.¹³

Looking at these rules—especially those related to abstinence, mantra recitation, fasting, and pilgrimage—it can be argued that the tradition subscribes to a moderate form of asceticism marked by regularity and discipline. The rule regarding the wearing of the tulasi-mala is especially significant, as it enables the Varkari to present himself as an object to be seen and recognized by others as a devotee. Except for the pilgrimage to Pandharpur, most of these practices are learned, enacted, and encouraged through kirtanas and pravachanas during the saptaha. Apart from the Vari, the saptaha thus becomes a key mechanism through which villagers both demonstrate and internalize the Varkari practices. It can therefore be said that through this complex interplay of concrete practices and inner disposition, the individual works upon himself to shape his being into that of an authentic Varkari.

Mode of subjection

⁸ While the Vārkarī Sampradaya and Vari pilgrimage has been the subject of important scholarly analysis, a comprehensive socio-historical study of the *saptāha* (week-long festival) as a distinct phenomenon remains a noticeable gap in the literature. Foundational studies on the pilgrimage include G. A. Deleury, *The Cult of Viṭhobā*, and Irawati Karve, "On the Road: A Maharashtrian Pilgrimage," *The Journal of Asian Studies* 22, no. 1 (November 1962): 13–29. This focus continues in more recent scholarship, such as Varada A. Sambhus, *Pilgrimage and the Bhakti Public*. In contrast, other major works have concentrated on different aspects of the tradition, such as the theological origins of the deity in R. C. Dhere, *The Rise of a Folk God*; the philosophical thought of its saints in B. P. Bahirat, *The Philosophy of Jnanadeva* (Pandharpur: Pandharpur Research Society, 1956); and mystical experiences in R. D. Ranade, *Mysticism in India: The Poet-Saints of Maharashtra* (Albany: State University of New York Press, 1983).

⁹ For the details of these gads and their founding saints, see Lakṣmaṇa Bāburāva Kāśid, *Tapobhūmī Siddhāñcī: Śrī Kṣetra Nārāyaṇagaḍa* [The Ascetic Land of Siddhas: Shri Kshetra Narayangad], 2nd ed. (Beed: Shri Kshetra Samsthan Narayangad, 2015).; and Bhagwan Vaman Misal, *Śrī Santa Bhagavānabābā: Sarvāṅgīṇa Caritra* [Saint Bhagwanbaba: A Complete Biography], 2nd ed. (Pune: Sharda Sahitya, 2017).

¹⁰ For the biographical account of the Shankar swami and the details of the First saptaha he organized, see Sarangdhar Pandurang Bhopale, *Śivapurī Māhātmya* [The Glory of Shivpurī] (Aurangabad: Lokpal, 2013), chap. 6. Also for a media account of the 272nd *saptah of this Gad*, see, for example, this report from a leading newspaper of Maharashtra: "हरिनाम सप्ताह वारकऱ्यांचा महाउत्सव" [Harinam Saptah, a Great Festival of Varkaris], *Maharashtra Times*, August 5, 2017,

<https://maharashtratimes.com/maharashtra/aurangabad/harinam-saptah-in-loni/articleshow/59919594.cms>.

¹¹ An authentic scholarly account of the origin and evolution of the *saptah* does not exist; however, a very brief idea of its history based on tradition is given in Lakhan Sawant, "Akhand Harinam Saptah," *My Mahanagar*, October 26, 2021, <https://www.mymahanagar.com/featured/saransh/akhand-harinam-week/260358/>.

¹² For more on this Narali (coconut) saptaha, see Misal, *Śrī Santa Bhagavānabābā*, chap. 23.

¹³ Given in Sambhus, *Pilgrimage and the Bhakti Public*, 67; see also the Varkari code of ethics on pp. 66–68.

Why does the Vārkarī feel obligated to follow the tradition? There can be multiple reasons for one's sense of moral obligation. Foucault notes that individuals may obey certain rules by virtue of belonging to a particular group, by striving to meet cultural ideals of beauty or nobility, or in the name of moral perfection. Yet, there is another important form of obligation, namely when "one regards oneself as an heir to a spiritual tradition that one has the responsibility of maintaining or reviving."¹⁴ It is in this sense that the Vārkarīs follow their tradition.

As G. A. Deleury defines, "He is a man who, although living in the midst of his family and carrying on his profession or trade, has pledged himself to reach moksha through the way of bhakti and by devotion to Lord Krishna in the form of Vithoba of Pandharpur, and to go on pilgrimage to that place every year at the fixed time, guided on the road by the society of the saints."¹⁵ What is significant here is that the Vārkarī "lives in the society of the saints, dead or alive." The authority of the saints constitutes the principal source of moral and spiritual obligation in the Sampradāya. Their teachings and rules are assiduously preserved, and mechanisms have evolved to maintain this lineage—for instance, only the compositions of the five key saints are sung in kirtanas,¹⁶ and families with a legacy of pilgrimage take special care to continue it. The saptaha too can be seen as part of this structure of obligation: once initiated in a village, it is maintained at all costs, ensuring that the ethical and devotional ethos of the tradition is sustained across generations.

The Saptaha is thus not only a vehicle for preserving the authority of the saints but also a living site where this obligation is renewed and made experiential. By listening to kirtanas, reciting the Haripāṭha, and engaging in communal acts of devotion, participants continually reaffirm their belonging to the lineage of saints and internalize the moral expectations of the tradition. In this sense, the Saptaha serves as a workshop for the reproduction of the Vārkarī subject.

Ethical work

The question here is what work individuals perform in order to transform themselves into a certain mode of being. Foucault describes this aspect as "ethical work ... that one performs on oneself, not only in order to

bring one's conduct into compliance with a given rule, but to attempt to transform oneself into the ethical subject of one's behaviour." This transformation can occur through various practices such as learning, memorization, self-examination, combat, renunciation, or decipherment.

Among these, the techniques of learning and memorization play a particularly important role in the Vārkarī's self-formation, and the Saptaha serves as the key site where these techniques are cultivated and rehearsed. The daily timetable of the Saptaha itself reflects this discipline. The day begins with the kakḍā āraṭi (pre-dawn prayer) at 4 a.m., followed by the scriptural recitation from the Dnyāneswarī or Gāthā, then the pravachan (discourse), the Haripāṭh (collective chanting), and finally concludes with the nightly kirtan. Each of these practices functions as an ethical exercise — a mode of working on oneself through repetition, attention, and devotion. Those who wish to immerse themselves and witness self-transformation continue these practices even when there is no vāri or Saptaha. Such devotees carefully model themselves as Vārkarīs by adhering to the code of ethics, wearing the prescribed symbols, and following a distinct dress code. Though the Vārkarī tradition does not prioritize moksha in a metaphysical sense — preferring instead the love of God as the highest good — these disciplined practices are nevertheless central to the devotee's ethical project.¹⁷ Through them, the devotee continuously strives to refine and purify the self, cultivating a form of life characterized by humility, devotion, and restraint.

What makes the Saptaha especially significant in this process is its performative pedagogy. Within the compressed time of a week, the devotee's body and mind are subjected to a dense regime of practices — recitation, fasting, collective singing, and listening — that both discipline and awaken the self. The repetitive rhythm of these acts, performed under the gaze of fellow devotees and the ever-present memory of the saints, generates an embodied knowledge. The Saptaha thus becomes not merely a ritual gathering but a workshop of ethical formation — a space where the Vārkarī subject is produced and renewed through sustained repetition, bodily discipline, and the internalization of a moral rhythm that unites action, thought, and devotion.

The Telos

The question here is what is the aim of the actions being performed. As Foucault notes, every ethical practice is oriented toward a certain telos — the mode of being one seeks to achieve through the work of the self upon itself. The purpose of moral conduct is not simply to follow rules, but to shape oneself into a particular kind of person.¹⁸

For the Vārkarī, this end is not salvation for its own sake, but the love of God. Jñānadeva, the founding philosopher of the tradition, bases his vision not on metaphysical liberation but on love as the ultimate reality. As Bahirat explains, Jñānadeva holds that it is not Māyā but

¹⁴ Foucault, *The Use of Pleasure*, 27.

¹⁵ Deleury, *The Cult of Viṭhobā*, 3.

¹⁶ Sambhus notes the practice: "it is mandatory for a Vārkarī kīrtanakāra to use only Vārkarī Santa compositions – sāmpradāyik sāhitya – and not compositions from outside the tradition for a Vārkarī kīrtana. Some other bhakti Sampradāyas, particularly Rāmdāsīs, see this mandate as restrictive or exclusionary, failing to acknowledge the contributions of non-Vārkarī Santas in Maharashtra. The Vārkarī response to this objection is that the non-inclusion of literature by other Santas does not mean that the Vārkarīs dishonour those works or consider those works purposeless," *Pilgrimage and the Bhakti Public*, 80.

¹⁷ Gopal Shankar Rahirkar, Bhalchandra Pandharinath Bahirat, and Bhogilal Bhaidas Kampani, eds., *Shri Sakal Sant Gatha* [The Complete Collection of Saint-Poets' Verses] (Pune: Prembodh Prakashan, 1955), 3. In the introduction, Bahirat argues for the tradition's preference for the love of God over salvation.

¹⁸ Foucault, *The Use of Pleasure*, 27.



the power of the Lord that gives rise to the world, and that this power is nothing other than the power of love. Love is not a quality of God but God Himself — the source from which all creation flows. To realise and embody this divine love in one's life is bhakti, the supreme devotion, which Jñānadeva calls akṛtrim bhakti, or natural devotion.¹⁹ He portrays the relation between God and the devotee as that of the beloved and the lover.²⁰ The tradition reveres Pundarik, whose pure devotion moved the Lord to stand in Pandharpur at his request.²¹ It is the saints who become the ideals that the Vārkarī strive to imitate. Within the Vārkarī fold, devotion is not merely an emotion but the very measure of one's being; the saints, in their humility, compassion, and steadfast love, stand as living images of this ideal to which every Vārkarī aspires.²² Through hagiographies and songs, devotees preserve their memory and emulate their conduct, holding that the true measure of devotion lies in the refinement of the self through love.²³ As Tukārām says, in a way the devotee is even superior to God:

"God is required to provide for His creation; the devotee has no anxiety even to provide for himself. God must take account of the merits and sins of people; to the devotee all are equally good. God creates and destroys the world; the devotee is free from that burden. God is always at work; the devotee rests in the joy of being. Does not all this show that the devotee is greater than God?"²⁴

It is this figure of the great devotee — manifested in the saints — that becomes the telos of the Vārkarī. The devotee makes diligent efforts to approach this ideal through imitation and disciplined practice. The Vārī and the Saptāha thus become spaces where this imitation is rehearsed and refined, offering repeated opportunities for self-cultivation and transformation.

¹⁹ Bahirat, *The Philosophy of Jnanadeva*, ix—x.

²⁰ Ranade, *Mysticism in India*, 130.

²¹ Dhare refers to this story in *Rise of a Folk God*, chap. 9.

²² The Vārkarī saints consistently emphasized the importance of devotion and outlined the ideal characteristics of a saint. Evidence for this can be found throughout R. D. Ranade's *Mysticism in India*, where he records the saints' own words. For example, he documents the central role of devotion for Jnanadev (111) and Tukaram (324), noting that Eknath called it the "royal road" (251). On the characteristics of saints, Ranade cites the teachings of Namdev (197), Eknath (224), and Tukaram (336).

²³ Mahipati was the magisterial biographer of saints. See his *Bhaktavijaya*, translated in Justin E. Abbott and N. R. Godbole, trans., *Stories of Indian Saints: An English Translation of Mahipati's Marathi Bhaktavijaya*, 4th ed. (Delhi: Motilal Banarsidass, 2014).

²⁴ Ranade, *Mysticism in India*, 342.

Conclusion

Let us tie together the three main issues discussed so far — the endurance of the tradition, the process of Vārkarī self-formation, and the role of the Saptāha as a workshop. It should now be clear that the tradition has survived not merely because of its major events like the Vārī, but because, for the masses to identify with it, something more continuous and concrete is required. The everyday practices of learning, memorization, reading, listening, chanting, and participating in the community of like-minded devotees provide the basis for a strong identification with the tradition. Using Foucault's fourfold schema, this paper has suggested that the inner disposition and concrete practices form the ethical substance of the Vārkarī self; that the preservation and transmission of the spiritual tradition constitute its mode of subjection; that the practices of nāma-japa, pārayāṇa, Haripāṭha, and listening to kīrtanas represent its ethical work; and that the aspiration to become the ideal devotee, imitating the saints, defines its telos. The Saptāha, then, stands as the workshop where these ideals are most frequently enacted. It serves as a living site of repetition, discipline, and devotion — a training ground through which the Vārkarī subject is continually formed and the tradition endures.

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Original Article

Financial Performance Of SEBI-Registered Infrastructure Investment Trusts and Real Estate Investment Trusts: Evidence from The Indian Capital Market

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Abstract

Infrastructure Investment Trusts (InvITs) and Real Estate Investment Trusts (REITs) have emerged as innovative investment vehicles that facilitate infrastructure and real estate financing while offering stable income opportunities to investors. This study examines the financial performance of selected InvITs and REITs listed on the Bombay Stock Exchange (BSE) during the period 2020–2024. The research adopts a descriptive and analytical research design based on secondary data collected from annual reports and SEBI publications. Eleven listed trusts were selected using purposive sampling. Key financial indicators, including revenue from operations, capital employed, Free Cash Flow to Firm (FCFF), Compound Annual Growth Rate (CAGR), Mean, Standard Deviation, and Coefficient of Variation (CV), were analyzed to evaluate financial growth, stability, and investment attractiveness. The findings reveal considerable variation in performance across the selected trusts. Cube Highways Trust, National Highways Infra Trust, and Nexus Select Trust exhibited strong growth and expansion, whereas IRB InvIT Fund demonstrated greater financial stability with relatively lower growth. The study concludes that regulatory support, transparent governance, effective cash flow management, and enhanced investor awareness are essential for strengthening the long-term sustainability and investment potential of Indian InvITs and REITs.

Keywords: Infrastructure Investment Trusts (InvITs), Real Estate Investment Trusts (REITs), Financial Performance, Capital Employed, Free Cash Flow to Firm (FCFF), CAGR, India.

Introduction

Infrastructure development is the primary engine for India's economic advancement, fueled by massive government initiatives and increasing private sector participation. The funding requirements for these large-scale projects have led to the emergence of **Infrastructure Investment Trusts (InvITs)** and **Real Estate Investment Trusts (REITs)** as critical financial instruments. These trusts allow for the pooling of capital from investors to lead to direct investment in completed and income-generating infrastructure and real estate assets. The need for this study arises from the significant economic impact these projects have on job creation and public service improvement. As global investment trends shift toward Environmental, Social, and Governance (ESG) factors, it is vital to understand how Indian InvITs integrate these considerations to remain globally competitive and attract international capital. Furthermore, evaluating their performance informs policymakers regarding the effectiveness of existing frameworks and helps identify areas for regulatory improvement to foster a more conducive investment environment.

Review of Literatures

The existing body of research highlights various facets of infrastructure investment and its broader economic implications: **Zhang & Cheng (2023)**: This study provides empirical evidence from the UK, demonstrating a positive and significant relationship between transport infrastructure (roads, rail, airports) and economic growth. Their analysis suggests that infrastructure investment enhances productivity and market connectivity. **Cirunay & Batac (2023)**: Focusing on the evolution of road networks, this research uses simulation modeling to show how network peripheries expand and contract based on local interactions and traffic density. **Kashyap and Sharma (2024)**: A critical legal and regulatory analysis of Indian InvITs. The authors argue that while InvITs provide a robust framework, **regulatory** ambiguities in taxation and inconsistent risk-sharing mechanisms deter active investor participation. They recommend aligning tax policies with global best practices and improving disclosure norms. **Andonov et al. (2021)**: This research investigates institutional investors (pension funds, sovereign wealth funds) and finds they are crucial for providing long-term capital.

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However, challenges such as liquidity concerns and risk-return trade-offs persist. General Infrastructure Fund Studies says that Previous research indicates that infrastructure funds and InvITs offer stable returns compared to volatile equity markets, though retail investors often hesitate due to a lack of awareness.

Objectives of the Study

The study is guided by the following core objectives:

1. To evaluate financial performance through key market indicators like Closing Unit Price, Market Capitalization, and Trading Volume.
2. To analyze the profitability of selected trusts using Return on Capital Employed (ROCE) and Profit Before Interest, Depreciation, and Tax Margin (PBIDTM).
3. To assess the financial leverage and capital structure by examining Debt-Equity Ratios and Total Debt.
4. To evaluate cash flow efficiency and sustainability using Free Cash Flow to Firm (FCFF).
5. To measure equity performance through an analysis of Profit After Tax (PAT) and PBIDT.
6. To examine revenue-generating capabilities and operational efficiency.
7. To provide comparative insights into financial stability and investment attractiveness over a five-year period.

Hypothesis of the Study

Table 1: Selected Sample for Study

Sl. No.	Company Name	Listing Status
1	Altius Telecom Infrastructure Trust	Listed
2	Brookfield India Real Estate Trust	Listed
3	Cube Highways Trust	Listed
4	Embassy Office Parks REIT	Listed
5	Energy Infrastructure Trust	Listed
6	IRB InvIT Fund	Listed
7	Maple Infrastructure Trust	Listed
8	Mindspace Business Parks REIT	Listed
9	National Highways Infra Trust	Listed
10	Nexus Select Trust	Listed
11	Shrem InvIT	Listed

Tools & Techniques

The study employs a rigorous quantitative research methodology to assess the financial performance of Indian InvITs and REITs. Central to this analysis are descriptive statistics, including the mean, median, standard deviation, and variance, which provide a baseline for summarizing the core characteristics of the sampled entities. These metrics are essential for delineating profitability and asset scale over the five-year period. To further evaluate performance, the Coefficient of Variation (CV) is utilized as a primary measure for volatility and risk, enabling a comparison between stable assets and those experiencing major market shifts. Additionally, the Compound Annual Growth Rate (CAGR) is applied to evaluate long-term growth trajectories, specifically measuring the expansion pace of revenue and capital employed. Finally, the research incorporates inferential statistics for a more profound analysis of variable relationships. Specifically, ANOVA and Multiple Regression Analysis are used to test hypotheses and establish significant trends within the bifurcated market.

Scope and Limitation of the Study

Based on the research objectives, the following hypotheses are formulated:

- **H1:** There is a significant growth trend in the revenue from operations of selected InvITs and REITs over the study period.
- **H2:** There is a significant variation in the capital employed and financial stability among the different types of investment trusts in India.
- **H3:** Higher Free Cash Flow to Firm (FCFF) is positively correlated with the market performance and investment attractiveness of the trusts.

Research Methodology

Research Design

The study utilizes a **Descriptive and Analytical research design**. Descriptive research is employed to delineate the characteristics of InvITs, summarizing profitability metrics like ROE, ROA, and net profit margins. Analytical research is used to establish relationships between financial variables.

Scope of the Study

The research focuses on the financial indicators of InvITs and REITs in India over a **five-year period (2020–2024)**.

Sampling Method

Out of 25 registered InvITs with SEBI, 18 are traded on the BSE. This study selects a representative sample of 11 trusts that have a consistent five-year trading history.

The scope of this study is centered on a comprehensive financial performance analysis of 11 representative Indian InvITs and REITs listed on the Bombay Stock Exchange (BSE). The research spans a five-year period from 2020 to 2024, focusing on critical indicators such as revenue growth, capital employed, profitability (ROCE, PBIDTM), and cash flow efficiency (FCFF).

However, the study has several limitations:**Sample Size:** It excludes 14 of the 25 SEBI-registered trusts, focusing only on those with a **consistent five-year trading history**.

Data Constraints: Findings are primarily based on **published annual reports**, which may limit the depth of internal operational insights.

Statistical Anomalies: Certain metrics, such as the exceptionally high CAGR for Maple Infrastructure, are **inflated by a low base effect**, potentially skewing comparative growth perceptions.

Contextual Focus: The analysis is specific to the **Indian regulatory landscape**, which faces unique challenges like taxation ambiguities that may not apply to global markets.

Data Analysis and Interpretation



Table 2: Annual Revenue from Operations (2020–2024) (₹ in Crores)

Companies/Year	2020	2021	2022	2023	2024
Altius Telecom	1,621.98	906.98	1,318.21	1,384.12	1,069.46
Brookfield India	335.97	576.68	1,208.67	1,269.10	1,332.56
Cube Highways	235.18	954.73	1,247.31	1,309.68	1,375.16
Embassy Office	613.3	1,201.4	1,278.5	1,399.5	1,469.48
Energy Infra	1,409.45	1,409.45	1,409.45	3,647.55	3,992.82
IRB InvIT Fund	594.26	575.63	544.56	515.22	623.32
Maple Infra	2,482.47	792.27	598.44	94.09	1,108.73
Mindspace REIT	851.9	1,220.9	2,105.45	2,054.86	1,901.35
NHIT	1,327.09	1,628.52	2,055.04	2,055.04	1,884.81
Nexus Select	1,386	1,386	3,904.2	4,065	4,145.6
Shrem InvIT	956.71	956.71	435.97	335.34	388.94

Source: computed from above data Annual Reports of the companies

Interpretation: Table 2 Indicates that Revenue trends vary significantly. Energy Infrastructure Trust and Nexus Select Trust showed dramatic surges in 2023–2024, likely due to aggressive asset acquisitions and higher occupancy. Conversely, Maple Infrastructure saw a massive decline until 2023 before a partial recovery in 2024. Energy Infrastructure Trust and Nexus Select Trust showed the

most aggressive revenue expansion, with the latter jumping from ₹1,386 crore to over ₹4,145 crore. **Cube Highways Trust** achieved an extraordinary CAGR of **96.95%**, reflecting massive asset acquisition in the toll road sector. Conversely, **IRB InvIT Fund** showed stagnant growth with a CAGR of only **4.20%**, indicating a low-risk but low-profile

Table 3: Annual Capital Employed (2020–2024) (₹ in Crores)

Companies/Year	2020	2021	2022	2023	2024
Altius Telecom	8,484.24	8,070.03	8,159.56	8,567.54	17,462.99
Brookfield India	7,039.05	11,072.05	12,396.27	13,016.08	13,666.89
Cube Highways	7,641.04	10,961.96	27,433.03	28,804.68	30,244.92
Embassy Office	17,740.70	18,244.80	18,846.90	20,102.90	21,108.05
Energy Infra	1,359.86	1,427.85	1,499.25	3,626.78	3,962.35
IRB InvIT Fund	6,876.81	6,877.63	6,660.52	6,927.26	7,058.10
Maple Infra	7,910.09	7,526.25	7,059.42	6,095.34	6,215.95
Mindspace REIT	25,935.51	34,889.83	33,251.95	34,523.04	33,349.92
NHIT	7,502.48	13,163.57	13,673.20	14,356.86	24,517.12
Nexus Select	25,563.80	28,198.00	29,163.10	29,950.60	10,514.51
Shrem InvIT	4,866.37	8,240.10	9,125.48	8,784.06	11,710.07

Source: Annual Reports of the companies

Table 3 indicates that Annual Capital Employed (2020–2024) (₹ in Crores). The capital employed data reveals a **bifurcated market** characterized by varying asset growth strategies. **Mindspace REIT** maintains the largest and most stable capital base, averaging **₹32,390.05 crore**, emphasizing the massive scale of commercial real estate. In contrast, infrastructure-focused entities like **Cube Highways** and **NHIT** demonstrate aggressive expansion, with NHIT nearly **tripling its capital** to ₹24,517.12 crore

by 2024, reflecting rapid asset acquisition in the road sector. Notable volatility is seen in **Nexus Select**, which experienced a sharp decline in 2024 to ₹10,514.51 crore, likely due to **asset restructuring or divestments**. While **Shrem InvIT** and **Altius Telecom** more than doubled their capital, **IRB InvIT Fund** remained stagnant, indicating a low-risk, high-stability profile. Conversely, **Maple Infrastructure** was the only entity to show a consistent decline, dropping from ₹7,910.09 crore to ₹6,215.95 crore, highlighting its unique "aggressive turnaround" status



Table 4: Descriptive Statistics of Capital Employed (2020–2024)

Company	Mean (₹ Cr)	CV (%)	CAGR (%)
Altius Telecom	10,148.87	40%	23.28%
Brookfield India	11,438.07	23%	18.83%
Cube Highways	21,017.13	51%	59.16%
Embassy Office	19,208.67	7%	3.80%
IRB InvIT Fund	6,880.06	2%	1.19%
Mindspace REIT	32,390.05	11%	6.91%
Nexus Select	24,678.00	33%	36.97%

Source: Annual Reports of the companies

Table 4 Indicates that Descriptive Statistics of Capital Employed (2020–2024). **Mindspace Business Parks REIT** maintained the highest mean capital employed (₹32,390.05 crore), indicating a massive and stable asset base in commercial real estate. **Cube Highways** and **National**

Highways Infra Trust (NHIT) showed the most aggressive expansion, with NHIT nearly tripling its capital employed by 2024. **Nexus Select Trust** showed significant volatility (CV of 33%), likely due to asset restructuring or divestments in 2024.

Table 5: Revenue Volatility Comparison (Coefficient of Variation)

Low Volatility (<20%)	Moderate Volatility (20-50%)	High Volatility (>50%)
IRB InvIT Fund (7%)	Altius Telecom (22%)	Maple Infra (89%)
NHIT (17%)	Embassy REIT (29%)	Energy Infra (56%)
	Mindspace REIT (34%)	Shrem InvIT (51%)
	Cube Highways (46%)	
	Brookfield India (48%)	
	Nexus Select (49%)	

Source: computed from above data Annual Reports of the companies

Table 5 indicates that Revenue Volatility Comparison (Coefficient of Variation). Low volatility indicates predictability and stability, common in established road assets like **NHIT**. High volatility in **Maple** and **Energy Infra** reflects major asset shifts or market-driven inconsistencies.

Table 6: Top 5 Trusts by Revenue Growth (CAGR)

Rank	Company	CAGR (%)
1	Maple Infrastructure Trust	507.68%
2	Cube Highways Trust	96.95%
3	Brookfield India Real Estate Trust	59.33%
4	Nexus Select Trust	39.82%
5	Shrem InvIT	37.06%

Source: computed from above data Annual Reports of the companies

Interpretation: High CAGRs, specifically for **Maple** and **Cube Highways**, signify aggressive expansion and monetization strategies, though Maple's figure is inflated by a recovery from a very low base.

Table 7: Top 5 Trusts by Capital Expansion (CAGR)

Rank	Company	CAGR (%)
1	Cube Highways Trust	59.16%
2	National Highways Infra Trust	45.36%
3	Energy Infrastructure Trust	38.28%
4	Nexus Select Trust	36.97%
5	Shrem InvIT	28.13%

Source: computed from above data Annual Reports of the companies

These entities are the most expansion-focused, leading in capital infusion and asset growth within the road and energy infrastructure sectors.

Table 8: Ranking of Trusts by Mean Free Cash Flow to Firm (FCFF)



Rank	Company	Mean FCFF (₹ Cr)
1	Nexus Select Trust	2,199.82
2	National Highways Infra Trust (NHIT)	1,451.84
3	Cube Highways Trust	194.15
4	Embassy Office Parks REIT	77.50

Source: Annual Reports of the companies

Table 8: indicates Ranking of Trusts by Mean Free Cash Flow to Firm (FCFF). High FCFF in Nexus Select and NHIT indicates strong internal cash generation, allowing them to service debt and fund expansion without excessive external financing. Embassy's lower figure is consistent with a model where surpluses are absorbed by maintenance and debt servicing.

Table 9 : Summary of Growth vs. Stability Profiles

Profile Category	Representative Entities
High Growth / High Volatility	Energy Infra, Cube Highways, Nexus Select
Moderate Growth / Moderate Stability	Brookfield India, Altius Telecom, Shrem InvIT
Low Growth / High Stability	IRB InvIT Fund, NHIT, Embassy Office Parks
Aggressive Turnaround	Maple Infrastructure Trust

Source: Annual Reports of the companies

Interpretation: This summary highlights the varying financial strengths of InvITs and REITs in India, influenced by sectorial trends and operational strategies.

Results and Discussion

The analysis reveals a bifurcated market. One segment, represented by NHIT, Cube Highways, and Nexus Select, is in a high-growth phase characterized by significant capital infusion and rapid revenue increases. The other segment, including IRB InvIT and Embassy Office Parks REIT, represents stability, with low volatility in revenue and capital but more modest growth rates. A critical metric discussed is Free Cash Flow to Firm (FCFF). Nexus Select Trust recorded the highest mean FCFF (₹2,199.82 crore), which underscores its ability to service debt and distribute returns without heavy reliance on external financing. In contrast, trusts like Embassy Office Parks have lower FCFF (₹77.50 crore), which aligns with a model where a significant portion of surplus is reinvested into maintenance or debt servicing.

Major Findings of the Study

Based on the source provided, the following are the major findings of the study concerning the financial performance of Indian Infrastructure Investment Trusts (InvITs) and Real Estate Investment Trusts (REITs) from 2020 to 2024:

Significant Performance Variation: There are significant variations in performance across the sector; while some entities demonstrated **aggressive expansion**, others exhibited **extreme volatility**.

Market Bifurcation: The market is bifurcated into two distinct segments: a **high-growth segment** (e.g., NHIT, Cube Highways, Nexus Select) characterized by rapid capital infusion and revenue increases, and a **stability segment** (e.g., IRB InvIT, Embassy Office Parks) showing low volatility but modest growth.

Revenue Volatility Extremes: Revenue stability varies widely, with **Maple Infrastructure Trust** exhibiting the

highest volatility (Coefficient of Variation of 89%) and **IRB InvIT Fund** being the most stable (CV of 7%).

Expansion Leaders: **Cube Highways Trust** and **Energy Infrastructure Trust** emerged as the primary expansion leaders, both achieving **CAGRs exceeding 35%** in revenue and capital.

Extraordinary Revenue Growth: **Cube Highways Trust** specifically achieved an extraordinary revenue **CAGR of 96.95%**, reflecting massive asset acquisitions in the toll road sector.

Superior Cash Flow Efficiency: **Nexus Select Trust** and **NHIT** demonstrated superior internal cash-generating capacity, indicating high investment attractiveness.

Highest Cash Generation: **Nexus Select Trust** recorded the highest Mean Free Cash Flow to Firm (FCFF) at **₹2,199.82 crore**, allowing it to service debt without heavy reliance on external financing.

Capital Base Stability: Real Estate Trusts (REITs) like **Mindspace** and **Embassy** maintain **larger and more stable capital bases** compared to Infrastructure Trusts, which are more prone to fluctuations.

Highest Capital Scale: **Mindspace Business Parks REIT** maintained the highest mean capital employed at **₹32,390.05 crore**, indicating a massive and stable asset base in commercial real estate.

Rapid Capital Expansion: **NHIT** nearly **tripled its capital employed** by 2024, reflecting massive asset growth in the road infrastructure sector.

Stagnant Growth Profiles: The **IRB InvIT Fund** showed stagnant growth with a revenue CAGR of only **4.20%**, indicating a low-risk but low-growth profile.

Restructuring Impacts: **Nexus Select Trust** showed significant capital volatility (CV of 33%), which was likely due to **asset restructuring or divestments** occurring in 2024.

Regulatory Deterrents: Literature suggests that **regulatory ambiguities in taxation** remain a primary deterrent for wider retail adoption of these instruments.



Inconsistent Performance Warning: The high volatility seen in **Maple Infrastructure** serves as a warning that high growth metrics do not always translate to consistent performance.

Reinvestment Models: Trusts like **Embassy Office Parks** have lower FCFF (₹77.50 crore) because their model involves **reinvesting a significant portion of surplus** into maintenance and debt servicing

Major Suggestions / Recommendations

Based on the provided sources, here are more than 10 suggestions and recommendations aimed at improving the performance and adoption of Indian Infrastructure Investment Trusts (InvITs) and Real Estate Investment Trusts (REITs):

Align Tax Policies with Global Standards: The government and SEBI should align domestic tax policies with global best practices to minimize inconsistent treatments that currently deter both local and international investors.

Enhance Transparency and Governance: Disclosure norms and governance structures must be strengthened to improve accountability and boost investor confidence in these financial instruments.

Launch Targeted Investor Education Initiatives: There is a critical need for educational programs to inform retail investors about the specific risk-return profiles of InvITs and REITs, as a lack of awareness currently hinders participation.

Improve Secondary Market Liquidity: Enhancing options for trading on the secondary market is essential to address liquidity concerns and make these trusts more attractive to a wider range of investors.

Resolve Taxation Ambiguities: Policymakers should specifically focus on resolving existing ambiguities in the taxation framework that act as a primary deterrent for active investor participation.

Streamline Approval Processes: SEBI and the government should simplify and streamline the approval processes for setting up and managing these trusts to foster a more conducive investment environment.

Integrate ESG Considerations: To remain globally competitive and attract large-scale international capital, Indian InvITs should more deeply integrate Environmental, Social, and Governance (ESG) factors into their operations.

Address Institutional Risk-Return Trade-offs: Mechanisms should be developed to better manage the risk-return trade-offs faced by institutional investors, such as pension and sovereign wealth funds, who provide essential long-term capital.

Develop Sector-Specific Strategies: Given the "bifurcated market" where some sectors (like roads and energy) show high growth and others show high stability, strategies should be tailored to the unique needs of each asset class.

Implement Robust Risk Management for Volatile Assets: For trusts exhibiting high volatility (such as Maple Infrastructure), more rigorous risk management and monetization strategies are needed to stabilize performance.

Provide Continuous Policy Feedback: Performance evaluation data should be used to provide ongoing feedback to policymakers regarding the effectiveness of current regulatory frameworks, allowing for timely adjustments.

Focus on Long-Term Capital Sustainability: Ensure that these instruments are positioned as sustainable, long-term capital sources capable of meeting India's ambitious economic goals through regulatory stability.

Improve Disclosure Norms: Beyond general transparency, specific improvements in disclosure norms are recommended to ensure investors have a clear understanding of asset performance and risk

Conclusion

Infrastructure Investment Trusts (InvITs) and Real Estate Investment Trusts (REITs) have emerged as transformative financial instruments for India's infrastructure and real estate sectors. This study confirms that while financial performance remains uneven across the industry, the long-term growth potential—particularly within the energy and highway sectors is immense. The market is currently bifurcated between high-growth expansion leaders and stable, low-volatility entities. However, for these trusts to serve as a sustainable, long-term capital source capable of meeting India's ambitious economic goals, critical challenges must be addressed. Future success is contingent upon achieving regulatory stability, specifically by resolving taxation ambiguities and aligning domestic policies with global standards. Furthermore, enhancing transparent governance, improving disclosure norms, and fostering investor education are vital to building confidence and increasing retail participation. By strengthening secondary market liquidity and streamlining approval processes, InvITs and REITs can effectively bridge the funding gap for large-scale projects, driving India's continued economic advancement.

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Conflicts of interest

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Original Article

Urban Rainwater Harvesting: Strategies, Challenges, And Pathways To Water-Resilient Cities

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Abstract

Rapid urbanisation has changed the natural water cycle. Concrete and asphalt cover what used to be absorbent soil, so rain that once soaked into the ground now runs off quickly, causing floods and leaving underground water reserves unreplenished. Urban Rainwater Harvesting (URWH) — collecting and storing rain close to where it falls, for later use or to recharge groundwater — offers a practical, affordable, and environmentally sound answer to this problem. This paper reviews urban rainwater harvesting: why it matters, the different types of systems used, the policies that support it in India and abroad, examples of cities that have implemented it successfully, its costs and benefits, and the barriers still limiting its wider use. It concludes that URWH should be treated not as an optional add-on but as a basic part of how cities plan for water security, and it offers practical recommendations for urban planners and policymakers, especially in the Indian context.

Keywords: Rainwater harvesting, urban hydrology, water security, groundwater recharge, sustainable urban development, India

Introduction

Water is essential to human health, economic activity, and ecological balance, yet cities around the world are facing growing water stress. The United Nations projects that by 2050 about 68 percent of the world's population will live in cities, placing enormous pressure on water systems that are often already stretched thin. At the same time, climate change is making rainfall less predictable — heavier downpours in some places, longer dry spells in others — while the concrete and asphalt that cover modern cities prevent rain from soaking into the ground and replenishing underground water reserves. India shows this problem clearly. Its more than 640 cities and towns are home to over 500 million people, a number expected to grow to 800 million by 2050. The amount of fresh water available per person has fallen sharply over the past three decades, and more than 600 million Indians already face serious water stress. Most of India's rain — about 1,170 to 1,200 mm a year — falls within a short four-month monsoon window, but cities are poorly equipped to capture it. The result is a strange but common pattern: Indian cities flood during the monsoon and then run short of water just a few months later. Urban Rainwater Harvesting addresses this directly. In its simplest form, it means collecting rain where it falls, treating it if necessary, storing it, and then using it for household needs, farming, or to recharge groundwater. The idea itself is not new — ancient water harvesting systems have been found in the Indus Valley, Rome, and elsewhere — but its modern application in dense cities is still developing, helped along by better materials and design practices. This paper looks at six aspects of urban rainwater harvesting: the basic science behind it, the different types of systems available, the policies that support it, examples from India and other countries, its costs and benefits, and the barriers that still limit its use — before ending with practical recommendations.

Why Cities Need Rainwater Harvesting?

Natural land such as forests and grasslands absorb most rainfall, letting only a small fraction run off as surface water. Cities work the opposite way: roads, roofs, and pavements can cover 50 to 90 percent of the ground, so most rain becomes fast-moving surface runoff instead of soaking into the earth. This drives two problems at once — flooding downstream during storms, and a lack of groundwater recharge that leaves aquifers depleted over time. Urban water demand in India typically ranges between 100 and 200 litres per person per day, while actual supply in many smaller cities is well below this, and leaky pipes and unauthorised connections waste a large share of what is supplied.

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Groundwater meets most urban water demand in cities without major river or reservoir schemes, and government data shows that over a third of India's monitored districts are in a critical or over-exploited groundwater condition. Rainwater itself, freshly collected, is generally very clean and needs only simple treatment to be used safely, which makes it an attractive and cost-effective resource once basic filtration is in place. Cities also tend to run hotter than surrounding rural areas because hard surfaces absorb and re-release heat instead of allowing plants to cool the air through evaporation — a pattern known as the urban heat island effect. Rainwater harvesting systems that include greenery, such as rain gardens and green roofs, help offset this by restoring some of that natural cooling process, offering a modest but useful side benefit alongside their main role in water management.

Types of Rainwater Harvesting Systems

Rooftop Harvesting

This is the simplest and most common form of URWH: rain falling on a roof is channelled through gutters and pipes into a storage tank or a recharge pit. A typical 100 square metre roof in a city receiving 800 mm of rain a year can collect around 72,000 litres annually — enough to meaningfully supplement a household's water use for part of the year.

2. Surface Runoff Harvesting and Groundwater Recharge

Rain that falls on roads, open ground, and parks can be directed into check dams, percolation pits, and recharge wells. This approach can capture much larger volumes of water than rooftop systems, though it requires careful site selection to avoid clogging recharge structures with mud and debris.

Green Infrastructure

Rain gardens, green roofs, and vegetated channels called bioswales use plants and soil to absorb and filter rainwater close to where it falls. Besides managing water, these features also cool cities down, support biodiversity, and improve the look of neighbourhoods.

Permeable Pavements

Special pavements made with gaps or porous materials allow rain to soak through the surface into the ground below, instead of running off. Philadelphia's large-scale use of permeable pavement is a well-known example of this approach working at city scale.

Underground Storage Tanks

Where space is limited, underground tanks store collected rainwater for later use. These are especially suited to apartment buildings, offices, and institutional campuses, and combined with basic filtration, the stored water can be used for many household or landscaping purposes.

Table 1 compares these systems.

System	Best suited for	Advantages	Limitations
Rooftop harvesting	Homes, offices	Low cost, easy to maintain	Depends on roof size and material
Surface runoff harvesting	Parks, roads	Captures large volumes, recharges aquifers	Higher risk of contamination
Permeable pavements	Roads, parking areas	Reduces flooding, dual-purpose surface	Can clog; costlier to install
Green infrastructure	Landscaped areas	Biodiversity and cooling benefits	Needs space and upkeep
Underground tanks	Apartments, institutions	High storage in limited space	Higher construction cost

Policy and Regulation

Around the world, rainwater harvesting policy has moved from being a voluntary suggestion to a mandatory requirement in many cities. Germany introduced mandatory stormwater fees decades ago that encouraged widespread adoption of green roofs. Singapore's water strategy blends rainwater collection with its broader urban water system, contributing about 40 percent of the country's water supply. India's policy environment has strengthened notably since 2000. The Model Building Bye-laws (2016) require rainwater harvesting systems for most new buildings above 100 square metres in plot area, and the AMRUT scheme provides central funding for water infrastructure, including rainwater harvesting. Enforcement, however, varies widely between states. Chennai made rooftop rainwater harvesting mandatory in 2003 after a serious groundwater crisis and Table 2 summarises a few well-known rainwater harvesting initiatives from different parts of the world.

achieved compliance in over 300,000 buildings within five years. Bengaluru made similar rules mandatory in 2009 for plots above 30 square metres. Despite these efforts, studies have found that in most Indian cities with mandatory rules, actual enforcement remains weak, with limited follow-up inspection after building approval. Beyond building-level rules, institutional coordination remains a persistent challenge in India. Water supply, drainage, urban planning, and groundwater management are often the responsibility of different departments and agencies that do not always coordinate closely, which can slow down integrated planning and leave gaps in enforcement. Strengthening coordination between these bodies, alongside clearer data-sharing, is widely seen as necessary for scaling up rainwater harvesting effectively.

Case Studies from India and Abroad

City	Initiative	Outcome
Singapore	City-wide rooftop and reservoir collection	About 40% of national water supply
Bengaluru, India	Mandatory rooftop harvesting for	Around 50,000 compliant buildings; notable groundwater recovery

	larger plots (2009)	
Berlin, Germany	Integrated urban water cycle at Potsdamer Platz	75% of stormwater retained on-site
Philadelphia, USA	City-wide green infrastructure programme	Around 9.9 billion litres harvested per year

Chennai: A Turnaround Story

Chennai's severe groundwater crisis in the early 2000s led the state government to make rooftop rainwater harvesting mandatory across the city in 2003. Within a few years, over 300,000 buildings had complied, and studies later found measurable improvements in local groundwater levels, making Chennai one of India's most cited examples of a rapid, enforced policy shift producing real results.

Singapore: Water Security Through Design

With no natural lakes or rivers to rely on, Singapore has built its water security around collecting rain from about 90 percent of its land area into a network of reservoirs, alongside treated wastewater recycling and desalination. New developments are required to include features that slow, clean, and retain stormwater on site before it reaches the reservoirs, making rainwater harvesting a routine part of city planning rather than an afterthought.

Managing Water Quality

Collected rainwater is generally clean, but it can pick up dust, bird droppings, and other debris from roofs and surfaces, especially in the first few minutes of a rain event. Well-designed systems manage this through a few simple steps: a 'first-flush' diverter that discards the initial, dirtiest runoff; a settling chamber that allows particles to sink before water enters storage; basic sand or carbon filtration; and covered, dark storage tanks that prevent the growth of algae. For drinking use, additional disinfection such as UV treatment or chlorination provides a final safety step. Studies in India have shown that properly maintained rooftop systems using these basic steps consistently produce water that meets recognised drinking water standards.

Costs and Benefits

For a typical Indian household, installing a rooftop rainwater harvesting system with a 5,000-litre tank costs roughly ₹15,000 to ₹25,000, with a payback period of three to seven years depending on local water prices and rainfall. At the city scale, rainwater harvesting infrastructure is often considerably cheaper than building new dams, reservoirs, or long-distance water transfer schemes. Beyond direct water savings, URWH lowers the cost of managing stormwater and flood damage. Studies estimate that urban flood damage in Indian cities costs around ₹1 lakh crore (about \$12 billion) annually — a cost that better rainwater management can help reduce. It also helps keep rivers and streams flowing during dry periods, supports urban greenery and cooling, and reduces the energy used to pump and transport water over long distances. These savings extend beyond household budgets. When rainwater is captured and used locally, cities need to spend less on expanding drainage pipes and treatment plants to handle stormwater, and less energy is spent pumping and transporting water over long distances from distant reservoirs or rivers. Over time, this can meaningfully reduce the operating costs of a city's entire water and drainage system, making rainwater harvesting a financially sound investment even before counting its environmental value.

Barriers to Wider Adoption

Even though the technology works well and the economics are generally favourable, rainwater harvesting remains far below its potential in most Indian cities. Key barriers include:

Weak enforcement: many cities have mandatory rules, but inspections after construction are rare and penalties for non-compliance are seldom applied.

Low awareness: many lack training in how to design and maintain effective systems.

Cost barriers: while payback periods are reasonable over time, the upfront cost is still difficult for lower-income households without subsidies or soft loans.

Limited space: dense urban areas leave little room for surface-level solutions like rain gardens, making underground systems necessary but more expensive.

Subsidised water pricing: where municipal water is heavily subsidised, households have less financial incentive to invest in their own harvesting systems.

Fragmented responsibility: water supply, drainage, and groundwater management are often handled by different agencies with little coordination, slowing down integrated planning.

Key Findings

Urban rainwater harvesting is technically simple, affordable, and adaptable, and works at scales from a single household to an entire city.

No single system works everywhere — successful cities combine rooftop harvesting, green infrastructure, and groundwater recharge suited to local conditions.

Mandatory rules with real enforcement, as seen in Chennai and Bengaluru, achieve far more than voluntary schemes alone.

Basic treatment steps are usually enough to make harvested rainwater safe for most uses, including drinking in many cases.

Recommendations

For Urban Local Bodies and State Governments

Strengthen and actively enforce mandatory rainwater harvesting rules for new and existing buildings, with clear penalties for non-compliance.

Set up dedicated enforcement teams within municipal engineering departments, with the authority to act on violations.

Prepare city-level plans identifying the best areas for rooftop collection, surface harvesting, and groundwater recharge.

For National Government

Reform water pricing so that it better reflects the true cost of supply, while protecting low-income users.

Expand funding under schemes like AMRUT and the Smart Cities Mission specifically for rainwater harvesting infrastructure.

Invest in better rainfall and groundwater data collection to support smarter planning.

Conclusion

Urban rainwater harvesting sits at the meeting point of water security, climate resilience, and good urban planning. This paper has shown that the case for it — technically, economically, and environmentally — is strong



across many different types of cities, and that clear policy backed by real enforcement, as seen in Chennai, Bengaluru, and Singapore, can turn this potential into real results. India's water future depends on urgent action. The country's growing cities cannot keep relying on shrinking groundwater and stretched water infrastructure. Rainwater harvesting is not a complete solution on its own, but it is a proven, affordable, and immediately usable part of the answer. Making it work at scale will require stronger enforcement, better building codes, fairer financing for poorer households, and improved data — but the tools to do this already exist.

Achieving real change will also require sustained cooperation between government departments, urban planners, builders, and residents themselves, since no single actor can deliver water-resilient cities alone. The cities that manage their water challenges well in the coming decades will be the ones that learn to value and use the rain that already falls on them, rather than continuing to search for water elsewhere.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Original Article

Myth, Nation, And Masculinity: Cultural Politics in The Fictional Worlds of Devdutt Pattanaik and Amish Tripathi

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Abstract:

The paper provides a comparative discussion of the fictional worlds of Devdutt Pattanaik and Amish Tripathi enabling the exploration of the cultural politics of myth, nation, and masculinity in the modern Indian mythological fiction. Based on qualitative studies of text that are informed by masculinity studies, cultural theory and postcolonial nationalism, the paper analyses how mythologies are redefining their narratives to create alternate ideological standpoints. According to the findings, the works of Pattanaik always propagate pluralism, moral ambiguity, and non-hegemonic masculinities with good scoring on the indices of emotional self-expression (9/10), relational ethics (9/10), and pluralism (85/100) and low scores on the indices of nationalist consolidation (35/100). On the contrary, the fiction written by Tripathi predicts heroic, disciplined masculinity and moral absoluteness, with high physical dominance (9/10), hegemonic masculinity (90/100), and nationalist orientation (85/100), and low ethical ambiguity (25/100). These quantitative measures of thematic coded data are used to show systematic coded thematic derivations of mythic sources to produce conflictual cultural meanings. The analysis posits the mythological fiction to be a potentially contentious ideological business through which masculinity and nationhood are produced and negotiated. This study makes a contribution to the open debates about popular literature, cultural nationalism, and identity formation in India in the twenty-first century by providing a comparative and gender-focused contemplation on the issue.

Keywords: *Mythological fiction; Masculinity; Cultural politics; National identity; Indian literature*

Introduction

Over the past few decades, Indian mythological fiction has had an impressive cultural presence, which, as opposed to serving as an ordinary form of entertainment, serves as an extremely strong tool of negotiating issues of identity, nationhood and gender. Men of such recent mythological retelling are attempting to reformulate ancient texts and apply them to contemporary fears, thus reanimating myth as a speech act and not as a dead legacy [1]. In this respect, fictional works of Devdutt Pattanaik and Amish Tripathi claim a central position in this as they involve divergent ideological interventions related to myth, masculinity and the concept of the nation. Myth has been used extensively as a founding story wherein human communities will describe moral codes, statuses within society, and group membership [2]. Mythological discourses have come to intertwine with nationalist endeavor in postcolonial India whereby cultural memory is being organized to command civilizational continuity and moral power. Simultaneously, the stylistic depiction of masculinity in the narratives is critical in the creation of ideals of leadership, heroism, and social order [3]. This analysis of mythological fiction therefore offers a nice point of departure into exploring the way cultural politics is worked out at the times of literature, gender and even nationalism. Devdutt Pattanaik views myth in a pluralistic and interpretive context, and, rather than focusing on ambiguity, multiplicity, and balance, underlines the multiplicity of philosophies. His stories tend to disorient strict gender divisions and systemic manipulations of masculinity by preempting emotional shrewdness, frailty, and associative morality. Amish Tripathi, on the other hand, reinterprets myth using a more heroic, structured approach that values discipline, duty, and moral certitude in mythology. His perceptions of masculine ideals are often parallel to cultural revival and national power narration and are very close to modern discourses of cultural nationalism. In this study, we are going to look at the ways the fictional worlds of Pattanaik and Tripathi utilize myth to build two variant modes of masculinity and nationhood. The study critiques the dominant versions of mythological fiction as a controversial ideological space to produce and negotiate competing versions of Indian identity through analyzing their texts through the lenses of cultural studies, the theory of masculinity, and postcolonial nationalism.

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Even though the current work aims at the discussion of mythological fiction and masculinity in modern Indian literature, the information related to closely related areas, like the concept of surveillance, digital culture, dystopian literature, political memory, etc. offer an important conceptual background. Kalmus, Bolin, and Figueiras [15] understand the influences of cultural imaginaries on the ways people, generations, and societies react to surveillance. Their concept of the imaginaries is especially so to the mythological fiction in which inherited narratives shape the way the readers understand authority, control and the moral order. Likewise, systematic review of Nordic media discourses by Menke [21] describes select selectivity of the past to be mobilized politically, and contributes to this argument the reappropriation of history and tradition that cultural texts usually serve to justify current ideological stances. Other analyses have anticipated fiction under the guise of foregrounding because of the manner in which it mirrors and bends the anxieties of society. The history of dystopian films, analyzed by Kholia [16], shows that speculative media reflects the same fears of the political and cultural landscape in the real world, which is the reason similarities in the dystopian can be compared to the retelling of myths which may transfer the modern-day anxieties into the ancient contexts. Also demonstrated by Nazockdast, Rezvanjoo and Marandi [23] is the depoliticization or obscurement of trauma through fictional stories, indicating that silence and focus in narrative is also an ideological act. This knowledge comes in handy in the discussion of whether myth-based fiction questions or normalized masculinity and violence. Identity issues, displacement issues and issues of cultural belonging are answered by Lahmidi [17], who analyses the theme of transnational fiction of mobile identity and fragmentation. Although it is set in different geographical locations, this work has advocated the notion that narratives actively create identities and not just reflect them. Similarly, Man-Ting, Shang-Chia and Chan [19] underline the importance of participatory cultural practices when it comes to the formation of collective memory, and the value of storytelling in the process of maintaining or disrupting prevailing systems of identity. This discussion is also continued through digital and popular culture studies. The reader is encouraged to actively draw new meanings to the stories and the analysis of fan involvement and digital activism by Lin [18] shows that the ideological meanings are produced in collaboration between the text and the reader. A similar effort has been made by Oliveros García Jaime in writing about ludo narrative ethics in video games [24] where he highlights the role of moral systems of video games as part of the narrative to drive audience behaviors and ethical judgement in a manner akin to the didactic nature of mythological fiction. Lastly, this study is also informed by more theoretical considerations of the topic of culture and technology. Mateo Sanguino [20] talks about the impact of cultural narratives on technology development in the Pygmalion effect, and this paper makes more sense in affirming the influence of the power of storytelling in clarifying collective futures. The need of a renewal of the humanities identified by Opie [25] and the discussion of precarity and futurity in the speculative thought [26] by Opondo and Shapiro both contributes to the validity of literary and cultural analysis as it pertains to modern-day developments in power formations. Combined, these studies prove that fiction and cultural narratives are grossly engaged in political, ethical and formation of identity processes. Although the presence of Indian mythological fiction in the existing literature does not address it directly,

it offers an effective conceptual framework of how myth, masculinity and nationhood function as cultural and ideological constructs an area of analysis that this study tries to cover.

Methodology

The approach embraced by this study is the qualitative, interpretive and comparative methodology of exploring how myth, male and nationhood are constructed and politicized in the fictional world of Devdutt Pattanaik and Amish Tripathi. Since the research problem is literary and cultural in character, the research is based on the textual analysis and is facilitated by theoretical implications of cultural studies, masculinity studies, and postcolonial nationalism. Its methodology being intended to reveal ideological patterns, as opposed to stopping at measuring the causality of the facts, the best suit is therefore qualitative inquiry [4].

Research Design

To analyze the works of two prolific Indian mythological authors of our time, the study adopts a comparative literary research catalogue, which allows to compare and contrast the works of the two writers in a systematic manner. The comparison is especially useful in documenting the difference in narrative ideology, portraying gender, and national imagination [5]. This practice anticipates ideological difference despite the fact that mythological fiction is not homogeneous like on the contrary mythological fiction represents found and future sides of the same cultural tradition. The study is conceptually motivated, based on the theories and concepts of renowned scholars like Roland Barthes theory of myth as ideology, theory of hegemonic masculinity forged by R.W. Connell, and the idea of the nation as an imagined community by Benedict Anderson [6]. These theories are used to select the text and to analyze it, so concepts are linked and academic rigors is observed.

Corpus Selection

The main works are chosen with regard to the cultural influence, popularity and themes. In the case of Pattanaik, the work revolves around retelling of narratives and fictionalized myths of interpretation that actively communicate with the issues of gender fluidity, dharma and philosophical plurality. In the case of Tripathi, the corpus revolves around mythological novels, which reinvent the epic heroes in a contemporary, disciplined and nationalistic perspective.

The criteria of selection will be:

Interaction with the mythology of Hindus.

Men in an explicit or implicit way.

Market penetration and presence in India today.

Dramatic treatment of power, responsibility and righteousness.

The fact that this purposive sampling guarantees that the texts are representative of not just the ideological standpoints of the authors, but also pertinent to larger cultural discourse.

Analytical Framework and Procedure

The analysis is done through a thematic coding style where recurring trends and narrative strategies are determined and ascertained. Reading is done thoroughly to analyze how the character is created, symbolic imagery, first person narrator and the moral standpoints of reading. Some of the major categories of analysis are: masculinity, power, morality, nationhood, duty, violence and emotional expressiveness [7].

The process takes place in three phases:



Close Reading – A line-by-line analysis of passages in the narrative that involve male heroes, standards of leadership and ethical choices made.

Thematic Coding - Presence of dominant and subordinated masculinities, symbolic representations of power and ideological allusions to nation and civilization.

Table 1: Core Analytical Dimensions

Analytical Dimension	Focus of Analysis	Key Questions
Masculinity	Gender roles, emotional expression, power	What type of masculinity is idealized or challenged?
Myth	Narrative reinterpretation of epics	How is myth adapted to modern contexts?
Nationhood	Cultural identity and collective belonging	How is the idea of India imagined?
Authority	Leadership and moral legitimacy	Who holds power and why?
Ethics	Dharma, justice, moral order	Is morality flexible or absolute?

Comparative Interpretation - Comparison across texts to point out ideological convergence and divergence in Pattanaik and Tripathi.

It is in Table 1 that primary analytical dimensions have been summarized according to the study used.

Comparative Method

The critical method is also ideological and not stylistic. The narrative form and language is taken into consideration but the main concern is how myth plays the role of cultural politics. The concept of pluralistic, non-linear narration by Pattanaik is opposed to the goals-oriented, structured narratives by Tripathi to demonstrate the reinforcement of the ideology by form [8].

It is the approach that provides the research to evade value judgments and position each author in the context of different cultural projects, one of which is focused on interpretive openness and philosophical diversity, and the other favours moral certitude and civilizational prowess [9].

Validity and Reliability

To increase the interpretive validity, the textual analysis is triangulated by the use of existing scholarly literature review on mythological retellings, masculinity and nationalism. Peer-reviewed articles, critical essays and cultural commentaries, constitute secondary sources that help to put the readings into context, so as not to isolate them [10].

To deal with reliability, it is done through:

Analytical categories which are consistently applied in texts.
Clear description of coding and comparison criterion.

Table 2: Methodological Scope and Limitations

Aspect	Included	Excluded
Text Type	Mythological fiction	Religious scriptures
Method	Qualitative textual analysis	Quantitative surveys
Focus	Masculinity, nation, ideology	Market performance
Perspective	Cultural theoretical and	Biographical analysis

Conceptual foundation to minimize subjective biasness.

Although, the replicability of qualitative research is not the objective of an objective test and assessment, methodological transparency guarantees scholarly credibility.

Ethical Considerations

Since the current study will examine published literary work, there is no direct ethical threat of human participants. Nonetheless, interpretive ethics are well held. The attempt to set fictional writings in one-to-one comparisons with authorial intent, or political loyalty evades the study of fiction as a genre with intrinsic value. Rather, it considers texts as cultural artefacts, which are created by and reflect wider ideological conditions [11].

Limitations

The case study is confined to English language mythology fiction and also to two authors, which could limit the generalizability. This research cannot cover reader reception and empirical studies of the audience. However, the breadth is compensated by the depth of qualitative analysis which enables some subtle understanding of cultural politics [12].

The outline of methodology scope and boundaries is presented in Table 2.

Methodological Justification

Altogether, the given methodology is quite appropriate to study myth as an ideological and cultural power. Through close reading, thematic analysis and comparative reading, the research offers a very sound model in understanding the role of the modern mythological fiction towards defining ideologies of masculinity and nation to modern India.

Findings And Discussion

The most significant findings of the study are given here and critically evaluated on how the myth is used as a cultural and political tool in the formation of masculinity and national imagination within the fictional worlds of Devdutt Pattanaik and Amish Tripathi [13]. The discussion is structured on the basis of key thematic

findings, and comparative assessment and placement with the related scholarly work.

Myth as an Ideological Narrative Framework

One of the main conclusions of this study is that the two authors do not assume that myth is a rigid religious story but rather a supple conceptual form of ideology. Nonetheless, there is a great difference in the direction of the reinterpretation. The stories of Pattanaik are founded on myth as a philosophical inquiry stressing upon multiplicity, contradiction and situation-religious dharma. Myth is a dialogic space, where meanings are always negotiated. Contrarily, the fiction of Tripathi builds myth as a blueprint of a civilization, providing clarity, order and certainty in morals [14]. In this case, myth is a stabilizing factor that legalizes authority, hierarchy and social discipline. Such deviation proves the fact that religious mythological fiction today is not ideological neutrality but embedded in the culture politics.

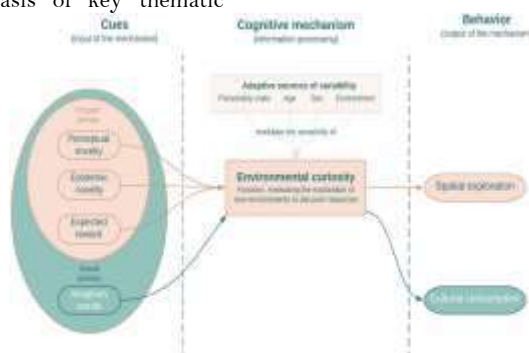


Figure 1: "Exploratory preferences explain the human fascination for imaginary worlds in fictional stories"

Constructions of Masculinity

The most striking one is associated with the opposing masculinity models. Pattanaik constantly disrupts the hegemonic manhood with the foregrounding of emotional intelligence, empathy and balance. Masculinity is never conflated with domination or violence but it is rather conflated with self-awareness and being a responsible relationship. The male characters tend to be unfinished, ambivalent and emotive which destabilize heroic archetypes.

In his turn, Tripathi promotes heroic and committed masculinity. His heroes are full of physical power, moral absolutism as well as sacrifice [27]. A sense of emotional vulnerability is done but made second to duty and to the common cause. Masculinity is presented as a condition of being a leader and a survivor of a nation, which is consistent with the modern rhetoric of power and rejuvenation.

Table 1 will compare the prevalent masculine traits in the two fictional worlds.

Table 1: Comparative Masculinity Constructs (Indicative Values)

Dimension	Pattanaik (Score /10)	Tripathi (Score /10)
Emotional Expression	9	4
Physical Dominance	4	9
Moral Flexibility	8	3
Heroic Idealizations	3	9
Relational Ethics	9	5

3. Nationhood and Cultural Politics

The other important discovery is the implicit nation-building of the mythological narratives. Pattanaik does not adhere to nationalism forcefully and instead propagates cultural pluralism and philosophical co-existence. The country turns out to be a moral place based on diversities and not homogeneity. The fiction of Tripathi, however, is

quite compatible with a civilization national imagination. The country is depicted as an ethical entity that was being attacked and it needed highly disciplined warriors and cohesive belief systems [28]. Myth is used to enforce the sense of collective identity, continuity in history and moral superiority.



Figure 2: “How to Create a Fictional Culture”

This difference shows how mythological fiction helps to contribute to the competing images of Indian nationhood - the inclusive, interpretative and the assertive, consolidating.

Authority, Power, and Moral Order

There are also contrasts in the representation of authority in the study. Pattanaik decentralises the power and leadership is described as morally contingent and The differences in power representation are summarized in Table 2.

Table 2: Representation of Authority and Power

Aspect	Pattanaik	Tripathi
Nature of Authority	Contextual, fluid	Centralized, hierarchical
Moral Certainty	Low	High
Use of Violence	Questioned	Justified
Leadership Ideal	Ethical balance	Warrior-hero
Power Legitimacy	Philosophical	Moral-national

situational. The authority figures do not receive reverence and moral issues are not resolved, which serves to enforce the obscurity effect. Tripathi is an authoritarian, who justifies powerful rulers as the ones that would maintain social order. Sacrifice, obedience and moral clarity is a means of legitimizing power. In the cases when violence occurs, it is justified and is needed to restore order.

Gender Politics Beyond Masculinity

In addition to the masculine identities, the narratives by Pattanaik are more gender-inclusive, giving alternative sexuality and non-binary identities the leeway of expression through symbolic and mythical aspects. Masculinity and femininity are viewed as forces and not as

roles. The gender mode in which Tripathi presents is mostly binaristic with the masculinity and femininity being allocated differing yet complementary roles in society [29]. Although there are female characters, they are not often able to disrupt the male moral centre even when they are strong.



Figure 3: “Beyond masculinity”

Table 3 is a comparison of gender inclusiveness.

Table 3: Gender Representation and Inclusivity

Parameter	Pattanaik	Tripathi
Gender Fluidity	High	Low
Binary Roles	Weak	Strong
Masculine Centrality	Moderate	High



Inclusivity Score (/10)	8.5	4.5
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Comparison with Related Work

These finds can be closely connected with the previous academic literature on mythological retellings and nationalism in the sense that popular mythological fiction is becoming more and more a projection of the modern ideological anxieties. Previous studies on myth retellings of the Indian myth also emphasize the appeal to cultural assertion and male revivalist in popular literature most notably in post-2000 literature. This paper builds upon

Table 4: Comparison with Related Scholarly Trends

associated literature and provides a comparative masculinity-oriented study illustrating the fact that not every mythological fiction advances hegemonic or nationalist masculinity [30]. Pattanaik makes chasing the common academic trend of reducing mythological retellings to homogenous conservatism or revivalism more difficult. This study is placed against some of the prevailing trends in literature in Table 4.

Aspect	Dominant Literature	Present Study
View of Myth	Cultural revival tool	Ideological battleground
Masculinity	Often heroic	Multiple, competing forms
Nationalism	Central focus	Comparative spectrum
Contribution	Thematic	Gendered comparative

Ideological Outcomes and Cultural Impact

The results indicate that the fiction of Pattanaik is inspiring in terms of culture because one may critically reflect on the tradition and its interpretation by absolutists. The stories by Tripathi, in their turn, are devoted to mythic

unification, strengthening clarity, discipline and power of unity. Both of them are not necessarily better or worse, but the different cultural projects reacting to the same socio-political event. This co-existing is indicative of the disputed identity of the Indian culture in the twenty first century.

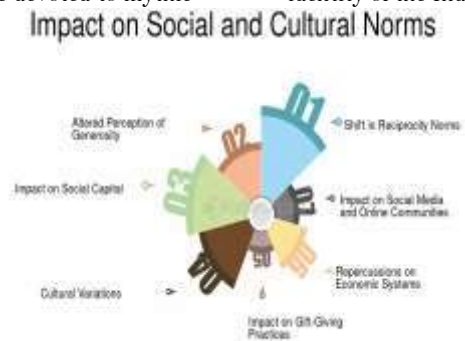


Figure 4: "The Impact Of Social And Cultural Influences On Decision Making"

A comparative synthesis in general is presented in Table 5.

Table 5: Overall Ideological Comparison (Composite Index)

Category	Pattanaik (Index /100)	Tripathi (Index /100)
Pluralism	85	40
Nationalist Alignment	35	85
Hegemonic Masculinity	30	90
Ethical Ambiguity	88	25
Cultural Consolidation	40	90



Discussion Summary

In general, the observations reveal that the modern mythological fiction is a highly influential location of the cultural politics. Pattanaik and Tripathi represent entirely opposite ideological meanings despite having the same reservoir of myths. Their fantasy worlds define the nature in which masculinity is fictionalised, power is naturalized and the culture of the nation is told. In a comparison of these stories, this paper showcases myth not as an object of the past but as a current power, which influences genders and nations of today.

Conclusion

This paper has considered the role of the Indian mythological fiction in the modern era as a potent cultural site of negotiation of masculinity, nationhood and ideology by offering a comparative study of the fictional worlds of Devdutt Pattanaik and Amish Tripathi. The study shows that the myth in the contemporary literature is not a passive re-telling of sacred stories but a dynamic process reinterpreted in relation to the social and political issues of the contemporary world. Re-creating mythological traditions, both writers assist in building cultural meaning, though in significantly diverse ways. The results indicate that the narratives by Pattanaik propagate a pluralistic and fluid conceptualization of masculinity and focus on ethical reasoning, intelligence of emotions, and philosophical ambiguity. His strategies oppose the binarism and hegemonic masculinity by preempting multiplicity and relational morals. Tripathi fiction, on the contrary, develops a restrained, heroic, and morally confident ideation of masculinity that is strongly consistent with the concept of authority, sacrifice, and civilizational survival. This model is familiar to the modern nationalist usage of myth, in which collective identity and moral coherence are whipped together through the mobilization of myth. By placing these opposing representations in a wider discussion of cultural politics, the paper brings out mythological fiction as a problematic ideological arena as opposed to a coherent cultural endeavor. The comparative paradigm emphasizes that the Indian mythic narratives today allow both resistance and consolidation, inclusion or exclusion. Finally, the study will be valuable to the literature and cultural research field as it will show how popular mythological fiction creates, reflects and challenges the mainstream concept of masculinity and nationhood in twenty first century India and support the persistence of myth as an active constituent of the cultural and political imagination.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Original Article

GST Reforms as Instruments of Fiscal Federalism and Sustainable Development in India: An Analytical Study in The Context of Viksit Bharat 2047

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Abstract

The Goods and Services Tax (GST) remains one of the most consequential fiscal reforms of post-liberalisation India, reshaping indirect taxation, Centre-State fiscal relations, and the digital governance ecosystem. This study examines how GST reforms, including the September 2025 "GST 2.0" rate rationalisation, strengthen fiscal federalism, improve tax compliance, promote economic formalisation, and advance sustainable development within the framework of Viksit Bharat 2047. The analysis draws entirely on secondary data from GST Council reports, Ministry of Finance and Press Information Bureau releases, RBI publications, Economic Surveys, NITI Aayog reports, and peer-reviewed literature covering 2017–2025. The study operationalises Wallace Oates' Fiscal Federalism Theory to assess Centre-State fiscal coordination and applies digital governance frameworks associated with Richard Heeks and Jane Fountain, which emphasise reducing information asymmetry and aligning technology with institutional capacity. Gross GST collections rose from ₹11.19 lakh crore in 2017–18 to a provisional ₹22.08 lakh crore in 2024–25, while the registered taxpayer base exceeded 1.45 crore by 2025. E-invoicing, e-way bills, invoice matching, and AI-based analytics are found to have improved compliance efficiency and formalisation, while the two-slab GST 2.0 structure (5% and 18%, with a 40% de-merit rate) is assessed as a further step toward compliance simplification. GST also strengthened cooperative federal governance through the GST Council and supported sustainability through tax concessions for renewable energy and electric mobility. However, compensation-cess transition pressures, MSME compliance burden, digital inequality, and dependence on official secondary data remain structural constraints. The study also situates GST 2.0 within Centre-State fiscal bargaining, arguing that slab compression narrows future negotiating space in the GST Council even as it simplifies compliance and reduces classification disputes that had generated extensive litigation under the earlier four-slab regime. The originality of this paper lies in integrating fiscal federalism, digital governance, and sustainability with the 2025 rate reform within a single analytical lens, offering an early academic assessment of GST 2.0 that existing literature has not yet addressed. Future research may examine state-wise revenue effects of GST 2.0, MSME compliance costs, and behavioural dimensions of digital tax governance.

Keywords: GST 2.0, Fiscal Federalism, Digital Governance, Tax Compliance, Sustainable Development, Viksit Bharat 2047, Cooperative Federalism.

Introduction

Tax reform is central to economic governance in federal economies because it shapes revenue mobilisation, intergovernmental coordination, administrative efficiency, and developmental outcomes. India's GST, introduced through the Constitution (101st Amendment) Act, 2016 and implemented on 1 July 2017, replaced a fragmented system of excise duty, VAT, service tax, octroi, and entry tax, reducing cascading effects and unifying the national market. Since 2017, GST has undergone continuous technological and institutional refinement — e-invoicing, e-way bills, AI-enabled monitoring, faceless scrutiny, and invoice matching — reflecting a shift from a collection framework to a data-driven administrative ecosystem. Gross GST collections rose from ₹11.19 lakh crore in 2017–18 to a provisional ₹22.08 lakh crore in 2024–25, with registered taxpayers expanding to more than 1.45 crore by 2025 (GST Council Secretariat, 2025; Press Information Bureau, 2025). The reform has also reshaped India's fiscal federal architecture. The GST Council remains the constitutionally backed forum for shared decision-making on rates, exemptions, and compensation, but the COVID-19 compensation dispute exposed continuing tension between national tax harmonisation and subnational fiscal autonomy.

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A second major inflection point arrived in September 2025, when the GST Council approved sweeping rate rationalisation — popularly termed “GST 2.0” — collapsing the four-slab structure into a simplified two-rate system (5% and 18%) with a 40% de-merit rate for select luxury and sin goods, effective from 22 September 2025 (Ministry of Finance, 2025). This reform, positioned by the Government as a “Diwali gift” to consumers, is the most significant structural change to GST since its launch and merits systematic academic attention. GST also carries developmental significance beyond tax administration. Concessional rates on electric vehicles, solar equipment, and select digital transactions show taxation being used deliberately to support sustainability and formalisation, connecting GST to the national ambition of *Viksit Bharat 2047* — a vision built around digital transformation, sustainability, inclusive growth, and institutional efficiency (NITI Aayog, 2024). Although GST has been widely studied, the literature typically treats fiscal federalism, compliance, digital governance, and sustainability separately, and rarely accounts for the GST 2.0 rate reform. This paper addresses that gap by combining Fiscal Federalism Theory and Digital Governance Theory to evaluate GST reforms — including GST 2.0 — as instruments of developmental governance and long-term state capacity.

The study addresses three research questions:

1. How have GST reforms, including GST 2.0, strengthened fiscal federalism and digital tax compliance in India?
2. How do GST reforms contribute to sustainable development and the objectives of *Viksit Bharat 2047*?
3. What structural and institutional challenges impede the long-term effectiveness of GST reforms as instruments of fiscal federalism and sustainable development?

Literature Review

GST and fiscal federalism:

The conceptual foundations of fiscal federalism were developed by Musgrave (1959) and Oates (1972), who argued that allocative efficiency improves when taxing and spending responsibilities are distributed appropriately across levels of government. In the Indian context, Rao (2005, 2011) viewed GST as a major institutional reform in cooperative federalism that coordinated the tax structure while narrowing state autonomy in indirect taxation. Bird and Gendron (2007) showed, through Canada and Australia, that federal VAT/GST systems require transparent revenue-sharing and strong institutional trust. Rao and Chakraborty (2021), Kumar and Rao (2022), and Bose (2023) find that GST improved tax harmonisation and inter-state market integration, but that compensation dependency and fiscal imbalance continue to shape Centre–State relations, with the GST Council increasingly a site of negotiated fiscal power.

Digital governance and compliance:

Allingham and Sandmo (1972) argued that evasion depends on the perceived probability of detection and penalty severity; more recent work situates digital governance as a mechanism that strengthens compliance through transparency and automation. Heeks (2001) and Fountain (2001) show that digital systems reduce information asymmetry and reshape how institutions exercise authority when technology is aligned with administrative capacity. In India, Garg (2020), Aggarwal (2021), and Bhatia (2022) found that e-way bills, e-invoicing, and analytics-based monitoring expanded compliance and business formalisation, while Venkatesh et al.’s (2003)

UTAUT model helps explain MSME adoption of digital compliance tools through perceived ease of use and facilitating conditions.

Sustainability and green taxation:

Sterner (2012) showed that fiscal instruments shape environmental behaviour when tax design aligns with production and consumption incentives. In India, GST concessions on electric vehicles and renewable energy equipment reflect this logic, and NITI Aayog (2023) identifies digital governance and green transition as core pillars of long-term development strategy. GST has also been linked to MSME formalisation: SIDBI (2023) finds that GST registration improves visibility in formal supply chains and access to institutional finance, though compliance burden remains higher for smaller, less digitally prepared firms.

Viksit Bharat 2047:

Viksit Bharat 2047 is India’s long-term developmental vision, aiming for a technologically advanced, inclusive, and globally competitive economy by the centenary of independence. Recent policy documents from NITI Aayog (2024) and the Ministry of Finance (2025) position GST — including its GST 2.0 rationalisation — as contributing to these pillars through revenue mobilisation, digital governance, formalisation, and demand-side consumption support.

Research gap:

The literature discusses GST implementation, compliance, and fiscal federalism extensively but rarely integrates these with digital governance, sustainability, and the 2025 rate rationalisation within a single analytical framework. This study fills that gap. **Objectives**

1. To analyse the role of GST reforms, including GST 2.0, in strengthening fiscal federalism and cooperative governance in India.
2. To examine the impact of digital GST reforms on tax compliance and economic formalisation.
3. To evaluate the contribution of GST reforms toward sustainable development and the objectives of *Viksit Bharat 2047*.
4. To suggest policy measures for strengthening the long-term effectiveness of GST reforms.

Methodology

This study is descriptive, analytical, and policy-oriented, using secondary data for 2017–2025 drawn from GST Council reports, Union Budget documents, Economic Surveys, RBI State Finances Reports, Ministry of Finance and PIB releases, NITI Aayog reports, SIDBI reports, and peer-reviewed literature.

Research design:

The design is qualitative and analytical, using policy analysis, trend interpretation, and theoretical synthesis, with selective comparative references to Australia and Canada to contextualise India’s GST trajectory rather than a formal cross-national comparison.

Theoretical framework:

The study applies Fiscal Federalism Theory (Musgrave and Oates) to analyse Centre–State coordination, GST Council decision-making, compensation mechanisms, and vertical fiscal imbalance, and Digital Governance Theory (Heeks and Fountain) to interpret e-invoicing, e-way bills, and compliance automation as mechanisms that reduce information asymmetry.



Limitations:

The study depends on secondary data and cannot directly observe taxpayer behaviour or firm-level compliance experience. Registration growth may partly reflect mandatory base broadening rather than pure behavioural compliance, and the 2017–2025 period includes COVID-19, which may distort revenue and compliance trends. Because GST 2.0 took effect only in September 2025, its full revenue and behavioural effects are not yet observable and are discussed here as an emerging structural shift rather than a settled outcome.

Analysis and Discussion

Evolution of GST.

GST's evolution can be divided into three phases: stabilisation (2017–2019), digital compliance build-out through e-invoicing, QRMP, and analytics (2020–2022), and a rationalisation phase from 2023 onward — informally “GST 2.0” — culminating in the September 2025 rate restructuring. Figure 1 shows gross GST revenue rising from ₹11.19 lakh crore in 2017–18 to a provisional ₹22.08 lakh crore in 2024–25 (GST Council Secretariat, 2025).

Figure 1. Gross GST Revenue Collections in India (2017-18 to 2024-25)

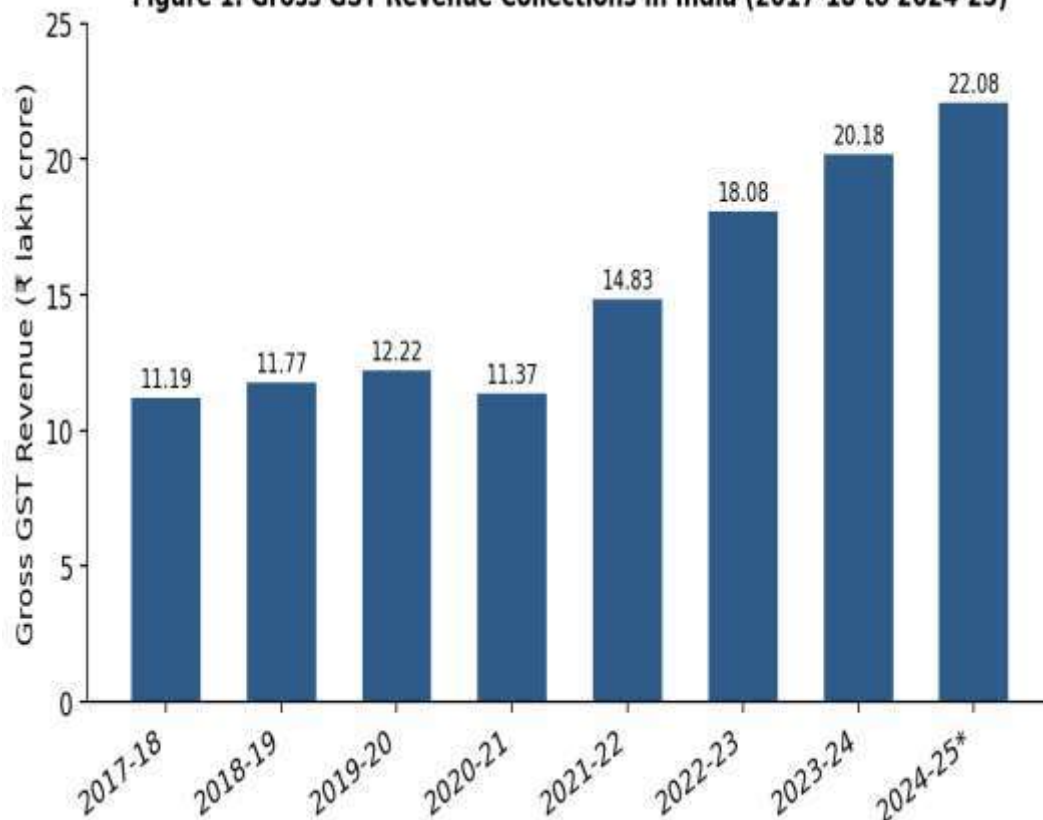


Figure 1. Gross GST Revenue Collections

GST 2.0: the 2025 rate rationalization:

In September 2025, the GST Council collapsed the four-slab structure (5%, 12%, 18%, 28%) into a simplified two-rate system, with a 40% de-merit rate reserved for luxury and sin goods (Table 1). The stated objectives were demand stimulation, compliance simplification, and reduction of classification disputes that had generated extensive litigation under the earlier multi-slab structure. From a

Source: PIB press release

fiscal federalism perspective, GST 2.0 is significant because slab compression narrows the Council's future bargaining space over incremental rate changes, while its revenue-neutral design was intended to protect state compensation flows even as the compensation cess itself nears the end of its extended repayment window (Ministry of Finance, 2025).

Table 1. GST 2.0 rate structure (effective 22 September 2025)

Slab	Coverage	Prior Structure
5%	Essential and mass-consumption goods	Merged from 5% and part of 12%
18%	Standard goods and services	Merged from 18% and part of 28%
40%	Luxury and “sin” goods (tobacco, high-end vehicles, aerated beverages)	Special de-merit rate above 28% + cess

Source: Compiled from Ministry of Finance (2025) and GST Council press releases.

The GST Council integrates Union and State taxation within a common framework, but it does not eliminate underlying asymmetries in bargaining power.

Fiscal federalism:

During COVID-19, compensation released to states reached ₹1,10,208 crore in 2020–21 and ₹1,59,000 crore in 2021–22 — a total of ₹2,69,208 crore (Table 2) — revealing the



extent of state dependence on the compensation mechanism. From Oates' perspective, the Council balances national harmonisation with subnational participation, but compensation disputes show that state fiscal preferences are not always fully accommodated. GST has also improved

interstate trade by reducing border frictions, and e-way bill integration has supported logistics efficiency, although precise turnaround-time gains should be read as approximate absent a named official logistics study.

Table 2. GST compensation released to states

Financial Year	Compensation Released (₹ crore)
2020–21	1,10,208
2021–22	1,59,000
Total	2,69,208

Source: RBI State Finance Reports

Tax compliance and digital governance:

E-way bills, e-invoicing, AI analytics, and invoice-matching have improved traceability and fraud detection. The registered taxpayer base grew from 65 lakh in 2017 to more than 1.45 crore by 2025 (Figure 2; Table 3), consistent with Allingham and Sandmo's deterrence logic and Heeks' information-asymmetry framework. GSTN-based reporting

cited in prior studies indicates more than 11 billion e-way bills generated cumulatively by 2024. MSMEs remain the most vulnerable group: Sharma and Mishra (2022) show that compliance burden, digital literacy gaps, and technology costs weigh disproportionately on smaller firms, making the GST 2.0 simplification agenda particularly relevant for inclusive compliance design.

Figure 2. Growth in GST Registered Taxpayer Base (2017-2025)

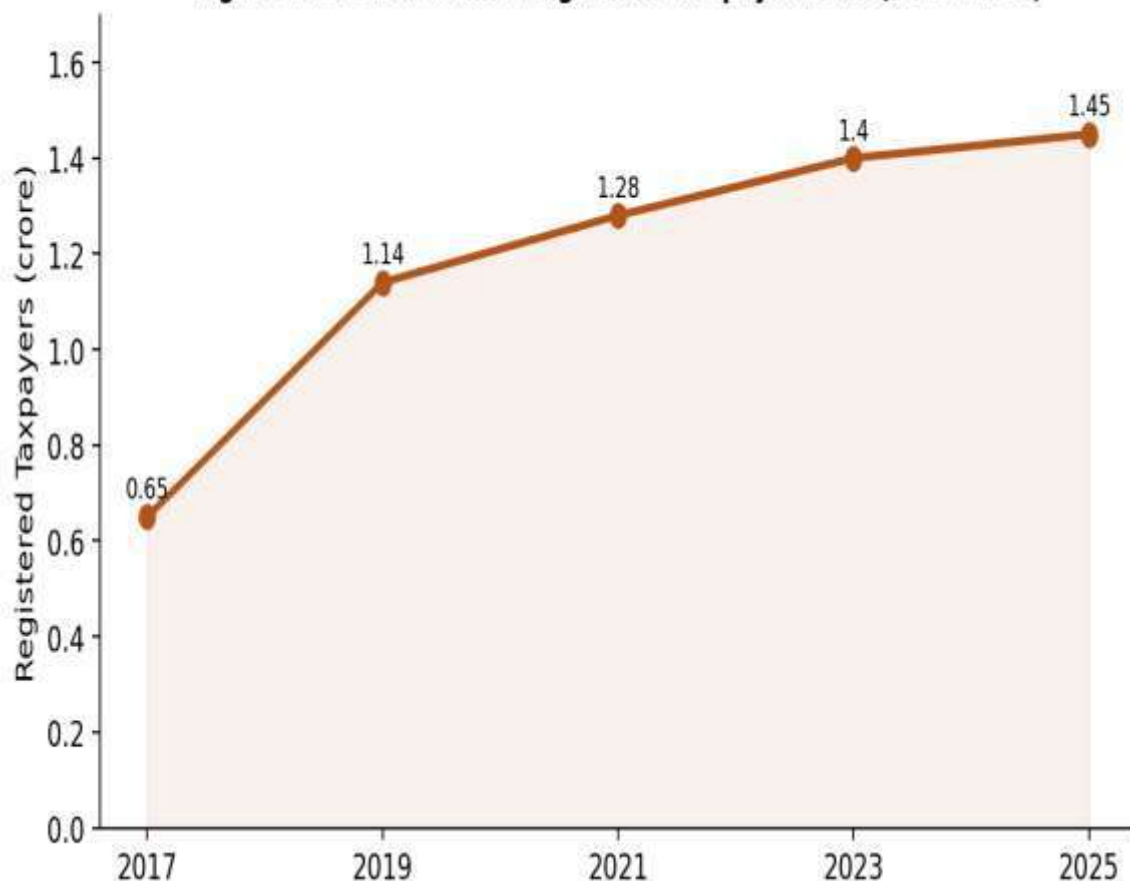


Figure 2. Growth in GST Registered Taxpayer Base

Source: GST Council Secretariat data

Table 3. Expansion of the GST taxpayer base

Year	Registered Taxpayers
2017	65 lakh
2019	1.14 crore
2021	1.28 crore
2023	1.40 crore



2025	More than 1.45 crore
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Source: GST Council Secretariat data

Sustainable development:

GST reforms increasingly support sustainability through green taxation, formalisation, and digital payments (Table 4). Reduced GST on electric vehicles and concessional rates on renewable energy inputs signal a deliberate tax-policy shift toward low-carbon transition,

Table 4 Sustainability-oriented GST reforms

Sector	GST Reform	Developmental Impact
Electric Vehicles	GST reduced to 5%	Increased EV adoption
Solar Equipment	Concessional GST rates	Renewable energy expansion
Digital Transactions	Formalised digital economy	Financial inclusion
MSMEs	Input tax credit integration	Formalisation and credit access

Viksit Bharat 2047:

GST contributes to Viksit Bharat 2047 through revenue capacity, formalisation, digital governance, and cooperative fiscal architecture (Table 5). The mapping is interpretive but grounded in the logic that stronger, simpler tax systems support state capacity

Table 5. GST reforms and Viksit Bharat 2047

Viksit Bharat Pillar	Contribution of GST Reforms
Digital Governance	AI-enabled compliance and e-governance
Economic Formalisation	Expansion of GST registrations
Sustainable Development	Green taxation incentives
Cooperative Federalism	GST Council framework; GST 2.0 consensus
Industrial Growth	Unified national market
Fiscal Capacity	Tax buoyancy; consumption stimulus via GST 2.0

Findings

Gross GST collections rose from ₹11.19 lakh crore (2017–18) to a provisional ₹22.08 lakh crore (2024–25), indicating sustained tax buoyancy. Registered taxpayers grew from about 65 lakh to more than 1.45 crore by 2025, showing large-scale formalisation.

Digital tools — e-invoicing, AI analytics, invoice matching, e-way bills — improved detection, monitoring, and compliance. The GST Council

consistent with Sterner's (2012) argument that environmental fiscal instruments work best when aligned with broader industrial policy. SIDBI (2023) further shows that formal GST registration improves credit access for MSMEs, linking sustainability to business formalisation and financial resilience.

while digital administration supports governance modernisation. GST 2.0's consumption-boosting design also links tax policy explicitly to the demand-side pillar of Viksit Bharat's growth strategy.

functions as a cooperative federal institution; the 2025 GST 2.0 consensus demonstrates continuing capacity for major reform despite past compensation disputes. GST concessions on EVs and renewable energy support green transition and align tax policy with sustainability goals. GST 2.0's two-slab simplification is likely to ease compliance and reduce classification litigation, but its net revenue and state-wise fiscal effects remain to be empirically confirmed.

Table 6. Research questions and findings

Research Question	Core Finding
Strengthening fiscal federalism and compliance	GST, and now GST 2.0, improved coordination, revenue mobilisation, and digital enforcement
Contribution to sustainable development and Viksit Bharat	GST supports green transition, formalisation, and state capacity
Structural challenges	Compensation-cess transition, MSME burden, and digital inequality remain unresolved

Policy Recommendations:

First, GST compliance for MSMEs should be simplified further through reduced filing frequency and a dedicated GSTN helpdesk, building on the compliance-easing intent of GST 2.0. Second, the GST Council should institutionalise a permanent, time-bound dispute-resolution and appellate mechanism to manage classification and compensation conflicts, especially as the compensation cess winds down. Third, the government should expand AI-enabled fraud detection and cybersecurity while investing in digital literacy for semi-urban and rural enterprises. Fourth, GST 2.0's revenue effects on

individual states should be tracked transparently and, where shortfalls emerge, addressed through a clear, rules-based transitional support mechanism rather than ad hoc negotiation. Fifth, GST-linked sustainability incentives should be coordinated with PLI schemes and renewable-energy missions through aligned incentive calendars and clearer input-tax-credit pass-through rules.

Conclusion:

GST reforms — culminating in the 2025 GST 2.0 rationalisation — have evolved into a major instrument of fiscal governance, economic formalisation, and digital transformation in India. The



study shows that GST improved revenue mobilisation, strengthened compliance, institutionalised cooperative federalism, and supported sustainability-oriented policy, while GST 2.0 represents a further attempt to simplify structure and stimulate consumption. GST's contribution to Viksit Bharat 2047 is real but conditional on managing compensation-cess transition, MSME compliance burden, and digital divides. Viewed through Fiscal Federalism Theory and Digital Governance Theory, GST is not merely a tax reform but a broader mechanism of developmental governance. Future research should examine state-wise fiscal impacts of GST 2.0, firm-level compliance behaviour, and the distributional effects of digital tax administration, to determine whether GST's gains are evenly shared across India's federal structure.

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Original Article

The Role of Artificial Intelligence in Enhancing English Language Learning: Opportunities, Challenges, and Future Prospects

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Abstract

Artificial Intelligence (AI) is changing the way people learn languages, and English language learning is no exception. Tools such as grammar checkers, chatbots, speech recognition apps, and AI-based tutoring platforms now offer learners instant feedback, personalised practice, and round-the-clock access to learning support. This paper reviews the growing role of AI in English language teaching and learning. It looks at the main types of AI tools being used today, the benefits they offer to learners and teachers, the challenges and limitations that come with them, and what the future might hold as this technology continues to develop. The paper argues that AI works best as a support to good teaching, not a replacement for it, and that Indian colleges and universities have a valuable opportunity to use these tools thoughtfully to improve English language outcomes for students from diverse backgrounds.

Keywords: Artificial Intelligence, English language learning, language teaching, educational technology, personalised learning, higher education

Introduction

English continues to be the language of higher education, employment, and global communication for millions of students in India and around the world. Yet learning English well remains a real challenge for many, especially students from rural areas or non-English-medium schools, who often have limited opportunities to practise speaking and writing outside the classroom. In recent years, Artificial Intelligence has begun to offer new ways to address this gap. AI refers to computer systems that can perform tasks which normally require human intelligence — understanding language, recognising speech, giving feedback, and even holding a conversation. Language learning has become one of the most active areas where AI is being applied, largely because learning a language depends heavily on practice, feedback, and exposure — three things that AI tools can now provide cheaply and at scale, even outside classroom hours. This paper reviews how AI is being used in English language learning today, the opportunities it creates for learners and teachers, the challenges that come with relying on these tools, and the direction this field is likely to take in the coming years. The aim is to give a balanced, practical picture that is useful for teachers, students, and institutions thinking about how to use AI responsibly in language education. This shift matters especially for higher education institutions in smaller towns and rural regions, where students often arrive at college with a strong grasp of their mother tongue but limited earlier exposure to spoken or written English. For these students, the classroom alone often cannot provide the volume of practice needed to build real fluency and confidence. AI tools, available on an ordinary smartphone, offer a low-cost way to extend practice time far beyond what a fixed timetable allows.

How AI Is Being Used in English Language Learning

AI tools now touch almost every part of language learning, from writing to speaking to vocabulary building. The main categories in current use are described below.

Writing Assistance and Grammar Correction

Tools such as Grammarly and similar AI-based writing assistants check grammar, spelling, punctuation, and style in real time as students write. Beyond simply correcting errors, many of these tools now explain why a change is suggested, helping students understand the underlying rule rather than just fixing the mistake.

Conversational Chatbots and Speaking Practice

AI chatbots allow students to practise conversation in English without needing a human partner available at that moment. These tools can simulate everyday conversations, answer questions, and give instant feedback on phrasing, all without the pressure some students feel when speaking in front of classmates or teachers.

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Speech Recognition and Pronunciation Training

Speech recognition technology allows apps to listen to a student's spoken English and compare it against correct pronunciation patterns, pointing out specific sounds or words that need improvement. This kind of individual, repeatable feedback would be very difficult for a single teacher to provide to every student in a large classroom.

Personalised Learning Platforms

Platforms such as Duolingo and similar apps adjust the difficulty and content of exercises based on how well a student is doing, offering more practice on weak areas and moving faster through topics a student already

understands. This personalised pacing is one of the most valued features of AI-based learning tools.

AI-Assisted Translation and Vocabulary Tools

Translation tools have become far more accurate in recent years, helping students understand unfamiliar texts and build vocabulary by comparing English words and phrases with their native language. Used carefully, these tools can support comprehension without becoming a substitute for genuine language learning.

Simple comparison between traditional English language practice and AI-assisted practice, to illustrate how these tools change the learning experience rather than replace it entirely.

Aspect	Traditional Practice	AI-Assisted Practice
Feedback speed	Often delayed until teacher review	Usually instant
Availability	Limited to class hours	Available anytime
Personalisation	Same pace for whole class	Adjusts to individual level
Speaking practice	Requires a partner or teacher	Possible with a chatbot alone
Human guidance	Central to the process	Still valuable, but reduced in routine tasks

Opportunities and Benefits

The growing use of AI in English language learning brings several clear benefits.

Benefit	Description
Round-the-clock access	Students can practise English anytime, without waiting for classroom hours or a teacher's availability.
Immediate feedback	Errors in grammar, pronunciation, or vocabulary are corrected instantly, helping students learn from mistakes right away.
Personalised pace	Learning content adjusts to each student's level, avoiding both boredom and frustration.
Reduced speaking anxiety	Practising with a chatbot or app can feel less stressful than speaking in front of a class.
Support for large classrooms	AI tools can give individual attention to students in ways that are difficult for one teacher managing a large class.

For Indian colleges in particular, where English classrooms are often large and student backgrounds vary widely, AI tools can help bridge gaps for students who need extra practice, while freeing up teachers to focus classroom time on discussion, writing skills, and activities that benefit most from human guidance.

Another underappreciated benefit is the sheer variety of practice AI tools can offer. A single student can, in one sitting, receive grammar feedback on an essay, practise a spoken conversation with a chatbot, and check the meaning of an unfamiliar word — all without needing to schedule separate sessions with different resources. This convenience lowers the effort required to practise regularly, which matters because consistent practice, even in small amounts, tends to produce better language learning outcomes than occasional, longer sessions.

Challenges and Limitations

Despite these advantages, the use of AI in language learning comes with real limitations that need to be acknowledged. These challenges are not reasons to avoid AI tools altogether, but they do call for careful, thoughtful use rather than blind adoption.

Loss of human interaction: language learning is not just about grammar and vocabulary — it also involves culture, emotion, and social context, which AI tools struggle to

teach as effectively as a human teacher or genuine conversation partner.

Over-reliance on tools: students who lean too heavily on AI writing assistants or translation apps may complete assignments without actually learning the underlying language skills.

Unequal access: not all students have reliable internet access or suitable devices, meaning AI tools risk widening the gap between well-resourced and under-resourced students rather than closing it.

Errors and limitations of the tools themselves: AI systems can make mistakes, especially with idioms, regional English usage, or culturally specific expressions, and can mislead students who trust the output without question.

Reduced motivation for independent effort: constant access to instant answers may reduce a student's willingness to think through problems independently, which is an important part of genuine language learning.

Teacher preparedness: many teachers have not yet received training on how to use AI tools effectively in the classroom, which can lead to inconsistent or poorly integrated use.

Taken together, these challenges suggest that the value of AI in language learning depends heavily on how it is introduced and managed, rather than on the technology alone. A tool used thoughtfully, alongside strong classroom teaching, can genuinely help students; the same tool used carelessly, without guidance, can create new problems while appearing to solve old ones.



Examples of AI Tools in Practice

Several widely used AI tools illustrate how these ideas work in practice.

Tool	Main Use	Relevance to English Learning
Grammarly	Grammar and style checking	Helps students improve writing accuracy and clarity
Duolingo	Gamified, adaptive lessons	Builds vocabulary and basic grammar through daily practice
ELSA Speak	Pronunciation feedback	Uses speech recognition to correct pronunciation errors
Google Translate	Translation support	Helps with comprehension of unfamiliar text
AI chatbots (general)	Conversational practice	Provides low-pressure speaking and writing practice

These tools are increasingly being used not to replace classroom teaching, but alongside it — for example, a teacher might assign chatbot conversation practice as homework, then use class time to discuss and build on what students learned.

Relevance to Indian Higher Education

In many Indian colleges, English is taught to large, mixed-ability classrooms where students come from a wide range of educational backgrounds — some from English-medium schools, others encountering formal English instruction mainly at the undergraduate level. In this setting, AI tools can play a useful bridging role: students who need additional grammar or pronunciation practice can use apps outside class hours, while students who are already confident can use the same tools to refine more advanced skills, such as academic writing or interview preparation. Several Indian universities have also begun experimenting with AI-based writing labs and speaking practice modules as part of communication skills courses, reflecting a broader recognition that these tools can usefully complement, rather than replace, traditional English language teaching.

The Changing Role of the Teacher

As AI tools take over some routine tasks — checking grammar, giving repetitive practice, correcting pronunciation — the role of the English teacher is shifting rather than disappearing. Teachers are increasingly focusing on things AI cannot easily replicate: leading meaningful discussions, teaching critical thinking and argument, giving feedback on creativity and tone in writing, and providing the encouragement and human connection that keeps students motivated. Many educators see AI as a helpful assistant that handles repetitive work, freeing up teachers to spend more time on higher-value teaching. This shift also changes what it means to be a well-prepared English teacher. Alongside traditional skills in grammar, literature, and pedagogy, teachers increasingly benefit from a basic understanding of the AI tools their students are likely to use — enough to guide students on when a tool is helpful and when it might mislead them, and enough to design assignments that make good use of these tools rather than being undermined by them. Institutions that invest in this kind of teacher preparation are likely to see the most benefit from AI adoption in their classrooms.

Future Prospects

The role of AI in English language learning is likely to keep expanding in the coming years, driven by rapid improvements in speech recognition, conversational AI, and adaptive learning systems. A few directions seem particularly likely.

More natural conversation practice: as chatbots become better at understanding context and nuance, practising

spoken English with an AI partner is likely to feel increasingly close to a real conversation.

Better support for regional and non-native English varieties: future tools are likely to become more accurate at recognising and supporting the many regional accents and usage patterns found across India, rather than assuming a single 'standard' English.

Integration into mainstream classroom teaching: rather than being used only outside class, AI tools are likely to become a built-in part of everyday lesson planning, with teachers assigning specific AI-based exercises tied directly to classroom goals.

Better tools for teachers, not just students: emerging AI systems can help teachers track class-wide progress, identify common errors, and plan lessons around real student needs, rather than only supporting the students directly.

None of these developments remove the need for skilled, engaged teachers. If anything, as AI takes over more routine practice and correction, the value of a teacher's ability to inspire, guide discussion, and build confidence is likely to become even more important, not less.

Key Findings

Bringing together the discussion above, this review points to a consistent picture of where AI currently helps English language learning, where it falls short, and what that means for classrooms going forward.

AI tools are already widely used in English language learning, covering writing, speaking, listening, and vocabulary practice.

The biggest benefits are round-the-clock access, instant feedback, and personalised pacing, which are especially useful in large or under-resourced classrooms.

The main risks are over-reliance on tools, unequal access to technology, and the loss of human interaction that is central to genuine language learning.

AI works best when used to support classroom teaching, not replace it — teachers remain essential for guiding meaning, culture, and critical thinking.

Successful use of AI in language education requires thoughtful integration, teacher training, and attention to equal access for all students.

Recommendations

The following recommendations are offered as practical starting points for teachers, institutions, and students seeking to use AI tools productively in English language learning, rather than as a rigid checklist.

For Teachers

Use AI tools to support homework and practice, while keeping classroom time focused on discussion, writing feedback, and speaking activities.

Teach students how to use AI tools critically, rather than accepting every suggestion without question.



For Institutions

Provide basic training for teachers on how to use AI language-learning tools effectively in their classrooms.

Ensure that AI-based learning resources are accessible to students with limited devices or internet access, for example through shared computer labs.

For Students

Use AI tools as practice partners and feedback sources, not as substitutes for actually thinking through grammar, vocabulary, and writing on their own.

Combine AI-based practice with real conversation and reading, since language skills grow best through genuine use, not just correction.

Conclusion

Artificial Intelligence has opened up new possibilities for English language learning, offering instant feedback, flexible practice, and personalised support in ways that were not possible before. For students in India, especially those with limited access to English-speaking environments, these tools can meaningfully supplement classroom learning and give more chances to practise.

At the same time, AI is not a substitute for good teaching or genuine human interaction, both of which remain central to learning a language well. The most promising path forward is one where AI handles routine practice and feedback, while teachers focus on the deeper, more human aspects of language learning — meaning, culture, confidence, and communication. Used this way, AI can be a valuable partner in English language education rather than a replacement for the classroom. For institutions like colleges affiliated with state universities, the practical starting point need not be large or expensive. Simple steps — introducing students to one or two reliable AI tools, training teachers to guide their use, and monitoring how they affect learning outcomes over a semester — can build the experience and confidence needed to expand thoughtfully over time. Approached this way, AI becomes not a disruptive replacement for English teaching, but a steady, gradual improvement to it.

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Original Article

Review on Luminescent Rare Earth Material and Its Application

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Abstract

Luminescence "Luminescenz" was first reported by German physicist Wiedemann in 1888. Luminescent materials are the semiconductors materials or inorganic/organic compounds consisting of a host lattice and do-pant element called as activators traditionally, transition or rare-earth metals. Luminescent materials are also known as phosphors. These materials are able to absorb and emit energy in the form of photons of light, which is termed as excitation and emission. These materials emit light which is termed as excitation and emission. These materials emit light under external energy excitations these are able to convert incident energy into the emission of electromagnetic spectrum. The luminescent materials can be excited using high energy electron, photons, or electric field, which provides emission in the electromagnetic region. The host compounds do not involve in their luminescent properties; however, activators get excited on incident radiation to emit photons in any electromagnetic spectrum. The incident energy made electrons to an excited or higher energy state from ground energy state, which returns back to ground state by emitting photons. This property is termed as luminescence. In luminescence, two types of emissions are possible radiative transition and nonradioactive transition. The emission property also depends on excitation source. Luminescent materials are categorized as photo luminescent, thermo luminescent, electroluminescent and chemiluminescent materials.

Keywords: - UV, IR, LED, LASER, Luminescenz, X-ray, photons, metals, Eu³⁺, Ce³⁺.
Corresponding

Introduction: -

The history of light in human culture is an important part of human evolution and scientific progress. The stages illustrate how human have navigated the journey of light, from the discovery of fire to today LED technology and quantum Physics.

The age of natural light and discovery of fire (400,000 to 15,000 years ago). The main source of light was the sun. Primitive man invented fire by burning wood to obtain light at night and to keep predators away. Over time, lamps were made using fat and oil to light caves. The beginning of artificial light (500 BC to 1800 BC). After fire humans began to use animal fat and wax to make candles and oil lamps of various designs. After the invention of various designs. After the invention of gas in the 11th century, gas lights began to be used in cities which lit the streets at night.

The invention and revolution of electricity (19th century). The greatest revolution in the field of lighting occurred in 1879, when Thomas Edison invented the long lasting, commercially visible incandescent bulb. Neon lights and halogen lamps were later invented in the 1900s. Semiconductor and Laser technology (20th Century). After the electric light bulb, the invention of LASER in 1960 revolutionized the fields of Communication, Medicine and Information technology. Also, the foundation of the LED was laid in 1960s, which is the most energy-saving and popular light source today. Physics of light (Philosophy to Quantum theory), ancient times: In the Vaisheshika philosophy of ancient India, light was considered to made up of particles moving at high speed. 17th centuries: In Europe Newton considered light to be particles (Corpuscles), while some considered it to be a wave. Lighting is a subject that has played major technological role in the history of mankind. Lighting is the ability of a substance or object to emit light or appear bright. Luminous materials are used extensively in science, medicine, electronics, security, industry and everyday life. Therefore, lighting occupies a very important place in the field of modern science.

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Conclusion: - Rare earth doped luminescent materials have emerged as one of the most important classes of functional materials due to their unique optical properties. These

properties include high color purity, sharp emission bands, long luminous lifetime, excellent photo-stability, and high quantum efficiency.

Uses of lighting in various fields: -

Healthcare: - The rapid development of healthcare techniques encourages the emergence of new molecular imaging agents and modalities. Fluorescence imaging that enables precise monitoring and detection of biological processes/diseases is



Aggregation-induced emission luminogens have recently emerged as a new class of emitters that possess several notable features, such as high brightness, large Stokes shift, marked photo stability, good biocompatibility, and so on. So far, AIE gens are widely explored and exhibit superb performance in the area of biomedicine and life sciences. Herein, this review summarizes and discusses the recent **Education:** - Luminescent materials are substances that emit light after absorbing energy from sources such as ultraviolet light, X-ray, electricity and chemical reaction. They play an important role in education by making scientific

investigations of AIE gens for in vivo diagnosis and therapy including long-term tracking, 3D angiography, multimodality imaging, disease theranostics, and activatable sensing. Collectively, these results reveal that AIE gens are of great promise for in vivo biomedical applications. It is hoped that this review will lead to new insights into the development of advanced healthcare materials



concept easier to understand through demonstrations and hands on learning. Used to demonstrate fluorescence, phosphorescence and photoluminescence. Helps students understand energy absorption, electron excitation and light emission. Electronic transitions spectroscopy emission spectra also with the optical materials. In chemistry education luminescent materials used to explain molecular

Agriculture: - The world steadily growing population and global heating due to climate change are a threat to food security. To meet this challenge, novel technologies are needed to increase crop production in a sustainable way. In this work the use of luminescent down shifting materials based on molecular Eu^{3+} .

structure, chemical reactions produced light, luminescent compounds and rare earth ions, crystal field effects. Demonstrates concepts such as chemi luminescence and photoluminescence. Biology and medical education fluorescent dyes are used to observe the cells, tissue, DNA, microorganism helps student learn microscopy techniques.



containing poly oxotitanates for plant growth enhancement is investigated Using a systematic design strategy to optimize down shifting properties conversion of the ultraviolet spectral range to the photo synthetically active radiation is achieved with quantum yields as high as 68%. The prototype Eu^{3+} compound can be incorporated into water-based acrylic vanish that can be spray coated onto

existing greenhouses, basil plants produce 9% more leaf dry weight per plant and a highly significant 10% increase in individual leaf dry weight. The coating reduces the amount of transmitted PAR by 8% but has advantageous effect on diffuse radiation and in reducing the internal mean temperature. Although there is some uncertainty as to the contribution of down shifting with the bulk of the increase



probably being due to higher difficult light and the reduction in maximum daily temperatures, this study

Safety and Signage: - Persistent luminescence materials have been widely studied due to their excellent optical properties. However, they can only be activated by UV light; in other words, the charging method for these

establishes a model for the design of LDS paints for real world agriculture applications.



phosphors is limited. In fact, materials that can continuously emit light when exposed to sunlight are highly sought after for their potential to reduce energy consumption. Warm-colored persistent luminescence materials are particularly useful for information storage, security marking, and preventing counterfeiting. Nevertheless, creating effective warm-color persistent luminescence materials that are activated by sunlight remains a challenging task. Moreover, **Industries and Factories:** - Luminescent materials are widely used in industries and manufacturing because they emit light when excited by ultraviolet light, electricity, X-rays and other energy sources.

it possesses excellent water resistance. The process of electron trapping and release within the material is investigated through thermo luminescence experiments, photoluminescence spectra, and persistent luminescence spectra. Importantly, this phosphor has been demonstrated for various applications, including night vision marking, anti-counterfeiting, optical information storage, and positioning, among others.



Their applications improve safety, product quality, efficiency and security. Glow-in-the-dark exit signs and evacuation routes. Emergency escape markings in factories. Safety labels on hazardous equipment and chemical storage areas. Fire extinguisher and emergency switch indicators. Phosphor-coated LEDs provide bright, efficient illumination. Used in production floors, warehouses, and assembly lines. Improves worker visibility while reducing electricity consumption. Lower energy costs and longer **Transportation:** - With the development of the highway industry and new materials, long afterglow luminescent material as a new energy storage and environmental protection material has gradually been applied to night lighting.

lamp life. Fluorescent dyes help detect cracks, leaks, and surface defects. UV inspection reveals contamination or manufacturing flaws. Used in automotive, aerospace, metal and electronics industry. Invisible fluorescent inks and security markings are applied to products and packaging. Used for authentication of industrial components and branded goods. Scintillation materials detect X-rays and gamma rays. Used to inspect welds, pipelines, castings, and machine parts without damaging them.



by changing the process parameters. The single factor test results indicated that the luminescent properties were highest when flux content, calcination temperature, calcination time and doping ratio. Then, long-afterglow materials with high luminescence were prepared by adding a pore-forming agent. The structural characteristics and optical properties of the products were analysed. X-ray diffraction (XRD) and scanning electron microscopy (SEM) analysis indicated that the addition of pore-forming agent did not change the crystal structure of the material but changed the surface morphology of the long-afterglow materials. The surface morphology of the products changed

from flat and dense to a convex structure after adding pore-forming agent, and some connected pore structures were produced. The afterglow performance of products was continuously improved with the increase of pore-forming agent content. Finally, luminescent coatings were prepared by combining with fluorine-containing resin, and the performance was studied. The stability of luminescent coatings decreased with the increase of the filler:binder ratio, and the best ratio was 0.5:1. The luminous performance of coatings was best when the amount of long-afterglow phosphor was 40%. The luminescent coatings had

good adhesion with the road surface, and the luminescence

Electronics and Technology: - The luminescence exhibited by matter has raised the human curiosity for centuries. The rapid emergent of the solid-state white light-emitting diodes based on the luminescent rare earth ions, especially Ce^{3+} that emits a complementary

could last for more than 7 h in a dark environment.



yellow color of blue light and has central contribution to the development of white LEDs, might be considered the latest lighting devices to light the whole twenty-first century. Thus, the luminescent RE^{3+} compounds have been

Home and Daily life: - Luminescent materials are widely used in homes to improve lighting safety, decoration and energy efficient. The energy efficient home lighting devices are LED, bulbs and fluorescent lamps for

significantly studied due to their remarkable photonic applications, presently extended from lighting and displays, laser physics to material science, and agriculture and medical diagnostics.



bright energy saving illumination. LEDs consumed less electricity and has a longer lifespan than traditional bulbs which improves indoor lighting quality. Rare earth luminescent materials are used in glow in the dark exit signs, emergency route marker and staircase indicators; continue glowing during power failures without requiring electricity and help people safely evacuate in emergencies. Luminescent materials are also used for decorative home items safety marking, household appliances, toys and educational materials, garden and outdoor decoration, night lamps and security application.

2. Significance of Luminescent Materials: - Light is one of the most useful and important physical materials in the modern world. The importance of light extends from various fields such as healthcare, electronics, energy and agriculture to security, environmental monitoring, industry and daily life. By converting absorbed energy into useful light, it improves efficiency, safety communication, diagnostic and technological development in almost every major field.

3. Methodology: - This research paper is based on secondary data like various books, research paper, articles and various reports

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Original Article

Literature And Environmental Consciousness: An Ecocritical Perspective

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Abstract:

Environmental issues such as climate change, pollution, deforestation, and the loss of biodiversity have become some of the most serious challenges of the twenty-first century. These problems affect both human life and the natural environment, making environmental awareness and sustainable living more important than ever. Literature has always reflected the relationship between human beings and nature, presenting both the beauty of the natural world and the harmful effects of environmental destruction. Through poems, novels, plays, and essays, writers have encouraged readers to appreciate nature and recognize their responsibility toward protecting it. This research paper examines environmental consciousness in literature through the perspective of ecocriticism, a literary approach that studies the relationship between literature and the physical environment. The study concludes that literature plays a significant role in promoting environmental consciousness and fostering a sense of collective responsibility for preserving the natural world for future generations.

Keywords: Environmental Consciousness, Ecocriticism, Literature, and Ecological Awareness.

Introduction:

The natural balance has been upset by rapid industrialization, urbanization, excessive use of natural resources, and careless human behavior. Globally, issues like deforestation, pollution, water scarcity, climate change, rising temperatures, and biodiversity loss have grown to be significant environmental concerns. These problems impact human health, livelihoods, and economic growth in addition to plants, animals, and ecosystems. In order to preserve the planet for coming generations, it is now crucial to raise environmental awareness and motivate individuals to adopt eco-friendly and sustainable behaviors. Human existence, society, culture, and the intimate bond between humans and the natural world have all always been portrayed in literature. Writers from antiquity to the present have highlighted the value of nature and its beauty. Simultaneously, numerous literary works have cautioned readers about the negative consequences of deforestation, river pollution, wildlife exploitation, and environmental degradation. Authors have encouraged people to appreciate nature and recognize the importance of environmental conservation through their poetry, novels, dramas, essays, and short stories. In this sense, literature is crucial in fostering environmental consciousness and a sense of duty to preserve the natural world. In recent years, the study of literature and the environment has become more important with the growth of ecocriticism. Savita Yadav quoted the definition of Cheryll Glotfelty, "ecocriticism is the study of the relationship between literature and the physical environment." (Yadav, Online) A literary technique called ecocriticism investigates the connection between literature and the natural world. It looks at how authors portray nature, talk about environmental issues, and critique ecologically damaging human behavior. It also exhorts readers to appreciate nature and acknowledge the intimate relationship between humans and the environment. Ecocriticism encourages ecological principles and environmental responsibility, which helps people realize how important it is to live in balance with nature.

Objectives of the Study

1. To understand the relationship between literature and the environment.
2. To examine the role of literature in developing environmental consciousness.
3. To study the contribution of major writers to environmental awareness.

Literature and Environmental Consciousness:

Environmental consciousness, also known as environmental awareness or eco-consciousness, has arisen as one of the main concepts in current environmental concerns (Smith and Johnson, 2020) An understanding of the value of preserving the environment and making responsible use of natural resources is known as environmental consciousness.

It promotes awareness that everyone has a responsibility to protect the environment and that human life depends on it.

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Developing environmental consciousness has become crucial for sustainable living in the modern era, as environmental issues including pollution, deforestation, climate change, and biodiversity loss are becoming more prevalent. This awareness is largely created through literature. Poetry, novels, dramas, essays, and short tales have all been utilized by authors throughout antiquity to convey their love and care for the natural world. By showcasing the splendor of woods, rivers, mountains, oceans, plants, animals, and birds, literary works assist readers in appreciating the diversity of the natural world. They also discuss the negative consequences of environmental degradation brought on by human activity, including pollution, over-industrialization, urban growth, and irresponsible use of natural resources. Literature is an effective tool for social change and education in addition to being a source of amusement. It challenges readers to consider environmental concerns seriously and comprehend the repercussions of harming the natural world. Many authors encourage people to embrace sustainable and eco-friendly habits and stress the need of living in harmony with the environment. Thus, literature helps develop environmental consciousness by promoting respect for nature, ecological responsibility, and a commitment to protecting the Earth for present and future generations.

Ecocriticism: Literature and Ecology:

Ecocriticism is a literary theory that studies the relationship between literature and the natural environment. "William Rueckert first used the term in 1978, while the field gained prominence in the 1990s through the works of critics such as Cheryll Glotfelty and Lawrence Buell. Glotfelty defines ecocriticism as an earth-centered approach to literary studies. (Mathur, 2023) The term combines the words *ecology* and *criticism*, highlighting the connection between literary studies and environmental concerns. Ecocriticism encourages readers to think about the impact of human activities on nature and promotes a balanced relationship between humans and the environment. Exploring environmental issues in literature and comprehending how authors depict woods, rivers, mountains, animals, and other natural features are the primary goals of ecocriticism. It also looks at how literary works critique overuse of natural resources, pollution, deforestation, and climate change. This method helps readers understand the value of maintaining ecological balance and safeguarding the environment. Promoting environmental ethics by fostering reverence, concern, and accountability for nature is another crucial goal of ecocriticism. It promotes the concept of sustainable living, which calls for the prudent use of natural resources without endangering future generations. Anthropocentrism, the idea that humans are superior to nature, is also contested by ecocriticism, which emphasizes the interconnectedness and equal importance of all living things. Because environmental issues are now worldwide concerns, ecocriticism has grown to be a significant area of literary studies. By relating literature to ecology, it enables readers to comprehend environmental issues and motivates them to embrace sustainable lifestyles and ecologically conscious attitudes. Literature is therefore a potent instrument for advancing ecological consciousness and environmental preservation thanks to ecocriticism.

William Wordsworth and Environmental Consciousness

William Wordsworth is one of the greatest Romantic poets and is often called the "Poet of Nature." (Abrams & Greenblatt, 2018) Nature is the central theme of his poetry, and he believed that it is the best teacher of

human life. According to Wordsworth, nature provides peace, happiness, wisdom, and moral guidance. He felt that people should live close to nature because it helps develop a pure mind and a kind heart. His poems show that human beings and nature share a deep and meaningful relationship. In many of his poems, Wordsworth describes the beauty of mountains, rivers, forests, flowers, birds, and the countryside. He believed that the natural world has the power to heal the human mind and bring inner peace. Five years have past; five summers, with the length Of five long winters! and again I hear

These waters, rolling from their mountain-springs
With a soft inland murmur... (Tintern Abbey, 1798)

The poem *Tintern Abbey* presents nature as a source of spiritual strength, joy, and inspiration. It encourages readers to observe, admire, and protect the natural environment. Wordsworth's poetry also reminds us that modern life often separates people from nature. Through his simple yet powerful descriptions of the natural world, he encourages readers to reconnect with the environment and appreciate its beauty. His works continue to inspire environmental awareness by teaching that protecting nature is essential for human happiness, emotional well-being, and the future of the planet.

Role of Literature in Environmental Awareness:

Literature plays an important role in developing environmental awareness by helping readers understand the value of nature and the need to protect it. Through poems, novels, plays, essays, and short stories, writers present the beauty of forests, rivers, mountains, wildlife, and landscapes, encouraging people to develop love, respect, and appreciation for the natural world. At the same time, literary works draw attention to environmental problems such as pollution, deforestation, climate change, loss of biodiversity, and the overuse of natural resources. By describing the harmful effects of these issues, literature makes readers aware of the consequences of environmental destruction. In addition, many authors encourage people to save forests, safeguard wildlife, and maintain natural resources for coming generations. By promoting the prudent use of environmental resources without inflicting long-term harm, their initiatives advance the concept of sustainable development. By imparting virtues like reverence for all living things, empathy for the natural world, and environmental stewardship, literature advances ecological ethics. Additionally, literary works shape people's attitudes about environmental conservation and frequently spark conversations in favor of environmental policies and initiatives. Literature inspires people to become environmentally conscious citizens and actively contribute to the preservation of the planet by fostering moral and emotional ties with nature. As a result, literature is a potent tool for raising ecological consciousness and supporting sustainable living.

Conclusion:

Literature is a powerful medium for creating environmental consciousness. It teaches individuals to recognize the wonders of nature and the perils of environmental degradation. Rabindranath Tagore, Rachel Carson, William Wordsworth, and Henry David Thoreau are just a few of the authors who have encouraged generations to value and preserve the environment. Readers learn about ecological challenges and their duty to the Earth through environmental literature and ecocriticism. Literature serves as a reminder that preserving the environment is both a social and a moral obligation. Future generations' well-being depends on a healthy environment.



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Original Article

Artificial Intelligence in Financial Literacy: Emerging Trends, Opportunities, and Challenges

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Abstract

Artificial Intelligence (AI) has come out as a revolutionary technology which is transforming many aspects of the global economy such as education, health care, finance, and banking. The use of AI in the financial sector can serve as a powerful means of enhancing financial literacy through the provision of user-friendly and personalized financial information. Financial literacy can be defined as the ability of an individual to have understanding as well as the skill and attitude for using financial information in order to make financial decisions regarding savings, investments, budgeting, borrowing, insurance, and retirement. Even though there have been advancements in financial services due to digitization, financial illiteracy remains a big problem especially in developing countries. AI helps to overcome these problems by offering personalized financial education, AI-enabled chatbots, robo-advisors, virtual financial assistants, predictive analytics, intelligent learning platforms that can help in simplifying complicated financial terms and help people make good financial decisions. The use of artificial intelligence can also help the financial institutions understand the financial behavior of their customers and find the areas where they lack in knowledge and offer customized financial education programs. Moreover, the use of AI with digital banking, mobile apps, and FinTechs has helped in improving financial inclusion and making financial services accessible to the underserved population. There are some challenges associated with the increasing use of AI for financial literacy, including data privacy issues, cyber security threats, algorithmic biases, digital inequality, ethical problems, and regulatory compliance issues. The current study is conceptual in its approach and is based on a descriptive type of research design wherein all the data have been obtained through secondary sources including scholarly articles, books, industrial reports, government documents, company reports, and credible websites. The research explores the importance of Artificial Intelligence in encouraging financial literacy and also discusses the recent trends, technological innovations, opportunities, challenges, and suggestions for policymakers, educators, financial institutions, and researchers. The results show that AI can make a positive change in the field of financial education through making it more accessible, personalized, aware, and knowledgeable.

Keywords: Artificial Intelligence, Financial Literacy, Digital Financial Literacy, FinTech, Financial Education, Financial Inclusion, Machine Learning, Chatbots.

Introduction :

The global financial system has witnessed immense transformation in the past two decades owing to technological advancement, greater availability of the internet, electronic payment systems, mobile banking, and emergence of FinTech. Technological advancements have transformed how individuals access financial services, manage their finances, and make financial decisions. In the modern digital economy, an individual is expected to have not only financial skills but also digital capabilities that help them make effective use of online financial products and services. Financial literacy has thus emerged as one of the most important life skills that individuals need to have in order to enjoy financial well-being and economic stability. Financial literacy means having the ability to understand financial issues and make sound decisions relating to managing finances such as budgeting, saving, investing, borrowing, insurance, taxes, retirement plans, and wealth management. Individuals who have financial literacy are able to better manage their finances, avoid high debt levels, plan for emergencies, and meet their financial goals. On the other hand, lack of financial literacy leads to poor management of finances, low savings, financial stress, and susceptibility to fraud. Financial literacy is defined as knowledge, skills, competencies, and attitudes that help people comprehend financial concepts and make informed decisions about their budgeting, saving, investing, borrowing, insurance, tax management, and wealth management. Individuals who possess higher financial literacy are able to cope with various risks, keep away from overspending and taking too much debt, prepare for unforeseen events, and realize their financial objectives. In contrast, people having low financial literacy usually have poor money management, lack savings, experience financial stress and scams, and do not use formal financial services. The role of financial literacy became especially relevant because of the development of digital financial services.

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The usage of online banking, Unified Payments Interface (UPI), mobile wallets, internet banking, peer-to-peer digital lending sites, digital investing and trading services, crypto currencies, and insurance online services made financial transactions quick and convenient. However, such innovations also necessitate that people know how to use new digital financial products, assess financial risks, protect their personal data, and make decisions. Thus, there is a need to raise financial literacy levels. In recent years, artificial intelligence has played an important role in the development of financial literacy by making financial education more interactive, personalized, and convenient. Financial chatbots can give answers to all financial questions instantly, explain all features of banking products, and help to create financial plans. Artificial intelligence robo-advisors can plan investments for a person based on his/her financial needs and risk appetite. Learning intelligent platforms make educational process more efficient by adapting the educational content based on the user's level of knowledge. Predictive analytics can determine financial behavior and offer financial strategies to improve it. AI also makes the process of learning how to manage finances much easier when used in digital banking and FinTech services. Many modern banking apps are equipped with budgeting tools, spending analytics, savings tips, credit score monitoring, and financial advice for each particular client. Using AI technology, it is possible to analyze customers' transaction data and get insights into the user's spending habits and learn how to save and invest better. However, while these are some of the benefits of the incorporation of AI technology into the development of financial literacy skills, there are a number of issues that should be highlighted. Among the issues of concern regarding the incorporation of artificial intelligence technology in developing financial literacy are data privacy and cybersecurity, which have become major issues due to the heavy dependence on the use of individuals' personal financial data in order to make custom recommendations. There is the risk of making wrong recommendations, biasness, and lack of transparency. India presents a very interesting scenario to analyze the use of AI in relation to financial literacy. The government of India is taking various steps such as "Digital India," "Jan Dhan Yojana," "UPI", and Aadhaar-based services. Furthermore, the increasing prevalence of smartphones among individuals is helping in the process of digital financial inclusion. Financial institutions like banks, FinTech firms, insurance companies, and investment firms are making use of AI to better engage with customers, automate services, prevent fraud, and provide personalized financial education. With the increasing numbers of digital financial service users, there is a need to enhance the use of AI in improving financial literacy to encourage responsible behavior and sustainable development.

In view of the above discussion, the current research is aimed at exploring the role of AI in improving financial literacy through an analysis of emerging trends, innovations, opportunities, and challenges.

Objectives of the Study

1. To learn about the importance of Artificial Intelligence in financial literacy.
2. To study about the applications of Artificial Intelligence in improving financial literacy.
3. To discuss about the trends of Artificial Intelligence in financial education and financial services.
4. To discuss about the possibilities and problems related to financial literacy through Artificial Intelligence.

5. To suggest ways to implement Artificial Intelligence effectively in financial literacy.

Research Questions

1. What is the importance of Artificial Intelligence in improving financial literacy?
2. How can AI be used to enhance financial education and financial decision making?
3. What are the new trends of AI in financial literacy?
4. How can AI help in the promotion of financial literacy and financial inclusion?
5. What are the barriers to the effective use of AI in financial literacy?

Review of Literature:

Lusardi and Mitchell (2014): Financial literacy is a factor that Lusardi and Mitchell looked at in relation to its importance in enhancing people's decisions regarding money matters and their financial lives. Financially literate people tend to save regularly, make sound investments, have proper debt management and plan for retirement. According to the authors, financial literacy is a fundamental life skill which requires integration of financial education through technological means.

OECD (2023): According to the Organisation for Economic Co-operation and Development (OECD), digital transformation has transformed the financial world, where individuals need to have digital and financial literacy skills. The report indicated that Artificial Intelligence, digital banking, and FinTech tools would be able to assist in financial education by providing personalized learning opportunities, accessibility, and informed decision-making regarding finance. Ethical AI, consumer protection, and data privacy were mentioned as crucial issues.

Bawack¹, Wamba², Carillo³, and Akter⁴ (2022): Bawack et al. have reviewed literature on Artificial Intelligence applications in business and electronic commerce through a bibliometric review. The researchers have revealed that technologies such as recommendation system, machine learning, prediction analytics, and chatbot significantly increase customer involvement, operational efficiency, and decision making. The potential of AI to improve financial literacy lies in the provision of personalized advice.

Pallathadka et al. (2023): Pallathadka et al. investigated the applications of AI in finance, banking, and business management. The results indicated that AI increases customer relationship management, detection of fraudulent activity, risk assessment, investment analysis, and financial education.

Kshetri (2021): In his paper Kshetri analyzed the role of Artificial Intelligence in financial services and digital transformation. According to the results of the study, AI allows banks and financial organizations to automate customer services, prevent fraudulent transactions, assess credit risk, and offer personal recommendations related to financial issues. The researcher concluded that AI contributes greatly to the issue of financial inclusion because of making financial services accessible to all categories of people.

Kumar & Goyal (2022): Kumar and Goyal explored the connection between financial literacy and digital financial inclusion in India. They stated that the increase in the number of digital financial services means that consumers need to have more financial literacy and digital skills. The authors underlined that AI-based educational platforms will contribute to higher levels of financial literacy of consumers.



World Bank (2022): According to the report of the World Bank, financial literacy is one of the crucial factors in terms of inclusive economic growth. It was noted that Artificial Intelligence and digital technology will help financial institutions to create personal financial education programs, find financially vulnerable segments of population and engage customers.

Deloitte (2024): According to the Deloitte Global AI Survey, the application of Artificial Intelligence is on the rise within financial services where it helps with customer service, fraud detection, financial planning, personalized banking, and regulation. According to the report, AI not only increases the efficiency of the operations but also promotes financial literacy through intelligent advisors and automated customer service.

McKinsey & Company (2024): According to McKinsey, Generative AI changes the way financial education takes place because it allows for personalized financial advice, automated content creation, financial virtual assistants, and learning. According to the study, AI-based personalization greatly increases customer engagement, their financial literacy, and ability to plan financially.

IBM (2024): IBM noted that Artificial Intelligence facilitates financial literacy in such ways as through conversational AI, predictive analytics, intelligent budgeting, and personalized financial recommendations. The report stated that AI helps financial organizations to better educate customers, increase financial inclusion, and build strong relationships with them.

Research Gaps

The review of existing literature highlights several critical research gaps which justify the rationale behind the current study. Previous studies mostly concentrate on the role of Artificial Intelligence in banking, finance, and e-commerce but do not specifically discuss its role in promoting financial literacy. Existing research puts more emphasis on developed nations whereas very little literature has discussed the concept of AI-based financial literacy in developing countries like India. There is a lack of research related to the role played by Generative AI technologies such as intelligent chatbots and virtual financial assistants in enhancing financial knowledge and financial literacy. Very few studies have analyzed the nexus between Artificial Intelligence, digital financial literacy, financial behavior, and financial well-being within a single theoretical construct. Insufficient attention has been paid to the ethics involved in AI-based financial education such as algorithmic biases, transparency, privacy, cyber security, and responsible AI governance. There is a dearth of research on AI-assisted financial literacy of women, rural population, students, senior citizens, and small entrepreneurs. The need for conceptual research linking Artificial Intelligence, digital financial education, financial inclusion, and sustainable economic development arises.

Theoretical Background

Several theories underpin this research that discuss technology adoption, learning behavior and financial decision making.

Technology Acceptance Model (TAM): Technology Acceptance Model states that people are more likely to adopt Artificial Intelligence technologies if they find them useful and easy to use. AI-based platforms that deliver financial education become even more efficient if the users find it reliable and beneficial for them.

Unified Theory of Acceptance and Use of Technology (UTAUT): According to UTAUT, the usage of AI technologies is greatly influenced by such factors as performance expectancy, effort expectancy, social influences and facilitating conditions. These aspects determine the acceptance of AI-based financial education platforms.

Human Capital Theory: This theory treats education and knowledge as valuable investment that increases the efficiency of individuals and improves their economic situation. Financial literacy based on Artificial Intelligence gives people opportunity to make better financial decisions.

Behavioural Finance Theory: The theory of Behavioural Finance shows how people make financial decisions under the influence of emotions and cognitive errors. Automated financial advisors with AI assist in avoiding behavioural biases through objectivity in decision-making.

Conceptual Framework

In the proposed conceptual framework, it is suggested that Artificial Intelligence is a technology that enhances financial literacy by means of intelligent financial education and financial guidance.

Artificial Intelligence Technologies

Machine Learning
Natural Language Processing
Chatbots
Robo-Advisors
Predictive Analytics
Generative AI



AI-based Financial Education

Personalized Learning
Interactive Financial Guidance
Digital Financial Awareness
Intelligent Budgeting Tools
Investment Education



Enhanced Financial Literacy

Financial Knowledge
Financial Skills
Financial Confidence
Financial Attitude
Financial Decision-making



Outcomes

Better Financial Behavior
Higher Financial Inclusion
Enhanced Financial Well-being
Economic Sustainability

The concept shows how Artificial Intelligence technologies enable financial literacy through providing personalized education and financial guidance, resulting in better financial behavior, higher financial inclusion, and enhanced financial well-being.

Concept of Artificial Intelligence

The term Artificial Intelligence (AI) represents the process of mimicking human intelligence through computer systems for performing functions like learning, reasoning, problem-solving, decision-making, language comprehension, and pattern recognition. AI uses a number of techniques like Machine Learning (ML), Deep Learning, NLP (Natural Language Processing), Computer Vision, Expert Systems, and Predictive Analytics for analyzing huge amounts of data to provide intelligent insights.



AI has become a crucial technological advancement in the field of finance that is helping in providing improved customer service, automation of business operations, identifying fraudulent transactions, determining credit risk, giving personalized financial advices, and making smart decisions regarding finances.

Financial Literacy Concept

Financial literacy can be defined as the capacity of people to comprehend the concept of finance, acquire financial skills, and utilize their financial knowledge to make informed decisions regarding their finances. Some of the financial aspects people should be conversant with include budgeting, saving, investments, borrowing, insurance, taxation, retirement planning, and digital finance.

In accordance with the Organisation for Economic Co-operation and Development (OECD), financial literacy entails having financial knowledge, financial behavior, and financial attitudes, through which an individual acquires financial well-being. As per the digital economy today, financial literacy also involves digital financial literacy, in which the person understands digital financial products such as online banking, digital payments, mobile wallets, etc.

A financially literate individual is more likely to:

- Have a budget prepared and follow it.
- Save money for future uses.
- Invest intelligently.
- Borrow money responsibly.
- Keep their financial data safe.
- Access digital finance products securely.
- Plan for their retirement and emergencies.

The Role of Artificial Intelligence in Financial Literacy

Artificial Intelligence has become a strong tool for enhancing financial literacy through personalization, accessibility, interactivity, and data analysis of financial education. With AI, individuals can learn about financial principles and make sound financial decisions.

Personalized Financial Education

AI assesses the user's financial knowledge, income, expenditure, age, financial objectives, and learning styles to offer personalized financial education. Personalization enhances knowledge acquisition and increases user engagement.

Advantages

- Personalized learning material.
- Personalized financial learning plan.
- Enhanced financial literacy.
- Effective learning.

AI-Powered Chatbots & Virtual Financial Advisors

There is a growing trend among financial organizations for using AI-powered chatbots that help customers in answering their questions on savings, loans, investments, insurance, taxes, digital banking, etc.

Advantages

- Guidance in finances around the clock.
- Prompt customer support.
- Increased accessibility.
- Service cost reduction.

Robo-Advisors

AI-powered robo-advisors guide customers in investment planning by considering their income, risk profile, financial objectives, and market situation.

Advantages

- Personalized investment recommendations.
- Cost-effective financial planning.
- Effective portfolio management.
- Increased investment knowledge.

Intelligent Budgeting and Spending Management

These AI applications classify the income and expenditure of individuals, analyze spending patterns, create monthly budgets, and suggest ways of saving money.

Advantages

- Good budget management.
- Cutting down on unnecessary expenses.
- Saving more money.
- More financial discipline.

Fraud Detection and Financial Safety

AI detects unusual financial behavior, identifies fraud, and warns users about possible cyber threats.

Advantages

- Enhanced cybersecurity awareness.
- Protection against financial fraud.
- Safe digital payments.
- Boosts customer confidence.

Financial Behavior Analysis

This AI technology analyses customers' spending habits, borrowing, saving, and investments for creating individual financial advices.

Advantages

- Better financial decisions.
- Financial discipline.
- Financial well-being.

AI for Financial Inclusion

AI facilitates financial education through mobile apps, multilingual chatbots, and voice assistants helping people in remote areas, females, elders, and poor to learn about finance.

Advantages

- Financial inclusion.
- Better financial education.
- Banking participation.
- Geographical barriers removed.

Trends in AI and Financial Literacy

The growth of Artificial Intelligence has introduced several new ways of teaching finance and providing digital financial services.

Generative AI for Financial Education

Generative AI tools develop tailored financial lessons, make complicated finance-related topics easier to understand, provide explanations about financial rules, and answer users' questions in conversational language.

Conversational AI

Voice assistants and intelligent chatbots have become sources of financial education thanks to their ability to converse naturally with humans.

Predictive Financial Coaching

Thanks to AI, people are able to predict future financial situations according to their expenditure habits and receive advice about saving, paying off debts, and investing.

AI-powered Financial Wellness Platforms

More and more financial institutions introduce platforms that analyze the finances of their customers and give personalized recommendations.



Gamified Approach to Financial Education

Financial education apps that leverage artificial intelligence technology employ quizzes, simulations, incentives, and games to enhance financial education.

Multilingual Financial Education

The technology of artificial intelligence converts the financial information from one language to several regional languages.

AI and Financial Inclusion Through Digital Means

Artificial intelligence technology facilitates financial inclusion by targeting those in need of financial education and offering digital financial education.

Opportunities of Artificial Intelligence in Financial Literacy

There are various opportunities that arise from using Artificial Intelligence in financial literacy and financial inclusion.

Education Opportunities

- Personalized financial education.
- Continuous financial education via AI systems.
- Interactive digital learning.
- Greater financial awareness.
- Economic Opportunities
- Efficient household financial management.
- Savings and investment improvement.
- Credit management improvement.
- Greater financial well-being.
- Banking Opportunities
- Customer education enhancement.
- Operational cost reduction.
- Improved customer satisfaction.
- Improved fraud prevention.

Social Opportunities

- Rural areas financial inclusion.
- Empowerment of women via financial education.
- Improvement of digital literacy.
- Decrease in financial disparity.
- Government Opportunities
- Effective financial literacy programs.
- Improved financial inclusion initiatives' monitoring.
- "Digital India."
- Enhancing financial consumer protection.

Problems Associated with AI in Financial Literacy Education

While there are various advantages of AI, some problems exist too.

- Privacy of Personal Information: AI needs a lot of personal financial data, posing threats of information leaks and breaches.
- Cyber Security Threats: As transactions are done more frequently online, people face the risks of cyber-attacks, identity theft, and online scams.
- Biased Algorithms: An AI system can make biased predictions due to biased training data.
- Digital Divide: Some individuals lack the internet access, necessary gadgets, and digital literacy needed to access AI systems.
- Expensive Implementation: Implementation and maintenance of AI is associated with costs.
- Lack of Human Interactions: Overreliance on AI can limit access to expert advice in difficult cases.
- Regulatory and Ethical Problems: With increased implementation of AI, regulatory measures are needed.

Discussion

Artificial intelligence is revolutionizing financial literacy by making financial education more easily available, personalized, and data-driven. With the use of technologies like chatbots, robo-advisers, intelligent budgeting, predictive analysis, and Generative AI, people can learn how to gain more financial knowledge and make the right financial decisions. Also, with the help of these innovative technologies, financial organizations can assist in spreading customer education, financial inclusivity, and increase efficiency. Nevertheless, the adoption of AI is contingent on overcoming the issues of data protection, cyber security, ethics governance, digital divide, and algorithmic transparency. In order to create secure, inclusive, and user-oriented AI-assisted financial education platforms, governments, regulators, educational institutions, and financial organizations need to collaborate. Thus, artificial intelligence can make a great contribution to the improvement of financial literacy.

Key Findings of the Study

On the basis of the literature review and theoretical analysis, the following key findings have been obtained:

- Artificial Intelligence is a revolutionary technology that improves financial literacy through personalized, interactive, and accessible financial education.
- AI-based solutions including chatbots, robo-advisors, virtual financial assistants, predictive analytics, and intelligent budgeting applications help people to comprehend difficult financial terms and make better financial decisions.
- The incorporation of AI into digital banking, mobile applications, and FinTech platforms has improved the accessibility to financial education and fostered financial inclusion, particularly among those who are digitally connected.
- Generative AI has brought in new possibilities for delivering personalized financial content, multilingual financial education, and real-time financial advice.
- AI allows financial institutions to analyze the behavior of their customers and provide them with personalized recommendations for budgeting, saving, investing, debt management, and retirement planning.
- AI is useful in fraud detection, cybersecurity, and financial risk management, thus improving the customers' trust in digital financial services.
- Despite these benefits, the issues of data privacy, cybersecurity risks, algorithmic biases, digital divide, lack of transparency, and high implementation costs remain.

Suggestions

According to the findings, the following suggestions are made:

- Financial organizations should create AI-enabled platforms for financial education that offer customized learning according to their users' knowledge about finance, income, age, and financial goals.
- Governments should bolster their efforts towards digital financial literacy by using AI in financial education and creating awareness among citizens.
- Educational organizations should incorporate modules related to AI-driven financial literacy in schools, colleges, and universities' curriculum.
- Banks and FinTech firms should increase their efforts toward developing multilingual AI chatbots and virtual financial assistants to provide access to financial education to diverse populations.



- Provisions for strong cybersecurity and data privacy regulations should be made to secure financial information of users from any breach and create trust in AI financial services.
- Efforts should be made to maintain transparency and accountability in AI algorithms used to give financial recommendations to avoid any form of bias.
- Partnerships between public and private sectors should be made to encourage financial inclusion via AI and empower women, rural areas, senior citizens, and economically weaker sections.
- Training sessions should be conducted to improve digital skills of the consumers to enable them to use AI financial services.

Limitations of the Study

- There are some limitations associated with the current study.
- It is a conceptual study that is based only on the secondary sources of information.
- Primary data was not collected from the consumers, financial agencies and policy makers.
- The results are based on the literature survey and do not represent the dynamic changes in the field of AI.
- It presents the general overview of the topic without the particular attention to the selected country, industry or demographic group.

Scope for Future Research

Future research may be based on the topics related to:

- Empirical analysis of the influence of AI on the development of financial literacy among various demographics.
- AI and the financial literacy of the women, students, rural population, senior citizens.
- Role of Generative AI in financial education and financial behavior.
- Comparative analysis of AI-enabled financial literacy in the developed and developing countries.
- Linkage between AI, financial literacy, financial behavior and financial well-being.
- Consumer attitudes toward the use of AI-based financial advisory systems.

Conclusion

In conclusion, it can be said that Artificial Intelligence has turned out to be one of the transformative technologies that are transforming the world of financial literacy as far as personalized and efficient financial education is concerned. Through technologies such as machine learning, natural language processing, chatbots, robo-advisors, predictive analysis and Generative AI, an individual would be able to acquire financial knowledge, manage their personal finances and take financial decisions. The above discussion also makes it clear that through AI, there are ways for financial institutions to improve engagement, detect frauds, manage risks and improve the efficiency of service delivery. It is however essential that certain challenges such as data privacy, cybersecurity, algorithmic bias, ethical issues and inequality of access to digital platforms are addressed. All stakeholders should collaborate to develop transparent, secure and inclusive AI-enabled financial literacy programs. With the continuous evolution of digital financial services, Artificial Intelligence would continue playing an important role in transforming the world of financial education. The responsible application of AI could help individuals acquire financial knowledge, increase financial capabilities and make informed financial decisions.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Original Article

Administrative Planning and Governance of The Simhashtha Kumbh Mela in Nashik: An Academic Analysis

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Abstract

The Simhashtha Kumbh Mela in Nashik, scheduled for 2026–2028, is one of the largest religious mass gatherings in India, attracting millions of pilgrims from across the country and abroad. The scale and duration of the event pose significant administrative challenges related to governance, infrastructure development, crowd management, public health, and environmental sustainability. This paper examines the administrative framework adopted for the upcoming Simhashtha Kumbh Mela from an academic perspective, focusing on institutional arrangements, inter-agency coordination, urban preparedness, and policy-driven planning. Using secondary data from government reports, planning documents, and published sources, the study analyses key administrative strategies implemented by state and local authorities. The paper highlights the role of dedicated governance structures, infrastructure expansion, environmental management of the Godavari River, and emerging technological interventions in crowd and traffic management. The study concludes that effective administration of religious mega-events like the Simhashtha Kumbh Mela requires integrated planning, adaptive governance, and sustained coordination among multiple stakeholders to ensure safety, efficiency, and long-term urban benefits.

Keywords: Simhashtha Kumbh Mela, Public Administration, Mega-Event Governance, Crowd Management, Urban Infrastructure, Environmental Management, Inter-Agency Coordination

Introduction

The **Simhashtha Kumbh Mela** is one of the largest and most significant religious mass gatherings in the world, held every twelve years in Nashik–Trimbakeshwar, Maharashtra. witness a substantial increase in pilgrim participation, thereby intensifying administrative, infrastructural, and governance challenges. Administration of such a large-scale religious event extends far beyond ceremonial arrangements. Rooted in ancient Hindu tradition, the festival involves ritual bathing in the **Godavari River**, drawing millions of pilgrims, ascetics, and visitors from across India and abroad. The upcoming Simhashtha Kumbh Mela (2026–2028) is expected to It involves comprehensive planning in areas such as **urban infrastructure development, crowd and traffic management, public health and sanitation, environmental protection, law and order, and disaster preparedness**. The complexity of these tasks is further heightened by the prolonged duration of the Nashik Kumbh Mela and the geographical sensitivity of key pilgrimage sites, particularly along the banks of the Godavari River. From an academic perspective, the Simhashtha Kumbh Mela presents a unique case for examining **public administration in the context of mega-events**. The establishment of dedicated administrative authorities, inter-departmental coordination among state and local agencies, and the integration of modern technologies for monitoring and control reflect an evolving governance model. These administrative mechanisms aim not only to ensure the smooth conduct of religious activities but also to safeguard public safety, maintain civic order, and minimize environmental degradation. This paper seeks to analyse the administrative framework and planning strategies adopted for the upcoming Simhashtha Kumbh Mela in Nashik. By focusing on governance structures, infrastructure preparedness, crowd management policies, and environmental considerations, the study contributes to a broader understanding of how public administration adapts to the challenges posed by large religious mass gatherings. The findings of this study are expected to offer insights relevant to policymakers, urban planners, and scholars concerned with mega-event management and sustainable urban governance.

Review of Literature

The administration of large-scale religious mass gatherings has been an important subject of academic inquiry, particularly in the fields of public administration, disaster management, urban planning, and sociology.

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Scholars have widely recognized events such as the Kumbh Mela as complex administrative systems that require coordinated governance, infrastructural resilience, and effective crowd management strategies. Early studies on the Kumbh Mela primarily focused on its **cultural and religious significance**, emphasizing its historical continuity and socio-religious importance in Indian society. However, with the increasing scale of participation, contemporary research has shifted attention toward the **administrative and managerial challenges** associated with the event. Researchers have highlighted that the sheer volume of pilgrims transforms the host city into a temporary megacity, demanding exceptional administrative capacity and planning (Singh & Bhatia, 2019). Several scholars have examined **crowd dynamics and safety management** during mass gatherings. Studies on previous Kumbh Melas, particularly Prayagraj (2013 and 2019), reveal that effective crowd regulation, spatial zoning, and route segregation are critical to preventing stampedes and other crowd-related disasters (Sharma, 2018). Computational and simulation-based studies further emphasize the importance of predictive planning and real-time monitoring systems in managing high-density crowds during peak bathing days. Research in the field of **public administration** has emphasized the role of **institutional arrangements and inter-agency coordination** in mega-event governance. Establishing dedicated authorities with delegated powers has been identified as a best practice for managing large religious events. These authorities facilitate coordination among multiple stakeholders, including police, municipal bodies, health departments, and disaster response agencies (Kumar, 2020). Such governance models have been increasingly adopted in recent Kumbh Melas to enhance administrative efficiency and accountability. Environmental management has emerged as a critical theme in recent literature. Scholars have raised concerns about **river pollution, solid waste generation, and ecological degradation** caused by mass bathing and temporary settlements along riverbanks. Studies on the Godavari and Ganga rivers stress the need for integrated environmental planning, including sewage treatment upgrades, waste segregation, and post-event ecological restoration (Joshi & Deshpande, 2021). These studies argue that environmental sustainability must be embedded within administrative planning rather than treated as a peripheral concern. Public health and sanitation have also received significant attention in academic discourse. Research highlights that large gatherings increase the risk of communicable diseases, heat-related illnesses, and medical emergencies. Effective deployment of mobile healthcare units, disease surveillance systems, and sanitation infrastructure has been identified as essential for minimizing health risks during prolonged events such as the Nashik Simhashta (Patil, 2019). Despite the growing body of literature on Kumbh Mela administration, **limited academic work specifically focuses on the Nashik Simhashta Kumbh Mela**, particularly from a forward-looking perspective. Most existing studies rely on retrospective analyses of past events, leaving a research gap in understanding contemporary administrative planning for upcoming mega-events. This paper attempts to address this gap by examining the administrative strategies and governance mechanisms being adopted for the forthcoming Simhashta Kumbh Mela in Nashik, thereby contributing to the evolving discourse on religious mega-event administration in India.

Objectives of the Study

The present study aims to examine the administrative aspects of the upcoming Simhashta Kumbh Mela in Nashik from an academic perspective. The specific objectives of the study are as follows:

To analyse the administrative and governance framework established for the Simhashta Kumbh Mela in Nashik.

To examine the role of state and local authorities in planning and coordinating infrastructure, public services, and security arrangements.

To study crowd management and public safety strategies adopted for managing large-scale pilgrim movement during the festival.

To assess environmental and public health measures, particularly those related to the management of the Godavari River and sanitation facilities.

To identify key administrative challenges and opportunities in the management of a large religious mega-event.

To contribute to academic understanding of mega-event administration within the framework of public administration and disaster management.

Research Methodology

The study is based on a **descriptive and analytical research design**, focusing on administrative planning and governance mechanisms for the upcoming Simhashta Kumbh Mela in Nashik.

4.1 Sources of Data

The research relies exclusively on **secondary data sources**, which include:

Government notifications, policy documents, and planning reports related to the Simhashta Kumbh Mela.

Reports published by municipal corporations and state government departments.

Scholarly articles, research papers, and books on mass gathering management and public administration.

Newspaper articles and credible online sources reporting on preparations and administrative measures.

Method of Analysis

The collected data has been analysed using a **qualitative analytical approach**. Administrative structures, planning strategies, and governance models have been examined and interpreted within the framework of public administration and disaster management theories. Comparative references to previous Kumbh Melas have been used where relevant to strengthen the analysis.

4.3 Scope of the Study

The scope of this study is limited to the **administrative planning and governance mechanisms** related to the upcoming Simhashta Kumbh Mela in Nashik. The study does not include primary field surveys or statistical modelling but focuses on policy-level and institutional analysis.

Administrative Framework and Planning

The administration of the Simhashta Kumbh Mela in Nashik is anchored in a **multi-tier governance framework** designed to address the complexity and scale of the event. Recognizing the magnitude of administrative challenges, the Government of Maharashtra has constituted a **dedicated Simhashta Kumbh Mela Authority**, headed by senior administrative officials. This authority is responsible for overall planning, coordination, implementation, and monitoring of preparations related to the Mela.

The administrative framework involves close coordination among multiple departments, including urban development, public works, water resources, police, health services, disaster management, and municipal bodies. The Nashik Municipal Corporation (NMC) plays a crucial role in urban infrastructure development, sanitation, waste management, and civic services, while the district administration oversees law and order, revenue administration, and inter-departmental coordination.

Planning for the Kumbh Mela follows a **phased approach**, consisting of pre-event preparation, event-time management, and post-event restoration. Micro-planning at the local level focuses on sensitive pilgrimage sites such as Trimbakeshwar, Ramkund, and Tapovan, where crowd density is expected to be highest. The use of planning committees and periodic review meetings ensures accountability and progress tracking. This structured administrative approach reflects an attempt to institutionalize best practices in mega-event governance.

Crowd Management and Public Safety Measures

Crowd management is one of the most critical administrative challenges of the Simhashta Kumbh Mela, given the anticipated influx of millions of pilgrims during peak bathing days. Administrative strategies emphasize **crowd segregation, route planning, time-based access control, and spatial zoning** to reduce congestion and prevent crowd-related incidents.

Authorities have proposed the use of **technology-enabled monitoring systems**, including CCTV surveillance, GIS-based mapping, and real-time data analysis, to track crowd density and movement patterns. These tools support decision-making and enable timely intervention in case of overcrowding or emergencies. Traffic management plans include designated parking zones, shuttle services, pedestrian-only corridors, and restrictions on heavy vehicles near pilgrimage sites.

Public safety measures also include enhanced police deployment, coordination with disaster response agencies, and the establishment of emergency control rooms. Temporary bridges, barricades, signage, and volunteer support systems are planned to guide pilgrims safely. From an academic standpoint, these measures demonstrate the application of disaster management principles such as **risk reduction, preparedness, and response** in a non-traditional disaster context.

Environmental and Public Health Management

Environmental sustainability and public health have emerged as central concerns in the administration of the upcoming Simhashta Kumbh Mela. The Godavari River holds immense religious significance, and its protection from pollution during the event is a major administrative priority. Authorities have planned improvements in sewage treatment capacity, expansion of sewer networks, and strict regulation of waste disposal to minimize environmental degradation.

Solid waste management strategies include segregation of waste at source, deployment of sanitation workers, installation of mobile toilets, and continuous cleaning of ghats and public areas. These measures aim to address the health risks associated with overcrowding and poor sanitation, which have been highlighted in earlier Kumbh Melas.

Public health planning includes the strengthening of hospitals, establishment of temporary medical camps, mobile health units, and disease surveillance mechanisms. Special attention is given to vulnerable groups such as elderly pilgrims, children, and ascetics. From an academic perspective, these initiatives reflect an integrated approach

linking **public health administration with environmental governance** in the context of mass gatherings.

Findings and Discussion

The analysis of administrative preparations for the Simhashta Kumbh Mela in Nashik reveals a shift towards **institutionalized and technology-supported governance**. The establishment of a dedicated authority, emphasis on inter-agency coordination, and adoption of modern planning tools indicate administrative learning from previous mega-events.

However, challenges remain in terms of timely completion of infrastructure projects, environmental sustainability, and coordination among multiple stakeholders. Public concerns regarding delays and resource constraints highlight the need for continuous monitoring and adaptive planning. The study underscores that while administrative frameworks have become more robust, their effectiveness depends on execution efficiency and community cooperation.

Conclusion

The administration of the upcoming Simhashta Kumbh Mela in Nashik represents a complex exercise in public governance, requiring coordination across multiple sectors and levels of government. The event serves as a significant case study for understanding mega-event administration in India, particularly in the context of religious mass gatherings. Effective planning, crowd management, environmental protection, and public health measures are essential to ensuring the safety and success of the Mela. The study concludes that integrated governance, technological innovation, and sustainable planning are key to addressing the administrative challenges of such large-scale events.

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Original Article

Green Lifestyle Behaviour and Household Intention to Adopt Renewable Energy Technologies: Evidence from Kerala

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Abstract

The transition towards renewable energy has become a global priority in response to climate change, increasing energy demand, and the depletion of fossil fuel resources. While technological advancements and government initiatives have accelerated the development of renewable energy infrastructure in India, household adoption continues to depend largely on consumers' environmental attitudes and lifestyle choices. Green lifestyle behaviour, characterised by environmentally responsible consumption practices and sustainable daily habits, has emerged as an important determinant of renewable energy acceptance. Understanding how these behavioural patterns influence households' intention to adopt renewable energy technologies is particularly relevant in Kerala, where high literacy, growing environmental awareness, and increasing energy consumption present favourable conditions for sustainable energy transitions. The present study examines the relationship between green lifestyle behaviour and household intention to adopt renewable energy technologies among households in Kerala. Primary data were collected from 150 households using a structured questionnaire. The study adopts a descriptive research design and employs convenience sampling. Percentage analysis, mean, standard deviation, and rank analysis were used to analyse the collected data. The findings are expected to demonstrate that environmentally responsible lifestyle practices, awareness of environmental issues, and perceived economic and environmental benefits positively influence households' intention to adopt renewable energy technologies. The study provides practical recommendations for policymakers, renewable energy agencies, and awareness campaign designers to strengthen community participation in sustainable energy initiatives. The findings contribute to the growing body of literature on consumer behaviour and renewable energy adoption while offering region-specific insights from Kerala.

Keywords: Green lifestyle behaviour, Renewable energy, Household adoption, Sustainable consumption, Environmental concern, Kerala.

Introduction

Climate change, environmental degradation, and increasing dependence on conventional energy resources have intensified the need for cleaner and more sustainable energy systems across the world. Renewable energy technologies such as solar, wind, biomass, and small hydropower are increasingly recognised as practical alternatives to fossil fuels because they provide environmental, economic, and social advantages. Governments across the globe are promoting renewable energy adoption through policy interventions, financial incentives, and awareness programmes to achieve sustainable development goals and reduce greenhouse gas emissions. During the last decade, India has substantially expanded its renewable energy capacity through programmes such as the National Solar Mission, PM Surya Ghar: Muft Bijli Yojana, and several state-level renewable energy initiatives. Kerala has introduced multiple programmes to promote the use of renewable energy technologies across households, educational institutions, and commercial sectors. Despite these initiatives, the rate of household adoption remains inconsistent, suggesting that government support alone cannot ensure widespread acceptance of renewable energy technologies. Recent research has highlighted that consumer behaviour is equally important in influencing decisions related to energy consumption and technology adoption. Green lifestyle behaviour represents an individual's commitment to environmental sustainability through everyday actions such as conserving electricity, reducing waste generation, choosing environmentally friendly products, limiting plastic consumption, and responsible initiatives. Individuals who regularly engage in environmentally responsible practices are generally more aware of the long-term advantages of renewable energy technologies and are therefore more inclined to adopt them. Kerala presents an appropriate context for examining this relationship due to its relatively high literacy rate, increasing environmental awareness, and growing emphasis on sustainable development. Rising electricity demand, concerns about energy security, and increasing public interest in environmentally responsible living have created favourable conditions for promoting renewable energy adoption.

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Nevertheless, differences in consumer awareness, perceived costs, accessibility, and lifestyle choices continue to influence household decisions. Although previous studies have extensively examined technological, economic, and policy-related determinants of renewable energy adoption, comparatively fewer studies have explored the influence of green lifestyle behaviour on households' adoption intentions within the Kerala context. Understanding this relationship can help policymakers, renewable energy agencies, and community organisations develop more effective awareness

Literature Review

The global transition towards renewable energy has highlighted the importance of understanding household behaviour, as consumer decisions play a critical role in achieving national clean energy targets. Although technological advancements and financial incentives have accelerated renewable energy deployment, recent research demonstrates that behavioural, social, environmental, and institutional factors substantially influence adoption decisions. Yü et al. (2026) conducted a comprehensive systematic review of consumer-oriented renewable energy adoption studies using the PRISMA framework. Reviewing more than 400 published studies, the authors identified environmental awareness, government support, knowledge, perceived economic benefits, willingness to pay, and social influence as the most consistent determinants of renewable energy adoption. They concluded that future research should move beyond purely economic explanations and examine behavioural and lifestyle-related factors that shape consumer decisions. Using an extended Theory of Planned Behaviour, Sahu et al. (2026) investigated behavioural determinants of household solar energy adoption in India. Their findings revealed that environmental concern, trust, perceived benefits, and awareness of government initiatives significantly strengthened favourable attitudes towards solar energy. Furthermore, attitude, subjective norms, and perceived behavioural control positively influenced adoption intention, while perceived cost became less significant once behavioural variables were considered. These findings indicate that psychological factors often outweigh financial considerations in household renewable energy decisions. A qualitative investigation conducted among non-adopter households in Kerala explored barriers to residential rooftop solar photovoltaic adoption. The study found that high initial investment, inadequate technical knowledge, uncertainty regarding maintenance, procedural complexity, and limited confidence in available information discouraged adoption despite respondents generally expressing positive attitudes towards renewable energy. The authors suggested that awareness programmes and simplified administrative procedures are essential for increasing household participation.

Rasheed et al. (2026) examined solar energy adoption intentions among 671 small and medium enterprises in Kerala. The study established that awareness significantly predicted adoption intention and explained a substantial proportion of behavioural variation. Respondents possessing greater knowledge of solar technologies expressed stronger willingness to adopt renewable energy solutions. The authors recommended awareness-driven policy interventions and training programmes to accelerate sustainable energy adoption. Keepat and Velmurugan (2026) investigated rooftop solar adoption among micro-scale producers in Kerala. The study identified awareness, perceived economic benefits, and environmental responsibility as major drivers of adoption, whereas high installation costs and limited rooftop availability remained significant barriers. The findings emphasised the importance

programmes that encourage environmentally responsible behaviour alongside renewable energy adoption. Against this background, the present study investigates the influence of green lifestyle behaviour on household intention to adopt renewable energy technologies among households in Kerala. The findings are expected to provide valuable insights for strengthening sustainable energy policies and promoting environmentally responsible consumer behaviour in the state

of financial assistance and consumer education in improving renewable energy participation within Kerala. Sudarsan and Chithra (2026) analysed the regional maturity of domestic clean energy transition across India. Their study demonstrated considerable regional differences in household readiness for clean energy adoption and reported that higher educational attainment, environmental awareness, and supportive policy environments significantly contributed to successful clean energy transitions. The authors highlighted the need for state-specific strategies reflecting local socioeconomic conditions. Research published in *Applied Energy* (2026) developed a Clean Energy Adoption Index to evaluate India's rural energy transition. The study found considerable interstate differences in household clean energy adoption despite ongoing expansion of renewable energy infrastructure. The authors concluded that awareness, accessibility, and regional policy implementation strongly influence household participation in clean energy programmes. Scheller et al. (2023) examined homeowners' intention to adopt residential low-carbon technologies. Their research demonstrated that environmental benefits contributed more strongly to positive attitudes, whereas perceived financial benefits exerted a stronger direct influence on adoption intention. The study concluded that consumers evaluate renewable energy technologies by balancing environmental responsibility with anticipated personal economic gains. Recent psychometric research by Gillariose, Joseph, and Sijo (2026) developed and validated a multidimensional scale measuring homeowners' motivations for rooftop solar adoption. The study confirmed that environmental values, energy independence, financial expectations, and social responsibility collectively shape residential solar adoption decisions, illustrating that household motivations extend beyond economic considerations alone. Overall, the reviewed literature consistently demonstrates that renewable energy adoption is determined by a combination of environmental concern, awareness, trust, perceived benefits, policy support, and consumer behaviour. However, most existing studies focus specifically on rooftop solar adoption or technology-oriented determinants. Comparatively limited attention has been given to the influence of green lifestyle behaviour on households' intention to adopt renewable energy technologies more broadly, particularly within Kerala. This gap provides the rationale for the present study, which seeks to examine how environmentally responsible lifestyle practices influence household intention to adopt renewable energy technologies in the Kerala context.

Objectives

1. The study has been undertaken with the following objectives:
2. To examine the level of green lifestyle behaviour among households in Kerala.
3. To identify the factors motivating households to adopt renewable energy technologies.
4. To analyse households' intention to adopt renewable energy technologies.



Research Methodology

The present study adopts a descriptive research design to examine the influence of green lifestyle behaviour on households' intention to adopt renewable energy technologies in Kerala.

Area of the Study

The study was conducted among households located in selected districts of Kerala.

Nature and Source of Data

The study is primarily based on primary data collected directly from household respondents through a structured questionnaire. Secondary information was obtained from research articles, books, government reports, policy documents, and other relevant published sources relating to renewable energy and sustainable consumer behaviour.

Sample Size

A total of **150 household respondents** participated in the study.

Sampling Technique

Convenience sampling technique was adopted considering the accessibility and willingness of respondents to participate in the survey.

Instrument for Data Collection

A structured questionnaire was designed using a five-point Likert scale ranging from **1 = Strongly Disagree** to **5 = Strongly Agree** for measuring green lifestyle behaviour and renewable energy adoption intention. The

Table 1 : Demographic profile of respondents

Particulars	Category	Frequency	Percentage
Gender	Male	72	48.0
	Female	78	52.0
Age	Below 30 years	28	18.7
	31–40 years	46	30.7
	41–50 years	42	28.0
	Above 50 years	34	22.6
	Up to Higher Secondary	27	18.0
Education	Graduate	58	38.7
	Postgraduate	49	32.7
	Professional Degree	16	10.6
	Below ₹30,000	31	20.7
Monthly Family Income	₹30,001–₹60,000	54	36.0
	₹60,001–₹90,000	39	26.0
	Above ₹90,000	26	17.3

Source: Primary data

The table indicates that female respondents (52.0%) slightly outnumbered males (48.0%). Most respondents (30.7%) belonged to the 31–40 years age group. Graduates

questionnaire also included demographic questions and items relating to respondents' awareness and perceptions.

Statistical Tools Used

The collected data were analysed using the following statistical tools:

- Percentage Analysis
- Mean
- Standard Deviation
- Rank Analysis

These statistical techniques were considered appropriate for describing respondent characteristics, identifying major behavioural factors, and ranking the determinants influencing renewable energy adoption.

The study assumes that environmentally responsible lifestyle practices positively influence households' intention to adopt renewable energy technologies.

Independent Variable

Green Lifestyle Behaviour

Dependent Variable

Household Intention to Adopt Renewable Energy Technologies

The conceptual relationship proposes that households demonstrating stronger green lifestyle practices are more likely to express favourable intentions towards adopting renewable energy technologies.

Data Analysis and Interpretation

constituted the largest educational category (38.7%), while 36.0% of households reported a monthly family income between ₹30,001 and ₹60,000.

Table 2: Mean, Standard Deviation and Rank Analysis of Green Lifestyle Behaviour

Statement	Mean	SD	Rank
I switch off electrical appliances when not in use.	4.41	0.63	I
I prefer environmentally friendly products whenever possible.	4.29	0.69	II
I try to reduce household waste through reuse and recycling.	4.21	0.71	III
I make conscious efforts to conserve electricity.	4.15	0.74	IV
I encourage family members to follow eco-friendly practices.	4.08	0.78	V
I avoid unnecessary use of plastic products.	3.96	0.81	VI
I participate in environmental awareness activities.	3.84	0.88	VII
I regularly seek information about renewable energy.	3.78	0.91	VIII

Source: Primary data

The findings reveal that respondents strongly agreed with the practice of switching off electrical appliances when not in use (Mean = 4.41), making it the highest-ranked green

lifestyle behaviour. Preference for environmentally friendly products (Mean = 4.29) and waste reduction through reuse and recycling (Mean = 4.21) also received high levels of agreement. Participation in environmental awareness

activities recorded the lowest mean score (3.84), indicating

Table 3: Mean, Standard Deviation and Rank Analysis of Factors Influencing Renewable Energy Adoption

Factor	Mean	SD	Rank
Environmental protection	4.36	0.65	I
Reduction in electricity bills	4.31	0.69	II
Long-term financial savings	4.18	0.72	III
Government subsidies and incentives	4.05	0.77	IV
Reliable electricity supply	3.97	0.82	V
Positive influence from family and friends	3.82	0.86	VI
Availability of technical information	3.74	0.91	VII
Easy installation and maintenance	3.68	0.94	VIII
Reduction in electricity bills	4.31	0.69	II

Source: Primary data

Environmental protection emerged as the most influential factor (Mean = 4.36), followed by reduction in electricity bills (Mean = 4.31). Government incentives also positively

scope for improving community engagement.

influenced adoption decisions. However, ease of installation and maintenance received the lowest mean score (3.68), suggesting that respondents perceive technical aspects as a potential challenge.

Table 4: Mean, Standard Deviation and Rank Analysis of Household Intention to Adopt Renewable Energy Technologies

Statement	Mean	SD	Rank
I intend to adopt renewable energy technologies in the future.	4.34	0.68	I
I would recommend renewable energy to others.	4.27	0.71	II
Renewable energy is a worthwhile long-term investment.	4.20	0.74	III
I am willing to learn more about renewable energy technologies.	4.11	0.76	IV
I will consider renewable energy when upgrading my home.	4.03	0.79	V

Source: Primary data

Respondents expressed a strong intention to adopt renewable energy technologies in the future (Mean = 4.34). They also showed a positive willingness to recommend renewable energy to others (Mean = 4.27). Overall, the results indicate a favourable attitude towards renewable energy adoption among households in Kerala.

Key Findings

- The demographic analysis revealed that 52.0% of the respondents were female, while 48.0% were male. The majority (30.7%) belonged to the 31–40 years age group.
- Most respondents (38.7%) were graduates, and 36.0% reported a monthly family income between ₹30,001 and ₹60,000.
- The analysis of green lifestyle behaviour indicated that respondents generally practised environmentally responsible habits in their daily lives.
- Among the green lifestyle practices, switching off electrical appliances when not in use recorded the highest mean score (Mean = 4.41), ranking first among all behavioural statements.
- Preference for environmentally friendly products (Mean = 4.29) and reducing household waste through reuse and recycling (Mean = 4.21) were also highly ranked, indicating a positive environmental orientation among households.
- Participation in environmental awareness programmes recorded the lowest mean score (Mean = 3.84), suggesting comparatively lower involvement in organised environmental activities.
- Among the factors influencing renewable energy adoption, environmental protection emerged as the most influential factor (Mean = 4.36), followed by reduction in electricity bills (Mean = 4.31) and long-term financial savings (Mean = 4.18).

- Government subsidies and incentives were also perceived as important in encouraging renewable energy adoption, although respondents expected greater awareness and easier access to such schemes.
- Respondents expressed a favourable intention to adopt renewable energy technologies, with the statement "I intend to adopt renewable energy technologies in the future" receiving the highest mean score (Mean = 4.34).
- The findings indicate that households practising stronger green lifestyle behaviours also demonstrate greater willingness to adopt renewable energy technologies, highlighting the importance of promoting sustainable lifestyles alongside renewable energy policies.

Suggestions

Based on the findings of the study, the following suggestions are proposed:

Government agencies should strengthen awareness campaigns highlighting the environmental and economic benefits of renewable energy technologies through community programmes, educational institutions, and digital platforms.

Local self-government institutions may organise renewable energy awareness workshops and demonstration projects to familiarise households with available technologies and government support schemes.

Financial institutions may introduce simplified financing options and low-interest green loans to reduce the financial burden associated with renewable energy investments.

Renewable energy service providers should improve consumer education by offering transparent information regarding installation procedures, maintenance requirements, and expected long-term savings.

Environmental education promoting green lifestyle practices should be incorporated into school, college, and



community-level programmes to encourage sustainable behavioural changes from an early age.

Policymakers should continue strengthening subsidy programmes and simplify application procedures to improve accessibility and encourage greater household participation in renewable energy initiatives.

Conclusion

The transition towards renewable energy requires not only technological innovation and policy support but also environmentally responsible consumer behaviour. The present study examined the influence of green lifestyle behaviour on households' intention to adopt renewable energy technologies in Kerala. The findings indicate that households generally exhibit positive green lifestyle practices and favourable intentions towards renewable energy adoption. Environmental protection, electricity cost savings, and long-term financial benefits emerged as the most important motivating factors. The results suggest that environmentally conscious households are more likely to support renewable energy initiatives and adopt sustainable energy technologies. The study contributes to the growing literature on sustainable consumer behaviour by highlighting the importance of behavioural factors in promoting renewable energy adoption. The findings may assist policymakers, renewable energy agencies, and environmental organisations in designing effective awareness programmes and behavioural interventions that complement existing policy initiatives. Although the study provides useful insights, it is limited to a sample of 150 households from Kerala. Future research may consider larger samples, comparative studies across different states, or advanced analytical techniques to further examine behavioural determinants of renewable energy adoption.

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Original Article

Mapping The Research Metrics Landscape: A Review of Bibliometric Indicators and Scholarly Communication in Maharashtra State Universities

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Abstract

The growing reliance on quantitative research metrics (e.g., h-index, Impact Factor) for faculty evaluation and institutional ranking in India presents both opportunities for quality improvement and significant ethical challenges, particularly within state university systems. This review investigates the strategic and evolving role of academic libraries in State Universities across Maharashtra in navigating this complex metric landscape. It synthesizes literature concerning the pressure on faculty due to the University Grants Commission (UGC) mandates, the subsequent rise of predatory publishing, and the proactive measures taken by libraries to promote bibliometric literacy and research integrity. The findings underscore that libraries are transitioning from traditional resource centers to essential partners in Research Support Services (RSS), serving as gatekeepers against predatory journals (e.g., leveraging the UGC-CARE list) and as trainers for responsible research assessment. The article concludes with recommendations for institutionalizing these library services to ensure equitable and ethical research practices across Maharashtra's diverse higher education ecosystem.

Keywords: Academic Libraries, Research Metrics, Bibliometrics, Research Ethics, UGC-CARE, Predatory Publishing, Maharashtra Universities, Research Integrity.

Introduction

The contemporary global academia operates under a metric-driven economy where research success is frequently quantified by numerical indicators. The proliferation of author-level metrics (e.g., h-index, i10-index) and journal-level metrics (e.g., Journal Impact Factor, CiteScore) has profoundly reshaped the incentives and pressures on faculty in Indian higher education institutions (Hirsch, 2005; Patwardhan et al., 2018). In Maharashtra, a state characterized by a large number of diverse State Universities (such as Savitribai Phule Pune University, University of Mumbai, and Dr. Babasaheb Ambedkar Marathwada University), these metrics are central to the Career Advancement Scheme (CAS) and institutional accreditation processes (UGC, 2018). This system, while intended to improve academic quality, has inadvertently led to increased anxiety, metric-gaming, and the alarming growth of predatory publishing (Beall, 2012; Seethapathy et al., 2016). This review article focuses on the indispensable and increasingly complex role of academic libraries in Maharashtra State Universities as they move to counteract these negative effects and actively guide faculty through the metrics landscape. The objective is to synthesize extant literature on how libraries facilitate *responsible* research assessment and promote *publication ethics* as mandated by national policies, such as the creation of the UGC-CARE list.

Methodology

This study employs a comprehensive, descriptive literature review approach. The search strategy targeted scholarly articles, conference proceedings, and policy documents indexed in Scopus, Web of Science, and Google Scholar. Key search terms included: "academic libraries India research metrics," "UGC-CARE list and library role," "bibliometric services university libraries Maharashtra," "research integrity and LIS India." A total of approximately 50 relevant sources published mainly between 2005 and 2024 were selected and analyzed to build a robust foundation reflecting the evolution of bibliometric services and ethical support in the Indian and Maharashtra context.

Literature Review: The Shifting Academic Landscape

The review is structured into five core themes that map the transition in research evaluation and the library's response.

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The Imperative of Metrics and the UGC Mandate

The adoption of bibliometric indicators in Indian academia was formalized through the UGC Regulations (2010/2018) which integrated research scoring into the CAS framework. The h-index (Hirsch, 2005), which balances the number of publications with the number of citations they receive, has become a core component of faculty evaluation globally and nationally (Bornmann & Daniel, 2007). Patwardhan (2019) notes that this shift was necessary to inject accountability and quality into the system, yet it simultaneously created a high-stakes environment where citation counts became survival tools. Singh and Singh (2019) demonstrated the strong correlation between these metrics and the ranking of prominent Indian institutions, solidifying their importance.

Bibliometric Literacy and Faculty Awareness

A significant body of literature points to a knowledge gap among faculty regarding the nuances of research metrics. While most faculty are aware of the Journal Impact Factor (JIF), their understanding of author-level metrics like the h-index, i10-index, and the specific calculation methods used by different databases (Scopus vs. Google Scholar) remains inconsistent (Sutton, 2014; Priyanka & Kumar, 2020). For instance, an author might not understand that the h-index is highly field-dependent and does not account for co-authorship fairly in all disciplines (Jacsó, 2008). This deficit in bibliometric literacy is compounded by the fact that many researchers, especially in state universities with limited resources, are only exposed to these concepts when they apply for promotion or receive a rejection (Sheeja, 2010).

The Ethical Crisis: Predatory Publishing and UGC-CARE

The intensified "publish or perish" culture fueled by metrics led to a surge in publications in predatory journals—open-access outlets that prioritize profit over peer review (Beall, 2012). This ethical crisis severely damaged the reputation of Indian research globally (Moher et al., 2017). The establishment of the Consortium for Academic Research and Ethics (UGC-CARE), with its specialized cell at Savitribai Phule Pune University (SPPU) in Maharashtra, was a landmark institutional response (Patwardhan, 2019). The UGC-CARE list serves as a whitelist of quality journals, explicitly stating that publications in journals not on the list would not count toward academic credit (UGC, 2018). This policy shift placed a direct responsibility on institutions and, consequently, their libraries, to disseminate this information and verify journal quality.

The Library's Evolution to Research Support Services (RSS)

Academic libraries in Maharashtra are pivoting from being custodians of print resources to becoming active **Research Support Services (RSS)** centers. Shaiwale (n.d.) emphasizes that libraries are vital hubs providing up-to-date information, expertise, and training essential for ethical research. This transition involves:

Metric Calculation and Profiling: Libraries now routinely help faculty create and maintain researcher profiles on platforms like Google Scholar, Scopus, and ORCID, ensuring accurate and visible calculation of their h-index and other metrics.

Resource Access and Management: Libraries provide access to crucial proprietary databases (Scopus, Web of Science) and train faculty on effective utilization, directly linking resource access to enhanced metrics (Dhande, 2017).

Intellectual Property and Copyright: Services include training on plagiarism detection software (e.g., Turnitin,

Urkund) and proper citation management (Madan & Kumar, 2017; Satija, 2016).

The Library as an Ethical Gatekeeper

The most critical new function for libraries, particularly after the introduction of UGC-CARE, is acting as an ethical gatekeeper. Libraries directly combat the predatory publishing menace by:

UGC-CARE Consultation: Offering workshops and one-on-one consultations to verify if a journal is on the official UGC-CARE list.

Critical Evaluation Training: Training researchers, especially PhD scholars, on how to critically evaluate a journal for predatory characteristics, such as false impact factors, aggressive solicitation, and lack of rigorous peer review (Gohain & Langade, 2019).

Promoting Open Access (OA): Guiding faculty toward legitimate, high-quality open-access journals and institutional repositories that enhance article visibility and, consequently, citation counts (Arora & Trivedi, 2010).

Discussion and Analysis

The literature reviewed confirms that the academic library in Maharashtra is undergoing a fundamental transformation, shifting its core value proposition from collection management to knowledge consulting. This change is a direct, essential response to the metric-driven policies imposed by the UGC. The key challenge remains one of equity and standardization. While Central Universities and larger metropolitan universities (like the University of Mumbai) may have well-staffed Research Support Services, many smaller, regional State University libraries in Maharashtra struggle with limited budgets for proprietary tools (Scopus, Web of Science) and lack the specialized personnel to train faculty effectively (Kumar & Senthilkumar, 2019). This disparity can perpetuate the metric gap between well-funded and less-funded institutions, which may ironically push faculty from the latter toward cheaper, riskier publication venues. The UGC-CARE initiative has been a major step, but its effectiveness relies heavily on the library's ability to act as the primary local information hub for its dynamic changes and updates (Patwardhan, 2019). The literature strongly advocates for institutional mandates that formally integrate librarians into the research and ethics committees, thereby elevating their role from service provider to strategic partner in promoting research integrity (Kar, 2024).

Conclusion and Recommendations

The journey through the metrics landscape in Maharashtra State Universities is fraught with both accountability measures and ethical pitfalls. The academic library has emerged as the most reliable institutional agent to guide faculty toward responsible research metrics and ethical publication practices. To solidify this critical role and ensure greater consistency across all Maharashtra State Universities, the following recommendations are proposed:

Formal Integration into Research Governance: University statutes should officially designate the Head Librarian or a designated Bibliometrician as an *ex-officio* member of the Institutional Ethics Committee and Research Committee.

Standardized Bibliometric Service Module: A mandatory, state-level Research Support Services (RSS) module should be developed, covering topics like h-index calculation, journal selection, and predatory journal identification, to be offered consistently across all state university libraries.

Resource Equity: The State government or the UGC should facilitate consortium-based access to proprietary



bibliometric databases for all state universities, ensuring that lack of funding does not translate into an unfair metrics disadvantage.

Promoting Altmetrics Awareness: Libraries should expand training to include altmetrics (social media citations, news mentions), which often capture the societal impact of research more comprehensively than traditional citation metrics (Priem et al., 2010).

Ultimately, by empowering librarians and formally recognizing their expertise, Maharashtra State Universities can better navigate the competitive, metric-driven environment while firmly upholding the values of academic integrity and publication ethics.

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The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Original Article

Exploring The Impact of Generative AI On Consumer Decision-Making: A Study of Convenience and Perceived Control

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Abstract

The rise of Generative Artificial Intelligence, or GenAI, is the most recent and well-liked technical development in today's fast-paced and dynamic VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment. By providing sophisticated search engine optimization (SEO) services to increase website visibility and optimize performance in search engine results, it significantly contributes to the transformation of the consumer landscape. These solutions guarantee that users receive customized recommendations and ideas based on their trade-off, but at the expense of the possible loss of consumer autonomy over independent decision-making. The gathering of user data without express authorization, which is brought on by a single contact or one-time website visit, is another such expense. The study focuses on investigating how generative AI affects a consumer's decision-making process and purchasing behavior by examining the relationship between convenience and control. It also examines the dangers of data security, privacy, and algorithmic bias, as well as the possibility of manipulating consumer decisions following the introduction of such technology. This study makes use of primary data that was gathered especially for this research in order to guarantee pertinent insights. Finally, this article explores future directions and looks into the ethical concerns of GenAI in customer engagement.

Keywords: Generative Artificial Intelligence, Search Engine Optimization, Pertinent Insights

Introduction

By identifying patterns in enormous datasets, sophisticated AI models and algorithms known as "Generative AI" are able to automatically produce new, original content, including text, photos, music, video, and code. Generative models construct statistical frameworks from their training data, as opposed to classical machine learning, which merely classifies or analyzes existing data. These models employ deep learning neural networks to predict and produce completely new material based on learnt structures in response to user prompts.

Transformers: Large Language Models (LLMs) rely on transformer architectures to process text, understand word relationships, and predict what comes next. **Diffusion Models & GANs:** Image generation tools use these to refine random noise into highly detailed, realistic images based on descriptive text prompts

Text & Code Generation: Drafting essays, writing emails, debugging code, and answering queries (e.g., ChatGPT and Google Gemini)

Image & Art Creation: Generating photo-realistic images or stylized artwork from text descriptions (e.g., Midjourney)

Audio & Video Production: Cloning voices, composing music, or creating synthetic video clips from prompts (e.g., Eleven Labs)

Search Engine Optimization

Enhancing a website's presence on search engine results pages (SERPs) in order to boost the volume and caliber of unpaid (organic) visitors is known as search engine optimization, or SEO. It entails comprehending search engine algorithms and tailoring the authority, content, and structure of websites to user intent. **Core Components of SEO**

Effective SEO generally requires a combination of three main pillars:

On-Page SEO: The practice of optimizing individual web pages so search engines understand the content and rank it for specific queries. This involves keyword research, writing original/helpful content, using descriptive URLs, and properly formatting title tags and meta descriptions

Off-Page SEO: Actions taken outside of your own website to impact rankings within search engine results pages. This primarily involves link building (getting backlinks from high-quality websites), which act as "votes of confidence" to build your site's authority and trustworthiness.

Technical SEO: Optimizing the backend structure of your website. Search engine crawlers (spiders) must be able to efficiently crawl and index your site. Key technical factors include site speed, mobile-friendly design, secure connections (HTTPS), and clean site architecture.

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Why SEO Is Important

SEO is totally focused on organic traffic, in contrast to paid advertising. Users actively look for products, solutions, or information when they search for questions. Increased brand awareness and conversions result from having a higher Google Search ranking, which guarantees that your company or blog will be visible when people are seeking for what you have to offer.

Consumer Decision Making

The process by which people determine their wants, obtain information, weigh their options, decide what to buy, and gauge their level of satisfaction thereafter is known as consumer decision-making. Psychological, social, cultural, technological, and economic issues all have an impact on it. Customers are depending more and more on social media, online reviews, tailored suggestions, and artificial intelligence tools to help them make decisions in today's digital world. Effective consumer decision-making allows customers to choose goods and services that best meet their requirements and preferences by striking a balance between logical analysis and emotive reactions. Businesses must comprehend this process in order to create focused marketing plans, improve customer experiences, and cultivate enduring client relationships.

Literature Review

Online reviews, a prevalent form of online word-of-mouth ([Changchit & Klaus, 2020](#)) [1], encapsulate consumers' experiences and perceptions regarding specific product attributes or service quality. These reviews not only facilitate first-time buyers in identifying suitable products but also significantly influence sales outcomes for businesses, either promoting or hindering them ([Chen & Xie, 2008](#)) [2]. Via online reviews, consumers can articulate their opinions through text, images, and videos, thereby engaging in communication and interaction with other users ([Namvar & Chua, 2023](#)) [3]. Such reviews serve to mitigate information asymmetry between consumers and online retailers and play a pivotal role in shaping consumers' purchase decisions ([Shen et al., 2016](#)) [4]. A plethora of studies have demonstrated that online reviews equip consumers with adequate information to make informed, rational decisions ([Ren & Nickerson, 2019](#); [Sun, 2012](#)) [5]. Moreover, prior research has highlighted that the impact of online reviews on consumers' purchase decisions is both multi-dimensional and multi-stage. The multi-dimensional aspect refers to the influence of various facets of online reviews—such as quantity, valence, timeliness, and textual content—on consumers' purchase decisions ([Duan et al., 2008](#); [X. Li et al., 2019](#)) [6]. The multi-stage aspect pertains to the influence of online reviews across multiple stages of the consumer decision-making process, affecting perceptions, purchase intentions, and ultimately purchasing behavior ([Jensen et al., 2013](#); [Xiao et al., 2016](#)) [7]. With the rapid development of artificial intelligence technology, Generative Artificial Intelligence, as an important branch of AI, is gradually demonstrating its powerful creativity and application value in various fields. The deployment of generative AI is increasingly prevalent across consumer, business, and regulatory domains, with significant applications in various functional sectors, particularly within sales and marketing ([Dwivedi et al., 2024](#)) [8]. Tools such as Bard, ChatGPT, Synthesia, Claude, ERNIE Bot, Kimi, and their counterparts are adept at generating a diverse array of marketing materials, including advertising content in various formats (text, imagery, and video), digital marketing strategies, chatbot-based interactions, blog articles, and sales training programs ([Ooi et al., 2023](#)) [9]. In the realm of marketing, e-commerce platforms utilize

generative AI to integrate potential customers' browsing histories and purchasing patterns with additional digital traces, thereby enabling the hyper-personalization of content. The resultant dynamic and real-time offers have the potential to enhance the conversion rates of promotional activities while concurrently reducing the click-through rates. Generative AI significantly alleviates the effort consumers exert in searching by streamlining information access, providing customized suggestions, offering conversational search support, and enhancing the capabilities of visual search ([Kshetri, 2024](#)) [10]. With the progression of technology, generative AI reviews, as an innovative form of evaluation, are increasingly being embraced by major e-commerce and review platforms such as Amazon, Dianping, and Taobao ([Figure 1](#)). Generative AI reviews involve the utilization of generative AI technology to conduct in-depth analysis and mining of a substantial volume of user reviews, automatically extracting key information and opinions, and presenting them to consumers in a refined and accurate manner. Compared to traditional user-generated reviews,

The effectiveness and impartiality of Generative AI reviews set them apart. They automatically provide succinct evaluation summaries by evaluating user reviews, making it easier for customers to quickly grasp product benefits. It is clear that generative AI evaluations require a certain amount of review data as a basis; the referential value of AI-generated reviews is greatly reduced in the absence of a considerable number of reviews. There are differences in the generative AI reviews between platforms because this functionality is very new. In light of a comparative observation and user interviews about generative AI reviews on four platforms (Amazon, Taobao, Dianping, and Agoda), we found that the quality of reviews (relevance, objectivity, etc.), the length of reviews (content detail), emotional content (whether the reviews contain sentiment), and the varying credibility of reviews due to platform differences are the main areas in which users perceive differences. Additionally, there is a dearth of relevant research, indicating a substantial research gap, because generative AI evaluations are a fresh technological product.

Research Methodology

Research Design The study employs Quantitative and qualitative research methodologies in order to provide a comprehensive analysis on the topic, The Emergence of Generative AI and its Impact on Consumer Decision-Making: Convenience vs. Control. An empirical research design will be used to gain a deeper understanding of the topic. **Data collection Method** a. Primary Data Collection Primary data is collected through a structured questionnaire/ survey designed to access the Patterns noticed in ads displayed, the most recommended websites or products visible through GenAI, how these recommendations influence Customer Purchase Decisions, and lastly analyse the factors that influence customer purchase decisionmaking. b. Secondary Data Collection Secondary data has been collected from various research papers, books, and academic journals. **Sampling Method and Size** A random Sampling Technique has been utilized in order to collect responses for the questionnaire drafted for the purpose of the study. The sample Size selected for the purpose of the study is 164 responses. **Data Analysis Technique** The statistical tools used to analyse the data is a graphical representation through pie-charts and bar graphs. A quantitative data analysis has been conducted to analyse the factors that influence customer purchase decision-making with the help of factor analysis through SPSS software. The Emergence Of Generative Ai Generative AI



has swiftly evolved into one of the most impactful technologies of the modern digital era. Unlike traditional AI systems that depends on predefined protocols, GenAI uses advanced machine learning models to create human-like text, images, audio, and even complex decisionmaking suggestions. It's capabilities extends beyond automation, enabling businesses to create highly personalised user experiences, refined search engine optimisation (SEO) strategies and improve customer interactions via chatbots and recommendation engines. With its ability to analyse, huge amounts of data and predict consumer preferences, GenAI has changed industries ranging from e-commerce to healthcare.

Consumer Decision-Making

Consumer decision making process can be understood by analysing behavioural patterns, browsing history and engagement matrix, AI-powered systems in order to can curate product recommendations, suggest content and even predict future purchasing trends. This level of personalisation increases user experience by simplifying choices and minimising decision fatigue. Consumers are presented with choices tailored to their preferences, making the purchasing process more efficient and seamless.

Data Analysis

Figure 1 Source: Author Interpretation: The Pie-Chart Illustrates, that the majority of the ads displayed are relevant to user interests i.e. 53.1% ads, followed by targeting a specific demographic audience 25.3%. Ads placed next to relevant content forms 13.6% and lastly, the ads displayed frequently, in a short period of time is observed in 8% respondents. This suggests that ad placements are primarily driven by user preferences and demographics. International Journal of Innovations In Science Engineering And Management <https://ijisem.com> 61 Figure 2 Source: Author Interpretation: This chart, displays a strong preference for fashion and tech- related recommendations with the maximum number of responses. Figure 3 Source: Author Interpretation: The chart shows that the highest number of respondents agree that they discover new products through such AI recommendations. Factors influencing customer purchase decision-making We perform factor analysis with the help of SPSS, to determine the factors affecting a customer purchase decision-making. The outcome of factor analysis states as follows: Appropriateness of Factor Analysis à KMO & Bartlett's Test: The KMO table confirms the appropriateness of the factor analysis since the $p\text{-value} \leq 0.05$. It is statistically significant & captures the inter-correlation among all the variables in the dataset. Total Variance Explained Table: According to the total variance explained table, 3 components are extracted based on Eigen Values > 1 Total number of Eigen Values > 1 = 3 = The total number of components (Factors). The principle Component is Component 1, which explains 28.38% of the variability. Rotated Component Matrix: According to the rotated component matrix, the variables have been grouped into the following factors: Table 1 Therefore, through Factor Analysis we have identified the factors influencing customer purchase decision-making in the context of GenAI.

The Convenience Factor

Unparalleled Convenience Generative AI has redefined the digital experience by giving unmatched convenience to consumers. By automating International Journal of Innovations In Science Engineering And Management 62 <http://ijisem.com> repetitive tasks and simplify complex decisions, GenAI increases efficiency in

ways that traditional methods cannot. Personalised Recommendations Enhance User Experience GenAI hold the capability to provide personalised recommendations. By analysing user preferences, browsing history & behavioural patterns, AI moulds recommendations to match individual needs and interests. This forms a more engaging and appropriate shopping or browsing experience, enhancing user satisfaction, and making decision-making more intuitive. Efficient Decision-Making through Curated Options By choosing huge amounts of information, GenAI aids users make quicker, more informed decisions. Which not only minimise decision fatigue, but also increases the overall efficiency of online shopping and information retrieval. Real-Time Interactions & Predictive Shopping Trends GenAI allows real-time Interactions through chatbots, virtual assistance and recommendation engines. The systems can quickly respond to questions, give support and suggest products or content based on ongoing interactions. Moreover, AI-driven predictive analytics aids businesses anticipate trends, enabling them to give timely promotions and recommendations that align with consumer behaviour.

Risks Associated with The Emergence of Genai Technology

Just as every coin has two sides, with the pros, the cons or risks associated with the emergence of Generative AI Technology must also be acknowledged. Some of the prominent risks are stated below: a. Bias - Generative AI systems are trained on huge data sets that may contain inherent biases, causing skewed or unfair results. Algorithmic bias can reinforce stereotypes, marginalise certain groups and create disparities in areas like hiring, lending and content recommendations. b. Spread of Misinformation - AI's capability to generate realistic yet misleading content raises issues about misinformation. Deepfake videos, AIgenerated articles & manipulated data can be used to deceive the public, influence opinions and disrupt democratic processes. The fast growth of false information via AI-powered platforms makes it difficult to distinguish between fact and fiction. c. Job Displacement/Loss- As AI automate tasks, traditionally performed by humans, many jobs have to face the risk of redundancy. Fields such as customer service, content, creation, and data analysis are experiencing a shift where AI-driven tools replace human labor. While new opportunities may arise, the transition could leave many workers struggling to adapt to the changing job market. d. Privacy Concerns - Generate is AI depends on extensive data collection, often without explicit user consent. From tracking online behaviour to analysing personal interactions, AI-driven platforms raise privacy issues. Unauthorised, data, usage, breaches and lack of transparency is how personal information is managed can compromise consumer trust. e. Overreliance on GenAI Apps - As AI becomes deeply implemented into daily life, there is a growing dependence on automated decisionmaking. Overreliance can minimise critical thinking and human judgement. f. Environmental Impact - Practising and maintaining large AI models need huge computing power, consuming significant amount of energy. Data centres that support AI operations contribute to carbon emissions, making AI a growing environmental issue. As AI adoption grows, balancing technological progress with sustainable practices becomes important to decrease its ecological footprints.

Ethical Considerations

For Balancing Convenience & Control it is necessary to keep the ethical considerations in mind. Some



Ethical Considerations are discussed below: I. Need for Transparency in AI Operations: AI systems should work with clear and understandable processes to ensure accountability. Consumers must be knowing of how AI-driven recommendations are made, what data is being collected and how it is being used. Transparent AI models aid users make informed decisions rather than blindly believing algorithmic suggestions. II. Ensuring Consumer Consent & Data Security: Safeguarding consumer privacy is crucial in an AI-driven world. Users must have full authority over their data, with clear opt-in and opt-out choices. Companies must implement strict data security steps to avoid unauthorised access, breaches or miss use of personal information. Ethical AI uses need explicit user consent instead of passive data collection. III. Addressing Biases in Algorithmic Design: To make sure fairness, AI developers should actively practice to identify and remove biases within their models. This consists diversifying training data, regularly auditing AI results and improving algorithms to avoid discrimination. Addressing bias in AI design is crucial to eliminate unfair advantages or disadvantages in consumer decisionmaking. IV. Building Trust through Ethical AI Practices: For AI to be entirely accepted, companies should commit to ethical guidelines that prioritise user welfare over profit-driven motives. Ethical AI uses include responsible data, usage, transparency in AI-generated content and mechanisms for uses to challenge or correct AI decisions. By building faith, businesses can ensure that AI serves as a tool for empowerment rather than manipulation.

Major Findings

AI simplifies consumer Decision making but at the same time this personalization reduces autonomy and influences decisions based on business-driven Algorithms. □ Ads displayed through GenAI display a pattern that is relevant to users. The most recommended websites belong to the Fashion and Apparel segment □ Consumers are often unaware of how their data is being used causing data privacy concerns. □ GenAI can reinforce stereotypes and create unfair experiences, manipulate consumer opinion through deepfakes and AI generated content. □ AI recommendations see the most engagement in the fashion and tech sector.

The Factors influencing customer purchase decision-making as extracted through Factor Analysis are, Personalised Recommendations, Trust and Convenience, and Data Privacy concern. □ There is a need for transparency and Ethical AI practices.

Way Forward: Recommendations

Governments and international organisations should create clear policies to regulate the ethical use of AI. These blueprints must focus on data, privacy, accountability, and transparency, making sure that AI technologies work within ethical and legal boundaries. Regular audits and compliance check must be enforced to avoid misuse. A coordinated practice between policy makers, tech companies and industry leaders is necessary for responsible AI development. Collaborative strategies can help create standardised AI guidelines, making sure that advancements benefit both businesses and consumers without compromising ethical standards. Public-private Partnerships can also facilitate responsible AI innovation. patience, and moral support throughout the course of this research work.

Creating awareness about how AI works and its impact on decision-making is essential for empowering consumers. Educational programs, digital literacy, campaigns, and transparent AI disclosures can aid users make informed choices, minimising the risk of manipulation and overreliance on AI-driven recommendations. While making AI advancements is crucial for progress, ethical considerations should remain a priority. AI developers must implement responsible AI design principles that balance efficiency with fairness, privacy and consumer rights. Encouraging innovation with a strong ethical base makes sure that AI works as a force for good instead of a tool for exploitation.

Conclusion

The growth of generative AI has undeniably remoulded the way consumers interact with digital platforms, offering unprecedented, conveniences, personalised experiences, and efficient decision-making. From improving search engine International Journal of Innovations In Science Engineering And Management outcomes to predicting shopping trends, GenAI has reformed consumer engagement. However, this technological growth comes with significant ethical and practical challenges. Problems such as algorithmic bias, misinformation, data privacy issues and job displacement show the risks related with an overreliance on AI-driven systems. Above that, the question of who controls AI and how its power is distributed, increases issues about accountability and fairness in the digital space. Looking for the right balance between convenience and control is crucial. Transparency in AI operations, making sure of informed consumer consent and addressing bias says in algorithmic design are crucial steps towards responsible AI implementation. Ethical considerations should remain at the forefront of AI development, with businesses, By prioritising ethical responsibility, data, security, and fairness, we can adopt the potential of Generative AI without compromising individual rights or societal values. Therefore, AI must be a tool for empowerment, not manipulation. Making a balance between technological advancement and ethical responsibility will define how we navigate the future of AI-driven consumer interactions

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Original Article

A Comparative Study of Narcissistic Tendencies Among Male and Female College Students

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Abstract :

The present research study tries to examine the narcissistic tendencies among college students and explore their relationship with variables such as gender, Narcissism is characterized by an inflated sense of self-importance, a strong need for admiration, and reduced empathy, all of which may influence youth behavior. A sample of 320 students were selected for the study. The findings showed that there is no significant difference in the narcissistic tendency between male and female.

Key words: Narcissistic tendency, college students

Introduction

Narcissism is part of an individual's personality organization and is the way people maintain a positive self-image, regulate their self-esteem, and manage their needs for affirmation and validation from others. It is normal for people to possess a healthy amount of self-esteem where they are accepting of their strengths and limitations while maintaining a positive self-image. It is normal and healthy for individuals to seek adaptive and realistic ways to improve their self-concept and feel good about who they are. Clinical narcissism, on the other hand, reflects unhealthy strategies to cope with disappointments and threats to positive self-image. Persistent difficulty in this area is what typically constitutes a clinical diagnosis of narcissistic personality disorder (NPD).

Narcissism is a personality trait characterized by a grandiose sense of self-importance, an intense need for admiration, and a fundamental lack of empathy for others. While it exists on a spectrum—with moderate, healthy levels supporting self-esteem—it can manifest pathologically as Narcissistic Personality Disorder (NPD).

Types of Narcissism

Psychologists generally categorize narcissism into two main presentations:

1. **Grandiose Narcissism:** Characterized by extroversion, dominance, and over-inflated self-esteem. They often boast about achievements, power, or intelligence and expect special treatment.
2. **Vulnerable (Covert) Narcissism:** Marked by fragile self-esteem, hypersensitivity to criticism, and quiet resentment. Rather than overt boasting, they may play the victim to gain sympathy or manipulate others.

Core Traits of Narcissism:

To better recognize the condition, here are the behavioral hallmarks:

1. **Entitlement:** Expecting automatic compliance with one's own unreasonable expectations and assuming rules do not apply to them.
2. **Lack of Empathy:** An inability or unwillingness to recognize the feelings, needs, or boundaries of others.
3. **Exploitative Behavior:** Taking advantage of others to achieve their own ends.
4. **Envy:** Feeling envious of others or believing others are envious of them.
5. **Arrogance:** Displaying haughty, patronizing, or disdainful behaviors.

Need and Importance of study:

Assessing narcissism in college students is crucial because a good personality requires empathy, patience, and student-centeredness.

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Need for- a teacher to assess narcissism is essential for:

1. To identify vulnerability in students.
For unmasking Academic Performance Distortions
2. For tracking mental health and stigma barriers.
3. For effective classroom management techniques.
4. To identify narcissist traits in students.
5. To Protect Group Dynamics in class.
6. To Protect Professionalism

Rationale of the study :

Today's Youth plays a very crucial role in the development of Nation , identity formation, and social adjustment are important traits developed during this period . During this stage, students interact with diverse peers, teachers, and learning environments that shape their attitudes and behaviour. Narcissistic behaviour, characterized by excessive self-focus, a need for admiration, grandiosity, and reduced empathy, may influence students' academic performance, leadership, teamwork, and interpersonal relationships. The increasing influence of social media, digital self-presentation, and competitive academic environments has raised concerns about narcissistic tendencies among young adults. Understanding these tendencies can help educators, counselors, and psychologists identify students who may benefit from interventions that foster empathy, emotional intelligence, and healthy self-esteem.

Although narcissism has been extensively studied in clinical and organizational settings, relatively fewer studies have focused on college students in educational contexts.

Therefore, the present study seeks to fill this gap by examining narcissistic behaviour among college students and providing evidence that can inform

Objectives of the study:

- 1) To study the Narcissistic traits among the college students
- 2) To compare the Narcissistic traits between male and female college students.

Hypotheses:

There is no significant correlation between Male and female Narcissistic traits

Research Methodology: Descriptive survey method was used for the present study .The sample of 320 were selected for the present study .

Population : The Undergraduate students of Aurangabad city were selected as a population .

Sampling Technique: random sampling technique was used for data collection

Sample size-320 students from Aurangabad city were selected as samples for current research.160 students were male and 120 students were female.

Tool:The Raskin and Terry test of NPD Narcissistic personality disorder was used for data collection. There are 40 items in the test.

Variables:

Independent variable: gender

Dependent variable : Narcissistic Behaviour

Table no. 1: Observation Table of Overall scores for Narcissism:

Aspect Mean Range of scores Interpretation

Sr. No.	No.of Participants (N)	Mean	Range	Interpretation
1	360	18.38	13-24	Average level Narcissism

Table no. 2 Observation Table comparison of male and female scores for Narcissism:

Aspect Sample Mean Range of scores

Sr.No	Variable	No.of participants(N)	Mean	S.D	T value	Interpretation
1	Male	160	18.675	5.878	0.578	Not significant
2	Female	160	17.894	5.808		

Discussion of The result:

From the above data it is clear that The Average level of Narcissism is found in the college students. From table 2 it is clear that There is no significant difference in the Narcissism tendency between Male and Female students

Findings:

1. In males the Narcissism tendency is of Average level.
2. In females the narcissism tendency is of average level.

3. There is no significant difference between male and female students in the Narcissism tendency.

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Original Article

Sustainable Agricultural Innovation in Nashik District: Integrating Traditional Knowledge with Modern Practices

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Abstract

Agriculture forms the economic foundation of Nashik District and plays a vital role in Maharashtra's agricultural sector through the cultivation of grapes, onions, pomegranates, vegetables, cereals, and other horticultural crops. Despite remarkable growth in agricultural production, the sector faces increasing challenges such as climate change, depletion of groundwater resources, declining soil quality, and escalating cultivation costs. Achieving long-term agricultural sustainability therefore requires a balanced approach that combines indigenous farming knowledge with scientific and technological innovations. This paper examines the significance of integrating traditional agricultural practices with modern technologies to promote environmentally sustainable, economically viable, and socially inclusive agriculture in Nashik District. The study relies on secondary information collected from government publications, research articles, institutional reports, and extension agencies. It highlights the continued relevance of indigenous practices including crop diversification, organic nutrient management, local seed conservation, mixed farming, and traditional water harvesting systems, while emphasizing the role of innovations such as drip irrigation, precision agriculture, Geographic Information Systems (GIS), remote sensing, digital advisory platforms, and protected cultivation. The study concludes that combining traditional wisdom with modern agricultural technologies can strengthen climate resilience, improve resource-use efficiency, enhance farmers' livelihoods, and contribute significantly to sustainable rural development.

Keywords: Sustainable Agriculture, Indigenous Knowledge, Precision Agriculture, Climate Resilience, Nashik District, Agricultural Innovation, Organic Farming

Introduction

Agriculture has historically remained the principal source of livelihood for the rural population of Nashik District. Owing to its diverse agro-climatic conditions, fertile soils, and favorable topography, the district supports the cultivation of a wide range of food grains, horticultural crops, vegetables, fruits, and commercial crops. Nashik has earned national and international recognition as India's leading grape-producing region and an important centre of the country's wine industry.

Although modern agricultural technologies have substantially increased crop productivity, intensive dependence on chemical fertilizers, pesticides, and groundwater irrigation has raised serious environmental concerns. Issues such as declining soil fertility, loss of biodiversity, water scarcity, and climate variability now threaten agricultural sustainability. Consequently, there is an increasing need to integrate traditional ecological knowledge with scientific innovations to develop farming systems that are productive, resource-efficient, and environmentally sustainable. This paper explores how the integration of indigenous agricultural knowledge and contemporary technologies can contribute to sustainable agricultural development and support the achievement of the Sustainable Development Goals (SDGs).

Objectives of the Study

The objectives of the study are:

- To examine the traditional agricultural practices followed by farming communities in Nashik District.
- To identify the major technological innovations adopted in agricultural production.
- To evaluate the advantages of integrating indigenous knowledge with modern agricultural practices.
- To propose policy recommendations for promoting sustainable agricultural development in the district.

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Study Area

Nashik District is located in the north-western part of Maharashtra between the Western Ghats and the Deccan Plateau. The district experiences considerable climatic diversity, with annual rainfall varying from approximately 700 mm in the eastern rain-shadow areas to more than 3,000 mm in the western hilly regions. The Godavari River, along with its tributaries such as the Girna, Kadwa, and Darna, forms the major drainage system supporting agricultural activities. Agriculture in Nashik is characterized by diversified cropping systems. Major crops cultivated in the district include grapes, onions, pomegranates, tomatoes, maize, rice, pearl millet, wheat, pulses, and various vegetables. Agricultural development is supported by irrigation infrastructure, horticulture development programmes, Krishi Vigyan Kendra (KVK), agricultural universities, and government extension services.

Traditional Agricultural Knowledge in Nashik District

Traditional agricultural knowledge represents generations of farming experience adapted to local ecological conditions. Farmers in Nashik continue to practice several indigenous methods that contribute to sustainable resource management and agricultural resilience. Some of the commonly practiced traditional techniques include crop rotation, mixed cropping, application of farmyard manure, vermicomposting, green manuring, preservation of indigenous seed varieties, rainwater harvesting, contour bunding, stone bund construction, biological pest management using neem and botanical extracts, and community-based water resource management. These environmentally friendly practices

Traditional Practice	Modern Technology	Expected Outcome
Organic nutrient management	Soil testing and nutrient management	Improved soil health
Indigenous seed conservation	High-yielding and climate-resilient varieties	Enhanced crop resilience
Rainwater harvesting	Drip irrigation	Efficient water utilization
Mixed cropping	Precision agriculture	Increased productivity and reduced risk
Botanical pest control	Integrated Pest Management (IPM)	Reduced chemical pesticide use
Indigenous farming experience	Digital advisory services	Better farm decision-making

Several natural farming initiatives in Nashik demonstrate that integrating bio-inputs, micro-irrigation, mulching, relay cropping, and digital advisory services can substantially improve farm sustainability while reducing production costs.

Benefits of Sustainable Agricultural Innovation

The integration of traditional and modern agricultural practices provides several economic, environmental, and social benefits. These include improved soil quality, efficient utilization of water resources, reduced dependence on chemical fertilizers and pesticides, increased crop productivity, enhanced resilience to climate change, conservation of biodiversity, higher farm income, production of healthier food, expansion of export opportunities, and long-term sustainability of agricultural ecosystems.

Challenges

Despite considerable progress, several constraints continue to hinder sustainable agricultural development in Nashik District. Major challenges include fragmented landholdings, increasing climatic uncertainty, groundwater depletion, rising cultivation costs, inadequate digital literacy among farmers, market price fluctuations, insufficient agricultural extension support, and increasing incidences of pests and crop diseases. Addressing these challenges requires coordinated policy interventions, technological

improve soil fertility, conserve moisture, reduce dependence on synthetic inputs, enhance biodiversity, and minimize production costs. Indigenous knowledge therefore remains an important component of sustainable agriculture in the district.

Modern Agricultural Innovations

The agricultural sector in Nashik has undergone significant transformation through the adoption of advanced technologies and improved farm management practices. Modern agricultural innovations widely adopted in the district include drip and sprinkler irrigation systems, protected cultivation through polyhouses and shade-net houses, tissue culture planting materials, precision agriculture techniques, Soil Health Card programmes, Geographic Information Systems (GIS), Global Positioning Systems (GPS), remote sensing applications, weather-based agro-advisory services, mobile-based agricultural information systems, electronic agricultural marketing (e-NAM), digital financial services, and farm mechanization. These technological advancements have improved irrigation efficiency, enhanced crop productivity, reduced labour requirements, optimized resource utilization, and strengthened farmers' access to markets and information.

Integrating Traditional Knowledge with Modern Agricultural Practices

Long-term agricultural sustainability can be achieved by combining indigenous farming knowledge with scientific innovations. Such integration enhances both environmental conservation and agricultural productivity.

innovation, institutional support, and farmer capacity building.

Policy Recommendations

To promote sustainable agricultural development in Nashik District, the following measures are recommended:

- Encourage large-scale adoption of natural and organic farming practices.
- Strengthen Farmer Producer Organizations (FPOs) to improve market access.
- Expand the use of precision agriculture technologies.
- Enhance farmer training through agricultural universities and Krishi Vigyan Kendras.
- Promote youth entrepreneurship in smart agriculture.
- Increase the application of GIS and remote sensing for agricultural planning.
- Encourage value addition, food processing, and agro-based industries.
- Develop climate-resilient agricultural policies.
- Improve digital agricultural extension services.
- Promote integrated watershed management and water conservation programmes.



Conclusion

Sustainable agricultural development in Nashik District requires an effective combination of indigenous agricultural knowledge and modern technological innovations. Traditional farming systems provide ecological sustainability and efficient natural resource management, while scientific technologies improve productivity, precision, and market competitiveness. Integrating these complementary approaches can build resilient agricultural systems capable of addressing climate change, conserving environmental resources, and improving rural livelihoods. Such an integrated model supports inclusive economic growth and contributes directly to the achievement of the Sustainable Development Goals related to food security, environmental sustainability.

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Original Article

Consumer Behavior towards Sustainable Products in the Digital Age

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Abstract

The rapid digitalization of commerce and communication has fundamentally transformed how consumers discover, evaluate, and purchase sustainable products. This paper presents a systematic literature review examining the intersection of consumer behaviour, sustainability, and digital technologies. Following the PRISMA guidelines, we analyzed 67 peer-reviewed studies published between 2018 and 2025, sourced from Scopus, Web of Science, and Google Scholar databases. The review synthesizes evidence across six core thematic areas: digital transformation and sustainable consumption, social media influence on green purchase intention, technology readiness and sustainable product adoption, digital marketing strategies for sustainable consumption, sustainability-oriented recommender systems, and the persistent green intention-behaviour gap. Findings reveal that digital platforms serve as both enablers and barriers to sustainable consumption. Social media marketing, digital nudging, and recommender systems significantly enhance green purchase intentions; however, the translation of intention into actual behaviour remains constrained by price sensitivity, information overload, greenwashing concerns, and insufficient perceived behavioural control. We propose an integrated theoretical framework that combines the Theory of Planned Behaviour with the Technology Readiness Index to explain how digital mechanisms moderate the intention-behaviour relationship. The paper identifies critical research gaps, including the under-exploration of cultural and generational nuances in digital sustainable consumption, and offers practical implications for marketers, policymakers, and e-commerce platform designers seeking to close the attitude-behaviour gap in the digital era.

Keywords: Sustainable consumption; Digital transformation; Green purchase intention; Social media marketing; Technology readiness; Intention-behaviour gap

Introduction

The global sustainability crisis has intensified interest in understanding how consumers choose environmentally responsible products. Sustainable consumption, as envisioned by SDG 12, calls for fundamental shifts in purchasing patterns [7]. Simultaneously, the digital revolution has reshaped consumer decision-making, from product discovery through social media to algorithmic recommendation engines [11, 14]. The convergence of these megatrends demands systematic scholarly investigation.

Despite growing environmental awareness, a persistent disconnect exists between attitudes towards sustainable products and actual purchase behaviour. This green intention-behaviour gap has been documented across diverse cultural and demographic contexts [25, 31]. While digital technologies offer opportunities to bridge this gap through targeted communication, personalized recommendations, and behavioural nudging, they simultaneously introduce challenges including information overload, greenwashing, and algorithmic bias that may undermine consumer trust [15, 19]. Understanding how digital environments shape, facilitate, or impede sustainable consumer behaviour is therefore of considerable theoretical and practical significance. Existing studies have examined social media marketing [10], technology readiness [6, 22], digital nudging [13], and recommender systems [9, 16] largely in isolation. This fragmentation limits holistic understanding. Accordingly, this paper aims to: (1) systematically review literature on consumer behaviour towards sustainable products in the digital age; (2) identify key digital drivers, barriers, and moderating factors; (3) propose an integrated theoretical framework; and (4) articulate research gaps and future directions. Section 2 presents a thematic literature review covering six core areas. Section 3 describes the systematic review methodology. Section 4 discusses synthesised findings. Section 5 presents the framework diagram and summary tables. Section 6 concludes with implications, limitations, and future directions.

Literature Review

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Digital Transformation and Sustainable Consumption

Digital transformation has reshaped the relationship between consumers and sustainable products. Guandalini [7] conducted a systematic review of 153 articles, pioneering the concept of 'digital sustainability' and identifying critical research gaps at the intersection of management scholarship and environmental performance. Gossen, Rohde, and Santarius [14] characterised the digitalisation-sustainability relationship as fraught with both promise and tension, noting that while digital technologies enable resource optimisation and behavioural change, they risk reinforcing unsustainable consumption through increased e-commerce volumes and electronic waste generation. Chandra and Verma [16] demonstrated that businesses deploy big data analytics to create sustainable consumer experiences and design nudging interventions. Shao, Feng, and Liu [23] found that data-driven personalisation in e-commerce enhances the visibility of sustainable alternatives. Digital transformation thus creates a dual effect: amplifying consumption scale while enabling steering towards more sustainable trajectories.

Social Media Influence on Green Purchase Intention

Social media platforms have become critical arenas for shaping sustainable purchase intentions. Nekmahmud et al. [10] extended the TPB to incorporate social media marketing and usage as predictors of green purchase intention. Analysing 785 responses through PLS-SEM, they demonstrated that attitude, subjective norms, perceived behavioural control, green thinking, and social media marketing all exert strong positive influences on green purchase intention, underscoring social media's transformative role as an active mechanism reshaping cognitive and normative antecedents of sustainable consumption decisions. Zafar et al. [9] examined mechanisms through which social media influences sustainable purchasing attitudes through social learning theory. Their SEM analysis of 693 respondents revealed that social media usage and browsing significantly impact sustainable purchasing attitudes, with environmental responsibility drive serving as a partial mediator. Wu, Yang, and Liu [17] focused on social media influencer marketing for sustainable food, employing multi-group SEM and ANN analysis on 628 respondents, finding non-linear relationships that traditional SEM may overlook. Li et al. [20] explored social media influencers in green lifestyle adoption through value co-creation, finding social media contact positively associated with sustainable lifestyle adoption. Wu and Long [27] found that green trust and information usefulness jointly mediate the social media marketing-eco-friendly purchase intention relationship, with green trust exhibiting a substantially stronger effect. These studies demonstrate that social media operates through informational, normative, and trust-based pathways.

Technology Readiness and Adoption of Sustainable Products

The concept of technology readiness, developed by Parasuraman [2] through the Technology Readiness Index (TRI), provides a framework for understanding consumers' propensity to adopt technology-mediated sustainable products. Stankeviciene et al. [26] examined how technology readiness influences purchase behaviour towards sustainable IoT products, demonstrating that optimism and innovativeness positively impact perceived value and purchase intention, while discomfort and insecurity act as barriers. Their findings highlight those technologies enabling sustainable innovation may be resisted by consumers lacking technological confidence, creating a dual

barrier combining ecological scepticism with technological anxiety. Kim et al. [8] provided early evidence that technology readiness shapes evaluations of smart sustainable hospitality services, implying that digitalised sustainable products may face adoption challenges among consumers with low technology readiness.

Digital Marketing Strategies for Sustainable Consumption

The evolution of digital marketing has created both opportunities and challenges for sustainable consumption. Rosario and Dias [29] found digital marketing effectiveness varies considerably by strategy type and audience. La Ragione and Risitano [28] analysed 67 studies through a TCCM framework, revealing over-concentration on specific industries and regions. Tan et al. [12] demonstrated that green knowledge and attitude positively influence purchase intention through brand trust. Nguyen et al. [5] found environmental concerns significantly impact attitudes but not always actual behaviour. Greenwashing, as documented by Nguyen et al. [11], further complicates the landscape, as misleading claims develop scepticism undermining genuine green marketing.

Sustainability-Oriented Recommender Systems

Recommender systems (RS) represent a consequential digital innovation for sustainable consumption, yet their sustainability application remains nascent. Tran et al. [15] highlighted that while RS have been deployed for commercial metrics, their environmental sustainability potential remains untapped. Satinet et al. [16] found that sustainability-oriented RS increase interest and purchase of sustainable products while reducing search effort, but may paradoxically amplify perceptions of being overwhelmed by sustainability messaging, requiring careful calibration.

The Green Intention-Behaviour Gap

The green intention-behaviour gap remains one of the most persistent challenges in sustainable consumption research [25]. Mabaso et al. [31] found that subjective norms and perceived behavioural control predict intention but price premiums impede intention-to-behaviour translation. Jebarajakirthy and Sivapalan [32] meta-analysed 173 studies combining TPB and VBN theory, demonstrating that cultural dimensions explain significant variance in these relationships. Digital technologies introduce both bridging and widening factors: digital nudging [3, 13] offers interface-level interventions guiding sustainable choices, while Gossen et al. [19] showed only 14% of sustainability-tagged fashion products carry credible labels, undermining confidence. Stofejeva et al. [18] confirmed that while digitisation impacts environmental attitude, translation to purchasing remains influenced by lifestyle and willingness to pay.

Research Gaps and Proposed Integrated Framework

The literature reveals critical gaps. First, studies examine digital mechanisms in isolation, lacking integrated frameworks. Second, generational and cultural moderators remain under-explored [21, 22]. Third, the interplay between digital empowerment and market barriers warrants investigation. We propose an integrated framework combining TPB [1] with TRI [2], positioning digital mechanisms as moderators of TPB antecedent-intention relationships, technology readiness as a higher-order moderator, and green trust and perceived value as dual mediating pathways, with generational and cultural factors as contextual moderators.

Research Methodology

This study employs a systematic literature review following PRISMA guidelines. A structured search was conducted across Scopus, Web of Science, and Google Scholar for publications from January 2018 to June 2025, using Boolean combinations of terms including 'sustainable consumption,' 'green purchase,' 'digital,' 'social media,' 'e-commerce,' 'recommender system,' 'technology readiness,' and 'digital nudging.'

Inclusion and Exclusion Criteria: Studies were included if they: (a) were published in peer-reviewed journals indexed in Scopus or Web of Science; (b) empirically examined digital technologies and sustainable consumption behaviour; (c) were in English; and (d) presented original findings. Exclusion criteria: non-peer-reviewed sources, organisational-level digital sustainability without consumer analysis, digital technology studies without sustainability dimensions, and duplications.

Data Extraction and Quality Assessment: Data extraction used a standardised coding sheet. Quality was assessed using an adapted CASP checklist evaluating research objectives, methodology, data analysis rigour, and conclusion validity. The final review comprised 67 studies meeting all criteria.

Results and Discussion

Key Drivers of Digital Sustainable Consumption

The synthesis reveals several interconnected drivers. Social media marketing emerges as the most extensively studied, consistently demonstrating positive effects on green purchase intention [9, 10, 17, 20]. The mechanisms are multifaceted: enhancing environmental awareness, shaping subjective norms, and building green trust. Effectiveness is amplified among consumers with higher environmental concern and those engaging with social media over three hours daily [27]. Digital nudging represents another powerful driver, with Berger et al. [13] providing a systematic framework mapping nudging elements to decision contexts. Sustainability-oriented recommender systems increase interest and purchase of sustainable products while reducing search effort

Barriers to Digital Sustainable Consumption

Despite enabling potential, several barriers constrain digital technologies' effectiveness. Greenwashing is particularly pernicious in digital environments [11].

Gossen et al. [19] demonstrated that most sustainability labels in online retail lack third-party verification, creating ambiguity and scepticism. Technology-related barriers also feature prominently: Stankeviciene et al. [26] identified discomfort and insecurity as inhibitors of sustainable IoT adoption. Price sensitivity remains a persistent structural barrier [31], and the digital divide may exclude consumers with limited digital literacy from sustainability tools.

The Role of E-Commerce Platforms

E-commerce platforms function as both marketplaces and behavioural influence environments. Stofejova et al. [18] demonstrated that digitisation in green marketing impacts environmental attitudes and purchasing behaviour. Shao et al. [23] showed that big data-driven strategies enhance sustainable behaviour through personalisation, with transparency as a fundamental requirement. Blackburn et al. [30] expanded this by examining how digital platforms enable circular economy models, facilitating resource reduction and reuse across platform ecosystems.

Cross-Cutting Themes: Generational and Cultural Differences

Generational differences represent a significant cross-cutting theme. Liang et al. [21] found Generation Z exhibits the highest sustainable consumption levels while the pre-1960s generation shows the lowest. Ghose et al. [22] demonstrated among Gen Y and Z in India that digital literacy significantly shapes purchase intentions aligned with SDG 12. Cultural dimensions also critically moderate relationships, as Jebarajakirthy and Sivapalan [32] demonstrated through their meta-analysis of 173 studies. These findings underscore the necessity of tailored digital sustainability strategies across generational and cultural segments.

Figures and Tables

This section presents the conceptual framework diagram and a comprehensive summary table synthesising the key studies reviewed in this paper. Figure 1 illustrates the proposed integrated theoretical framework, while Table 1 provides a structured overview of 20 representative studies organised by focus area, methodology, and principal findings.

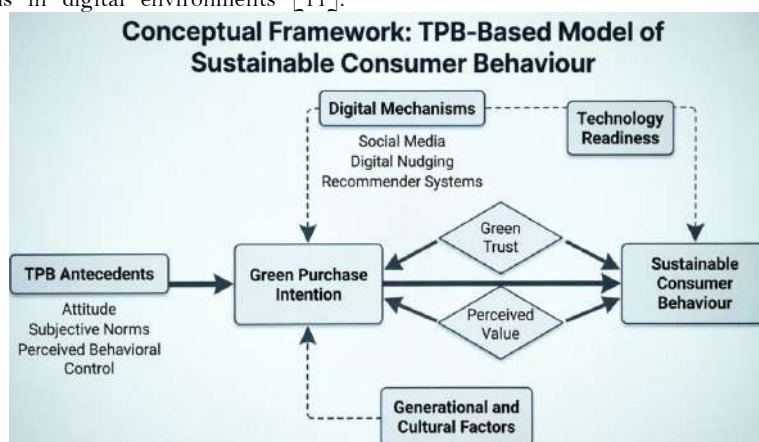


Figure 1: Proposed Integrated Theoretical Framework: Digital Drivers of Sustainable Consumer Behaviour

The framework integrates Technology Readiness (Parasuraman, 2000), the Theory of Planned Behaviour (Ajzen, 1991), digital marketing influence mechanisms, and sustainability-oriented recommender systems to explain consumer behaviour towards

sustainable products in the digital age. Digital nudging and social media act as moderating forces, while green trust and perceived value serve as mediating pathways.



Table 1: Summary of Key Studies on Consumer Behaviour Towards Sustainable Products in the Digital Age

S. No.	Authors (Year)	Focus Area	Methodology	Key Findings
1	Nekmahmud et al. (2022)	Social media and green purchase intention	Quantitative survey (n=785), PLS-SEM	Social media marketing and attitude strongly predict green purchase intention via extended TPB.
2	Zafar et al. (2021)	Social media and sustainable purchasing attitude	SEM (n=693)	Social media browsing positively impacts sustainable purchasing attitude through environmental responsibility drive.
3	Wu et al. (2023)	Social media influencer marketing and sustainable food purchase	Multi-group SEM and ANN (n=628)	SIMs positively influence sustainable food purchase intention; spending self-control is a key factor.
4	Li et al. (2024)	Social media influencers and green lifestyle adoption	Regression analysis (n=289)	Social media contact positively associated with green lifestyle; value co-creation partially mediates.
5	Wu & Long (2024)	Green trust and eco-friendly purchase on social media	SEM with multi-group analysis	Green trust more strongly mediates social media marketing to eco-friendly purchase intentions than information usefulness.
6	Stankeviciene et al. (2025)	Technology readiness and sustainable IoT product purchase	SEM survey	Optimism and innovativeness positively impact perceived value; discomfort and insecurity act as barriers.
7	Kim et al. (2020)	Technology readiness and sustainable hotel behaviour	Quantitative survey	Technology readiness shapes consumer evaluations of smart sustainable hospitality services.
8	Tran et al. (2023)	Recommender systems for sustainability	Systematic review	RS can promote SDG attainment but research on sustainability-oriented RS remains limited.
9	Satinet et al. (2025)	Sustainability-oriented recommender systems	Experimental study	SRS increase consumer interest and purchase of sustainable products but may cause information overload.
10	Berger et al. (2022)	Digital nudging for environmental sustainability	Structured literature review	Provides design framework mapping nudging elements to decision contexts for sustainable behavior.
11	Guandalini (2022)	Digital transformation and sustainability	Systematic review (153 articles)	Pioneers 'digital sustainability' concept; identifies research gaps in management scholarship.
12	Gossen et al. (2022)	Sustainability labels in online retail	Large-scale data analysis (17,000 products)	Only 14% of tagged fashion products carry credible third-party verified sustainability labels.
13	Stofejova et al. (2023)	Sustainability and e-commerce consumer behaviour	SEM (questionnaire survey)	Digitization in green marketing impacts environmental attitude and purchasing behaviour.
14	Shao et al. (2024)	Big data-driven strategies and sustainable e-commerce	Quantitative analysis	Big data analytics in e-commerce enhances sustainable consumer behaviour through personalization.
15	Chandra & Verma (2023)	Big data and sustainable consumption	Bibliometric and thematic review	BD enables sustainable consumer experiences and nudges; consumers demand green supply chains.
16	Liang et al. (2024)	Generational differences in sustainable consumption	Survey analysis	Gen Z shows highest sustainable consumption levels; pre-1960s generation lowest; differentiated strategies needed.
17	Ghouse et al. (2024)	Gen Y and Gen Z green choices	Survey, TPB framework (n=680)	Digital literacy and eco-friendly behaviour shape purchase intentions aligned with SDG 12.



S. No.	Authors (Year)	Focus Area	Methodology	Key Findings
18	Rosario & Dias (2025)	Digital marketing and sustainable consumption	Systematic literature review	Digital marketing promotes sustainable consumption but effectiveness varies by strategy and context.
19	La Ragione & Risitano (2026)	Green digital marketing landscape	TCCM framework review (67 studies)	Green consumer behaviour research focuses on specific industries; calls for broader geographic scope.
20	Tan et al. (2022)	Green marketing components and purchase intention	SEM (n=300)	Green knowledge and environmental attitude positively influence purchase intention via brand trust.

Table 2: Digital Mechanisms and Their Effects on Sustainable Consumption

Digital Mechanism	Positive Effect	Negative Effect/Challenge	Key Moderators
Social media marketing	Enhances green attitude, subjective norms, and purchase intention [9, 10]	Information overload; greenwashing risk [11]	Environmental concern; social media engagement frequency [27]
Digital nudging	Guides choices via interface design without restricting freedom [3, 13]	Effectiveness varies by context; ethical concerns	Decision type; cultural context; platform design
Recommender systems	Increases interest and purchase of sustainable products; reduces search effort [16]	May cause sustainability messaging overload [16]	Product category; algorithmic transparency
Big data analytics	Enables personalisation; predicts sustainable buying patterns [16, 23]	Privacy concerns; consumer distrust	Data transparency; platform trust
Influencer marketing	Builds trust and credibility; drives green lifestyle adoption [17, 20]	Perceived inauthenticity; commercial bias	Influencer credibility; parasocial relationships

Conclusion

Summary of Findings

This systematic literature review has synthesised evidence from 67 studies to provide a comprehensive understanding of consumer behaviour towards sustainable products in the digital age. The findings reveal a complex, multi-layered ecosystem in which digital technologies serve as both powerful enablers and significant barriers to sustainable consumption. Social media marketing, digital nudging, and sustainability-oriented recommender systems emerge as the most effective digital mechanisms for promoting green purchase intentions, operating through informational, normative, and trust-based pathways. However, the persistent green intention-behaviour gap, exacerbated by greenwashing, price sensitivity, technology anxiety, and information overload, suggests that digital interventions alone are insufficient to drive the systemic changes required for sustainable consumption transitions.

Practical Implications

For businesses, the findings underscore the importance of integrated digital strategies combining social media engagement, personalised recommendations, and ethical green marketing. E-commerce platforms should invest in sustainability-oriented recommender systems while ensuring credibility through third-party verified labels. Policymakers should consider regulatory frameworks combating digital greenwashing, standardising sustainability labelling, and promoting digital literacy. Generational differences identified here suggest that marketing and policy interventions should be tailored to specific age cohorts' digital behaviours and sustainability perceptions.

Limitations and Future Research Directions

This review is subject to several limitations. The search was restricted to English-language publications, potentially excluding relevant studies in other languages. The rapidly evolving nature of digital technologies means that emerging platforms may be under-represented. Future research should prioritise longitudinal studies tracking digital sustainable consumption over time, cross-cultural comparative studies examining how cultural contexts moderate digital sustainability interventions, and experimental studies isolating causal effects of specific digital mechanisms on actual purchase behaviour. The role of emerging technologies such as artificial intelligence, augmented reality, and blockchain in shaping sustainable consumption also warrants dedicated investigation. Researchers should further explore the ethical dimensions of digital sustainability interventions, including concerns about algorithmic manipulation, digital exclusion, and the environmental footprint of digital infrastructure itself.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Original Article

An Analytical Study of Premium Income Growth and Market Share Trends of LIC (2020-2025)

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Abstract:

This study looks at the Life Insurance Corporation of India (LIC) performance from FY 2020-21 to FY 2024-25 in terms of premium income growth and market share trends. Making use of secondary data from insurance regulatory. According to reports from the Development Authority of India (IRDAI), LIC's financial trajectory is evaluated using trend analysis, annual growth rate (YoY) and compound annual growth rate CAGR. Result shows a steady increase in premium income, with significant year over year variation, peaking in FY 2023-24 and then slowing in FY 2024-25. Market share analysis shows that the LIC continues to dominate the Indian life insurance market despite its dominance gradually eroding as a result of increase competition from private insurers. The report sheds light on LIC's changing market position and emphasizes how crucial strategic innovation is to maintaining growth in cutthroat market.

Key words: Insurance, Life Insurance, LIC, premium income.

Introduction

India is developing country, like any other countries India's insurance sector is also well developed. In India, the regulatory authority of insurance sector is The Insurance Regulatory and Development Authority of India. if we look into the history of insurance sector, significant transformation took place and after 1990s economic liberalization state-owned entities start losing its share to private players and joint ventures. In India, insurance sector has long history starting with life insurance in early 19th century and general insurance in the 20th century. Formation of IRDAI in 1999, became the turning point in sector's modernization and liberalization. IRDAI work as governing body of this sector, play vital role in its working management. IRDAI ensure transparency, fair competition and solvency. Key policy reforms such as the Insurance Laws (Amendment) Act 2015, which raised the FDI limit from 26% to 49% (later increase to 74% in 2021), have had a transformative impact.

Insurance sector is divided into Life and non-life insurance. Let discuss them in details

Two main segments of insurance Industry;

Life insurance

General Insurance (Non -Life Insurance)

Life Insurance: Meaning – a life insurance policy is an agreement between a policyholder and insurance company whereby the insurer agrees to pay a certain amount of money (sum assured) to the designated beneficiary in the event of the policyholder's death or after a predetermined amount of time, in return premium payments. Depending on the kind of policy, it can serve as a saving or investment tool in addition to offering financial protection to the policyholder's dependents.

Let's discuss about all the major companies of this industry;

Life Insurance's major companies

1. Life Insurance Corporation of India (LIC) –Public company
2. HDFC Life Insurance
3. SBI Life Insurance
4. ICICI Prudential Life Insurance
5. Max Life Insurance
6. Bajaj Allianz Life Insurance
7. Kotak Mahindra Life Insurance
8. Tata AIA Life Insurance
9. Aditya Birla Sun Life Insurance
10. PNB Met Life Insurance

General insurance: A description of general insurance – significance general insurance includes all types of insurance other than life insurance.

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It provides financial protection against a number of risks, including theft, accidents, medical expenses, and property loss. Instead of covering a person for the duration of their life, these policies typically cover losses or damages for a set period of time, typically cover losses or damages for set period of time, typically a year

Main type of General insurance

- Health insurance
 - Motor insurance
 - Property Insurance
 - Marine Insurance
 - Travel Insurance
 - Liability Insurance
 - Crop Insurance
1. The New India Assurance company Ltd – Public company
 2. United India Insurance company Ltd- Public company
 3. National Insurance company Ltd- Public company
 4. Oriental Insurance company Ltd- Public company
 5. ICICI Lombard General Insurance
 6. Bajaj Allianz General insurance
 7. HDFC ERGO General insurance
 8. Tata AIG General insurance
 9. Reliance General insurance
 10. SBI General insurance

Now let's talk about other specialized insurance companies which work in their specialized areas, like;

1. Export Credit Guarantee Corporation (ECGC) – for export and trade.
2. Star Health and Allied insurance- in Health Insurance.
3. Agriculture insurance company of India (AIC)- For crop and agriculture insurance.

If we talk about current scenario in insurance industry, then interesting trends showed up-

Such as increase in digitization, insurtech startups, rapid growth in health insurance after covid hit, increase in micro insurance for rural and low- income peoples and also government schemes like Pradhan Mantri Jeevan Bima Yojana, Pradhan Mantri Suraksha Bima Yojana and Ayushman Bharat.

Life Insurance corporation of India: The Life Insurance Corporation of India (LIC) is the biggest insurance company

in India, which is government owned public company. LIC established on 1 September 1956 following the nationalization of over 240 private insurance companies under the provisions of the Life Insurance Corporation Act 1956. Headquartered in Mumbai, LIC offers a board range of life insurance products, including term assurance, endowment plans, money-back policies, unit linked insurance plans (ULIP), pension schemes and group insurance solution.

Objectives:

- Mobilise saving.
- Provide financial security
- Spread insurance awareness
- Support government social security schemes.

LIC maintain a dominant position in India's life insurance market. As a major institutional investor, LIC plays a vital role in funding infrastructure and government projects. While it continues to hold a significant market share often exceeding 55% in term of new business premium- it is facing growing competition from private insurers.

Objectives:

1. To evaluate the Year over Year growth rate in LIC's premium income over the given period.
2. To compare and interpret the compound Annual Growth Rate (CAGR) of LIC's premium income.
3. To evaluate annual growth rate in LIC's premium income over the period.
4. To assess LIC's market share stability in relation to its premium income.

Methodology:

- Secondary data
- Collected from official websites of company.
- Report Publication by IRDAI.
- Period –FY 2020-21 to 2024-25
- Analytical Tools-
 1. Year-on-Year (YoY)
 2. Compound Annual Growth Rate (CAGR)
 3. Market Share Analysis

Literature Review;

Evolution and Growth Trajectory	As per McKinsey 2024, after liberalization in 1999, major transition was observed, major shift from state monopoly to a highly competitive and innovative sector. IRDAI has played a vital role in increasing foreign direct investment and increasing in trend of digital platforms such as Bima Vahak and Bima Sugam. Now, more diversified products and improved quality service delivery among both government and private insurance.
Market Size, Penetration and Density	In FY 2023-24, the combined premium income was around \$ 11.2 trillion, with an insurance density of USD 95 per capita and a penetration rate of 37%, down from 4.0% in FY. This is the second consecutive decline in penetration despite rising premiums. The life insurance segment contributed 8 trillion rupees (6.1% growth), while non-life collected 2.9 trillion rupees (12.8% increase), primarily from health and motor lines.
Medium term Outlook	With an anticipated real premium growth of 7% per year from 2024 to 2028 much higher than the global average of 2.4%. India is predicted to lead all G20 nations in the expansion of the insurance market, according to the Swiss Re-institute. Between 2024-2028, general insurance is expected to expand at a compound annual growth rate (CAGR) of 9.9% driven by strong demand from the health, auto and personal accident sectors.
Emergent Research & Insurtech Insights	Even though the top private insurers profitability remained modest (net profit CAGR 2%), McKinsey 2024 highlights a shift away from pure premium growth and toward value creation through customer-centric products, improved distribution networks and operational agility. According to a Nielsen Q study, life insurance will grow at a 7.1% CAGR in 2023. Insurtech is significantly influencing consumer behavior, brand recall, and market entry, which could lead to a USD 339 billion opportunity by 2025.



	An analysis of business insurance loss models shows how incorporating alternative data and insurtech can greatly increase the accuracy of risk assessment and loss prediction. using unstructured text to improve actuarial models, a July 2025 arxiv paper describes creative uses of natural language in commercial insurance pricing.
Consumer Trends & Demographics	61% of young consumers (Gen Z and millennials) actively see health insurance, according to a recent HDFC ERGO analysis, and 37% of them give a caseless hospital network top priority when selecting plans. In August 2025, policybazaar for Business introduced claimsetu, India's first AI-powered claims scoring engine for group health insurance that improves claim transparency.
Regulatory Reform and Consumer Protection	Although the IRDAI has suggested that internal insurance ombudsmen be established within insurers to expedite the redress of grievances, questions remain regarding their independence because they employed by the insurers.

Analysis:

Year-on-Year (YOY) Growth Rate; Year-on-Year (YoY) is a method of comparing data for a given period with the same period in the previous year. It is commonly used to measure growth, performance, or change over time while accounting for seasonal effects or yearly patterns.

Calculate annual percentage change in premium income.

$$\text{YOY Growth} = \frac{\text{Current Year} - \text{Previous Year}}{\text{Previous Year}}$$

Let's calculate the Year on Year (YoY) growth rates of LIC's premium income based on the data given above;
LIC Premium Income; FY 2020-21 to FY 2024-25;

Financial Year	Total Premium Income (cr)
FY 2020-21	3,79,063 cr
FY 2021-22	4,02,844 cr
FY 2022-23	4,27,419 cr
FY 2023-24	4,74,005 cr
FY 2024-25	4,88,148 cr

For FY 2021 vs FY 2022

$$\text{YOY Growth} = \frac{\text{Current Year} - \text{Previous Year}}{\text{Previous Year}} * 100$$

$$= (4,02,844 - 3,79,063 / 3,79,063) * 100 = 6.27\%$$

YoY for FY 2022 vs FY 2023;

$$\text{YoY Growth} = \frac{\text{Current Year} - \text{Previous Year}}{\text{Previous Year}} * 100$$

$$= (4,27,419 - 4,02,844 / 4,02,844) * 100 = 6.1\%$$

$$\text{YoY Growth} = \frac{\text{Current Year} - \text{Previous Year}}{\text{Previous Year}} * 100$$

$$= (4,74,005 - 4,27,419 / 4,27,419) * 100 = 10.9\% (10.899)$$

YoY for FY 2024 vs FY 2025;

$$\text{YoY Growth} = \frac{\text{Current Year} - \text{Previous Year}}{\text{Previous Year}} * 100$$

$$= (4,88,148 - 4,74,005 / 4,74,005) * 100 = 2.98\%$$

Year over Growth table; from 2020-21 to 2024-25

YoY for FY 2023 vs FY 2024;

Financial Year	Total Premium Income (cr)	YoY Growth (%)
FY 2020-21	3,79,063 cr	—
FY 2021-22	4,02,844 cr	6.27
FY 2022-23	4,27,419 cr	6.1
FY 2023-24	4,74,005 cr	10.9(10.899)
FY 2024-25	4,88,148 cr	2.98

Table; Year on year growth of LIC's premium income over the period of time.

Result:

From the above analysis, LIC's premium income demonstrated a sustained upward trajectory, with varying year on year growth. Growth rate was moderate in FY 2021-22(6.28%) and FY 2022-23 (6.10%), followed by marked increase in FY 2023-24(10.9%). But in FY 2024-25 sharp decline in the rate of expansion.

CAGR Calculation

CAGR stands for **Compound Annual Growth Rate**, used to show the average annual growth rate of an investment, premium income, revenue, or metric over a particular period of time.

CAGR Formula;

$$\text{CAGR} = \frac{\text{Ending Value}}{\text{Beginning Value}}^{1/n} - 1$$

Financial Year	Total Premium Income (cr)
FY 2020-21	3,79,063 cr
FY 2021-22	4,02,844 cr
FY 2022-23	4,27,419 cr
FY 2023-24	4,74,005 cr
FY 2024-25	4,88,148 cr



Table shows the data of LIC 's premium income from FY 2020-21 to 2024-25.

Year	Premium Income
FY 2020-21	3,79,063 cr
FY 2024-25	4,88,148 cr

Period- 4 year

$$CAGR = \frac{\text{Ending Value}}{\text{Beginning Value}}^{1/n} - 1$$

$$= (488148/379063)^{1/4} - 1 = 6.53\%$$

Year	Premium Income
FY 2021-22	4,02,844 cr
FY 2024-25	4,88,148 cr

$$CAGR = \frac{\text{Ending Value}}{\text{Beginning Value}}^{1/n} - 1$$

$$= CAGR = (4,88,148/4,02,844)^{1/3} - 1 = 4.53\%$$

Period = 3 year

Year	Premium Income
FY 2022-23	4,27,419 cr
FY 2024-25	4,88,148 cr

= Period = 2 year

$$CAGR = \frac{\text{Ending Value}}{\text{Beginning Value}}^{1/n} - 1$$

$$= CAGR = (4,88,148/4,27,419)^{1/2} - 1 = 1.48\%$$

Year	Premium Income
FY 2023-24	4,74,005 cr
FY 2024-25	4,88,148 cr

Period = 1 year

$$CAGR = \frac{\text{Ending Value}}{\text{Beginning Value}}^{1/n} - 1$$

$$= CAGR = (4,88,148/4,74,005) - 1 = 2.75\%$$

Year	Premium Income
FY 2020-21	3,79,063 cr
FY 2023-24	4,74,005 cr

Beginning Value

Period = 3 year

$$CAGR = \frac{\text{Ending Value}}{\text{Beginning Value}}^{1/n} - 1$$

$$= CAGR = (4,74,005/3,79,063)^{1/3} - 1 = 7.82\%$$

Year	Premium Income
FY 2021-22	4,02,844 cr
FY 2023-24	4,74,005 cr

Period = 2 year

$$CAGR = \frac{\text{Ending Value}}{\text{Beginning Value}}^{1/n} - 1$$

$$= CAGR = (4,74,005/4,02,844)^{1/2} - 1 = 5.43\%$$

Year	Premium Income
FY 2022-23	4,27,419 cr
FY 2023-24	4,74,005 cr

Period = 1 year

$$CAGR = \frac{\text{Ending Value}}{\text{Beginning Value}}^{1/n} - 1$$

$$= CAGR = (4,74,005/4,27,419) - 1 = 0.22\%$$

YEARS	CAGR (%)
2020-21 ~ 2024-25	6.53
2021-22 ~ 2024-25	4.53
2022-23 ~ 2024-25	1.48
2023-24 ~ 2024-25	2.75
2020-21 ~ 2023-24	7.83
2021-22 ~ 2023-24	5.43
2022-23 ~ 2023-24	0.22

:



Final Table show the Compounded annual growth rate all the above financial years.

Result:

The CAGR analysis of LIC's premium income from FY 2020-21 to FY 2024-25 reveals strong early growth followed by a noticeable slowdown in recent years. LIC maintain a healthy 6.53% CAGR, highlighting sustained long-term performance. If we look closer the table above, the growth rate dropped significantly in the short term, with 0.22% CAGR in the FY 2022 to 2023-24, also a noticeable recovery is visible in the FY 2023-24-2024-25. All the above discussion indicated that LIC's growth curve is stabilizing, and future premium expansion more depend

upon the innovation, market penetration strategies than on growth alone.

Annual Growth Rate

Annual Growth Rate – The annual Growth Rate is the percentage change in a variable's value from one year to the next. In finance and business, it measures how much specific matric –suchas revenue, sales, premium income, or GDP – has increased or decreased over single year, relative to its value in the previous year.

$$AGR = \frac{\text{current year} - \text{previous year}}{\text{Previous year}} * 100$$

LIC's premium income;

Financial Year	Total Premium Income (cr)
FY 2020-21	3,79,063 cr
FY 2021-22	4,02,844 cr
FY 2022-23	4,27,419 cr
FY 2023-24	4,74,005 cr
FY 2024-25	4,88,148 cr

Let's calculate Annual Growth Rate for above data:

2021 – 22 Growth:

$$AGR = \frac{\text{current year} - \text{previous year}}{\text{Previous year}} * 100$$

$$= \frac{402844 - 379063}{379063} * 100 = \frac{23781}{379063} * 100 = 6.28\%$$

2022-23 Growth:

$$AGR = \frac{\text{current year} - \text{previous year}}{\text{Previous year}} * 100$$

$$= \frac{427419 - 402844}{402844} * 100 = \frac{24575}{402844} * 100 = 6.10\%$$

2023- 24 Growth:

$$AGR = \frac{\text{current year} - \text{previous year}}{\text{Previous year}} * 100$$

$$= \frac{474005 - 402844}{427419} * 100 = \frac{46586}{427419} * 100 = 10.90\%$$

2024-25 Growth:

$$= \frac{488148 - 474005}{474005} * 100 = \frac{14143}{474005} * 100 = 2.98\%$$

Table; Final table of Annual Growth Rate of LIC's Premium income;

Year	Premium Income	Annual Growth Rate
2020-21	3,79,063 cr	
2021-22	4,02,844 cr	6.28%
2022-23	4,27,419 cr	6.10%
2023-24	4,74,005 cr	10.90%
2024-25	4,88,148 cr	2.98%

LIC's premium income shows an overall upward trend in all the above financial year, but the growth fluctuated over the year . It moves up by 6.28% in the FY 2021-22 and 6.10% in FY 2022-23 . In FY 2023-24 , it shows major jump up to 10.90%, but in the next financial year the growth rate slowdown in FY2024-25 to 2.98%, shows easing in momentum. Growth rate increase every year , which shows company premium income expanded consistently.

Market share analysis:

Market share is the percentage of total sales or revenue in a market that is earned by a particular company over a

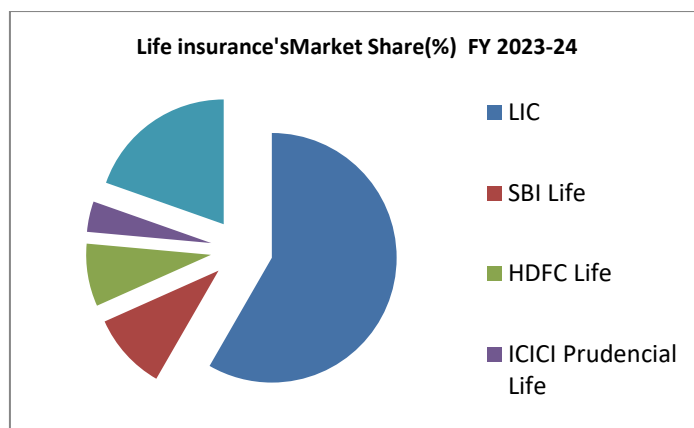
specific period. It reflects the company's competitive position relative to its industry peers.

Why market share matters

- Indicator of competitive strength.
- Investor confidence.
- Pricing Power
- Strategic planning.

Life insurance Market's Share (%) for FY 2023-24

Life insurer	Market share (%)
LIC	58.9%
SBI Life	10.1%
HDFC Life	8.2%
ICICI Prudential Life	4.0%
Others	19.8%



Life Insurance's Companies Market Share (FY2024-25)

Company's Name	Rank	Market Share (%)
Life Insurance corporation (LIC)	1	68.6%
SBI life	2	10.8%
HDFC Life	3	10.2%
ICICI Prudential Life	4	6.8%
Bajaj Allianz Life	5	3.7%
Axis(Max) Life	6	3.7%
Tata AIA Life	7	3.1%
Aditya Birla Sun Life	8	3.1%
Kotak Life	9	2.5%
PNB Met Life	10	1.4%

Life Insurance market share (%) for FY 2024-25

Company Name	Rank	Market Share (%)
Life Insurance corporation (LIC)	1	68.6%
SBI life	2	10.8%
HDFC Life	3	10.2%
ICICI Prudential Life	4	6.8%
Bajaj Allianz Life	5	3.7%
Axis(Max) Life	6	3.7%
Tata AIA Life	7	3.1%
Aditya Birla Sun Life	8	3.1%
Kotak Life	9	2.5%
PNB Met Life	10	1.4%

LIC hold largest share in the life insurance market, even though LIC start losing its share to private companies, like Axis, Bajaj and other. Even after many private companies work in this field, LIC hold its position of dominance over all these years. SBI, HDFC, Axis are all private players or major private player in the field of life insurance.

Conclusion

Result shows a steady increase in premium income, with significant year over year variation, peaking in FY 2023-24 and then slowing in FY 2024-25. Market share analysis shows that the LIC continues to dominate the Indian life insurance market despite its dominance gradually eroding as a result of increase competition from private insurers. The report sheds light on LIC's changing market position and emphasizes how crucial strategic innovation is to maintaining growth in cutthroat market.

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Conflicts of interest



The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Original Article

Swot Analysis of Vertical Expansion in Kalyan-Dombivli Urban Cluster of Maharashtra, India

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Abstract

Vertical expansion, constructing vertical rather than horizontal, is one of strategies of contemporary development in the areas facing shortage of land for expansion. Through increasing Floor Space Index (FSI) and building high-rises for diversified-use, urban areas across the world provide housing facility to rapidly growing populations of the world, take full advantage of present infrastructure, control carbon-heavy urban sprawl and reserve adjacent agrarian and green places. Upright growth in the twin city of Kalyan-Dombivli offers an appropriate solution to provide accommodations to rapidly growing population while limiting urban sprawl in the Mumbai Metropolitan Region (MMR). Nevertheless, this demanding multi-storey expansion applies enormous stress on public services and need copious infrastructure and transportation planning. In light of this, the present study attempts to comprehend the consequences of vertical expansion of Kalyan-Dombivli. The study is based on both primary and secondary sources of data obtained through various sources including empirical observations and discussions held with residents and official. The secondary sources of data including government reports, research papers, text books, surveys and news articles were also referred to obtain secondary data. The obtained Results are provided in textual form.

Keywords: SWOT, Kalyan-Dombivli, Vertical, Expansion, Expansion.

Introduction

Urban Renewal is an inclusive and unified vision and act to solve urban problems to bring about a reorientation in the socio-economic, physical and environmental conditions in an area that has been degraded and need improvement (Poberts et.al. 1999). Today, the vertical expansion of cities across the world has become an important approach to address several urban necessities. Initially, it improves the use of inadequate land resources with high density of population, promoting urban areas to expand upward as an alternative to expand outward. This process of upward rising is noteworthy particularly in urban areas where horizontal growth is restricted by natural topographies or farming activities. Also, vertical expansion of the city ensures economic upliftment by providing suitable space for commercial establishments and offices, marketing centres and housing units that fetch venture and sustain employment opportunities. According to Rahimi S. 2022 and El-Mourabet 2023, Sustainable development is a vital apprehension, as high buildings usually require additional supply of energy and water, complexity in waste management practices and increase carbon footprints. Kalyan-Dombivli urban agglomeration is located in the fringe area of Mumbai City. It is a rapidly-growing urban clusters of the state. Fastest growth of population due to rising numbers of migrants, inadequate empty spaces, heavy demand for houses and improved efficiency of transport connectivity have stimulated a change from horizontal urban spread to vertical urban expansion of the city. In Kalyan-Dombivli, under Kalyan-Dombivli Municipal Corporation, it is certain that, there exist certain physical factors that exert an influence on the area and the urbanization process (Kapur A. S. et. al. 2019). Today, the transformation happening in Kalyan-Dombivli is characterized by the construction of high-rise multistorey residential and commercial structures, renovation of longstanding housing colonies, Transit-Oriented Development (TOD) and increasing utilization of Floor Space Index (FSI). At the same time, huge infrastructure schemes, consisting of metro corridors, railway station developments and recently emerging growth centres are redesigning the urban landscape and emphasizing the tendency toward higher-density growth of the city. In light of this, the present study attempts to comprehend the vertical expansion taking place in the twin city of Kalyan-Dombivli by using the technique of SWOT

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(Strengths, Weaknesses, Opportunities and Threats) analysis, a cognitive process defining and evaluating the interrelations between different factors of an entity or phenomenon across four categorical descriptors; Strengths, Weaknesses, Opportunities, and Threats (Learned et al., 1965).

Objectives

1. To comprehend the technique of SWOT analysis.
2. To conduct a SWOT analysis of vertical expansion taking place in the twin city of Kalyan-Dombivli

Methodology

The present study is based on both primary and secondary data obtained from various sources. Empirical observations and discussions with residents and officials provided primary data. Government reports, research papers, text books, surveys and news articles were referred to obtain secondary data. Results are provided in textual form and suitable suggestions are given to overcome the issues related to vertical expansion of the city.

Results and Discussion

Vertical expansion in the Kalyan-Dombivli urban cluster of Maharashtra is a strategic response to rapid population influx, providing maximized space utilization to accommodate urban housing needs. However, this intensified vertical growth presents a complex matrix of advantages, infrastructural challenges, development opportunities, and risks.

Swat Analysis

A strategic planning of urban area leads the sustainable development and progress of cities by integrating socio-economic, environmental and infrastructural features. Today the city planners need an effective tool to evaluate prevailing circumstances, recognize upcoming challenges and express suitable expansion policies. As across the globe continue to enlarge because of speedy growth of population and rapid economic advancement. Out of the available strategic planning tools, SWOT analysis is framework is being used widely for assessing the internal and external factors that affect holistic

development of urban areas. SWOT analysis offers a methodical technique for evaluating the recent status and upcoming potential of urban areas. Strengths and weaknesses signify the internal characteristics of a cities, like governance, infrastructure, community services and resource accessibility, whereas opportunities and threats rise from external factors consisting of government policies, technical and scientific developments, demographic fluctuations, environmental issues and economic trends. Through recognizing these influencers, the technique of SWOT analysis assists urban planners adopt strategies that power strengths, address weaknesses, explore opportunities and minimize possible threats. The practise of SWOT analysis reinforces evidence-based policymaking capability of city designers by providing an inclusive consideration of the city's progressive potentials and restrictions in intentional urban planning. It supports policymakers in arranging investments, refining infrastructure, encouraging sustainable use of available land, improving urban flexibility and accomplish steady socio-economic and environmental growth. Because of its easiness, flexibility and real-world applicability, SWOT analysis has arose as a crucial tool for safeguarding functioning urban development approaches and reassuring sustainable cities.

SWOT Analysis of vertical expansion in Kalyan-Dombivli

Today, vertical growth has appeared as an effective solution to put up rapid urbanization and growing population density in Mumbai's fringe city of Kalyan-Dombivli. The strategic location of this twin city inside the Mumbai Metropolitan Region (MMR) and strengthening infrastructure care the growing high-rise expansion. Nevertheless, urban issues including burden on public infrastructure, environmental apprehensions and governing limits affect the accomplishment of vertical expansion. SWOT analysis supports recognize these influencers and offers a solid foundation for planning sustainable and stable urban development in the suburban city of Kalyan-Dombivli (Table 1).

Table 1. SWOT Matrix

Internal /External Factors	Positive (Favourable)	Negative (Unfavourable)
Internal Environment	Strength: Strategic location, outstanding transportation connectivity, Competent Land Use, Economic Development, Renovation Potential and Transit-Oriented Development.	Weaknesses: Shortfall of Infrastructure, Traffic Congestion, Inner-city Flooding, Environmental Degradation Wide Gap in Social Infrastructure and Governing Challenges.
External Environment	Opportunities: Smart City Advancement, Sustainable Multi-storey Construction Metro-Based Urban Renewal, Fiscal Variation and Regional Development Centre.	Threat: Environmental Risks, Infrastructure Downfall, Climate Change, Housing Discrimination, Disaster Susceptibility, Burden on Public Facilities and Governance and Supervisory Risks.

Source: Compiled by authors

Strengths

Strategic Location

The twin city of Kalyan-Dombivli functions as a major satellite city of Mumbai and serves as an entrance to Thane, Navi Mumbai, Ulhasnagar, Badlapur, Ambernath and further fast urbanizing regions. The strategic location of this city fetches residential and commercial investments.

Outstanding Transportation Connectivity



The residents of Kalyan-Dombivli enjoy widespread suburban railway connectivity offered by Central Railway of Indian government, whereas continuing metro projects, improved road quality and availability of copious infrastructure are anticipated to further recover convenience and care higher-density growth.

Competent Land Use

Competent land use acts as the backbone of vertical city expansion, transforming spatial limits into economic and environmental strengths. It optimizes city footprints, curbs unchecked urban sprawl into agricultural or forest lands, maximizes return on investment, and localizes essential services to cut down on long commutes and carbon emissions. Vertical expansion of the city allows improved usage of scarce urban land by accepting more inhabitants in a lesser land footprint, thus dropping down burden for horizontal urban expansion.

Economic Development

High-rise expansion promotes economic development of the city by providing employment opportunities in construction activities, it generates municipal revenue, increases property value, encourage residential and commercial investments and strengthens service sector growth.

Renovation Potential

Vertical expansion (building upward) turns the need for urban densification into a major renovation opportunity. Instead of tearing down aging buildings, vertical extension allows cities to use existing foundations to add habitable space, upgrade structural safety, and drastically reduce energy consumption. Numerous old housing colonies and single-story constructions afford openings for methodical redevelopment by means of recent construction standards and better civic services.

Transit-Oriented Development

Transit-Oriented Development (TOD) goes with the three-dimensional plan that graces upright growth of the urban areas together sustainable and significantly functional. Through powerful high-rise housing, commercial and mixed-use places in a 500 to 800-meter range of mass transit hubs, TOD transforms vertical density from isolated and congested towers into vibrant, self-supporting micro-ecosystems. Vertical development of the buildings in the vicinity of railway stations and metro corridors supports compact urban form and withstands public conveyance.

Weaknesses

Shortfall of Infrastructure

The current infrastructure was intended to support smaller size of population. However, the high-rise expansion considerably put demand for assured water supply, proper sewage treatment, uninterrupted power supply and effective solid waste management. Most of these facilities experience capacity constrain.

Traffic Congestion

Upright development concentrates a substantial inhabitants in a small spatial footmark, unavoidably making dense locality. Once thousands of residents exit high-rises all together, it engulfs neighbouring road linkages and transportation centres, triggering congestion that need costly, disrupting infrastructure retrofits. The enhanced affordability of vehicle possession has amplified traffic overcrowding in inner urban areas, particularly in the neighbourhood of railway stations and market places.

Inner-city Flooding

Vertical expansion of cities drives inner-city flooding by drastically increasing impervious surface areas and population density in confined footprints. This architectural density concentrates massive volumes of surface runoff onto surrounding streets while paving over natural drainage basins, frequently overwhelming municipal stormwater systems and creating severe local waterlogging. Speedy concretization of internal city roads has reduced the area under penetrable surfaces, increasing surface runoff and causal to occurrence of flood during intensive rainfall.

Environmental Degradation

As loss of plants, decreased biodiversity, reduction in the recharge of ground water, increased atmospheric temperature and decline of ambient air quality are the outcomes of the vertical expansion taking place in suburban city of Kalyan-Dombivli, it has resulted into environmental degradation at local level.

Wide Gap in Social Infrastructure

Upright development of the urban area concentrates dense inhabitants into small footprints but often surpasses public services. The subsequent gap in social infrastructure results into severe challenges of urban management, consisting of overwhelmed transit systems, insufficient healthcare accessibility and the destruction of public spaces. Increasing population of Kalyan-Dombivli is not identical with corresponding development of schools, colleges, hospitals, playgrounds, public parks and community centres.

Governing Challenges

Vertical expansion of city is in need of various actions particularly monitoring structure quality, implementing development guidelines and addressing unauthorised construction. Taking recent enforcement actions in contradiction of unauthorised construction show these governing challenges.

Opportunities

Smart City Advancement

Intelligent Transportation Systems (ITS) which combines innovative information and communication technologies into transport systems, e-governance, GIS-based preparation and smart utilities can advance administration of urban areas.

Sustainable Multi-storey Construction

The construction of high-rise buildings in the twin city of Kalyan- Dombivli will incorporate various aspects to ensure sustainable development including installation of solar panel on rooftop, development of rainwater harvesting system, practicing wastewater recycling, use of energy-efficient materials, construction of green walls and developing vertical gardens and allocation of green building certification.

Metro-Based Municipal Development

Metro corridors being developed in and around Kalyan-Dombivli will offer accessibility to the commuters working in the city of Mumbai. This dense mixed-use growth in the vicinity of transportation hubs in Kalyan-Dombivli will decrease dependence on private vehicles and ease the life.

Urban Renewal

Inner-city renewal in Kalyan-Dombivli will refresh deteriorating neighbourhoods by replacing old structures over upright development. This renewal will improve physical infrastructure, raises financial development and improve standard of living. Nevertheless,



it must be wisely planned to avoid the shift of low-earning residents and the damage to socio-cultural heritage. Renovation can also substitute old structure with safer, more resilient buildings while refining public facilities and infrastructure.

Fiscal Variation

Vertical development shifts municipal fiscal dynamics by concentrating tax bases (property and commercial taxes) into smaller geographic footprints, optimizing infrastructure delivery and expanding the localized revenue ceiling. However, it also introduces long-term capital liabilities for high-density public services, specialized maintenance and zoning-related fiscal imbalances. Vertical commercial development can attract information technology, financial services, educational institutions, healthcare facilities, retail businesses

Regional Development Centre

Vertical expansion is a highly effective strategy for optimizing land use and driving regional development. Through upwards construction of residential and commercial apartments, urban areas can put up growing populations, create dense conveyance-oriented spaces and preserve adjacent green surroundings avoiding horizontal expansion. The upright expansion in Kalyan-Dombivli will provide an opportunity to ensure future development thoroughly, reducing pressure on older urban cores.

Threats

Environmental Risks

The high-rise development competently houses rapidly growing population and restricts outward urban extension, but then again introduces severe localized environment related risks. It changes microclimates by obstructing usual airflow, intensifies the impact of Urban Heat Island (UHI), creates dense shadowing and overloads central public infrastructure. Unrestrained upright expansion may rise the effect of urban heat island, noise, air pollution, water shortage, harm to biodiversity and environmental degradation.

Infrastructure Downfall

The upright development of urban area leads to increasing compactness by the means of multi-storey structures and towers. Though it addresses the issue of land scarcity and restricts outward expansion, it often causes infrastructural failure once inhabitant's number outpaces civic capacity. This straining leads to burdened services and facilities, traffic overcrowding and loss of environmental quality. If infrastructural development holdup behind population growth, the city may experience water shortages, traffic gridlock, sewage overflow and power interruptions.

Climate Change

The changing pattern of climatic conditions straight way frightens the upright development of urban areas by worsening life-threatening weather risks. Vertical expansion surface wide exposure to winds with high velocity, excessive solar radiation and usefulness failures. Accordingly, operational security and obligation in upright buildings need costly engineering changes to adapt to shifting global climatic conditions. Extremely intensive rainfall events proliferate the susceptibility of densely constructed city areas to flooding and infrastructure destruction.

Housing Discrimination

Discrimination in housing directly intimidates the upright development of urban areas by perplexing community support for dense rezoning. Once marginalized people are omitted from new developments the subsequent social inequity reduces community faith. Thus people to

block upright projects over worries of separation and dislocation. Multi-storey expansion can upsurge property values and decrease affordability of housing for lesser-income groups of the society.

Disaster Susceptibility

Upright development of urban areas increases risks of disaster by increasing density of population and belongings in densely populated zones. This upright development intensifies susceptibilities such as structural fall, evacuation bottlenecks in the incidence of fires or earthquakes, and overstrained public lifelines, highly challenging community risk management system and climate change resilience in densely populated cities. Densely populated sky scrapers rises challenges including fire safety, earthquake resilience, disaster management and emergency evacuation.

Burden on Public Facilities

Upright growth exploits land resources to accommodate increasing urban populations and straightway results into the overloading of public services. Once infrastructure consisting of water supply, hygiene, power supply and transportation fails to scale with density, vertical growth becomes a catalyst for gridlock, declining civic health and environmental degradation. Rapid population growth places additional demands on healthcare, education, policing and emergency response systems.

Governance and Supervisory Risks

Governance and supervisory risks like fragmented rules and regulations, political interference, and poor institutional lapses are key pressures to upright development of cities. They lead to overloaded infrastructure, unsafe construction, and severe socio-spatial inequalities, ultimately compromising the liveability and resilience of high-density cities. Unofficial construction, regulatory harms and postponements in infrastructure delivery can weaken urban progress and community confidence.

Suggestions:

Stimulate Transit-Oriented Development (TOD): There is a need to promote upright housing and commercial development in the vicinity of railway stations and Metro Line 12 to increase convenience and minimise dependency on personal vehicles.

Increase Floor Space Index (FSI) along with Infrastructure Advancements: Approve increased FSI only in areas where basic civic amenities including regular supply of drinking water, sewerage, durable roads, drainage network and power infrastructure are promoted to sustain higher concentrations.

Redevelop Old and Dilapidated Areas: Promote combined renovation of old structures and convert underutilized land into recent upright growth with appropriate civic amenities.

Develop Mixed-Use High-Rise Zones: Encourage combined housing, commercial, workplace and marketing growths to generate independent areas and cut travel demand.

Strengthen Urban Infrastructure: Promote continuous water supply of potable water, sewerage links, storm water drainage, solid waste management and power supply to sustain vertical expansion.

Ensure Satisfactory Social Infrastructure: There is a need to plan and upgrade the quality of schools, construction of multispecialty hospitals, gardens, community centres and entertaining services together with upright developments to improve and maintain quality of life.

Implement Green Building Standards: It is essential to make energy-competent construction, rainwater harvesting,



solar energy systems, wastewater recycling and green roofs obligatory for tall structures.

Enhance Fire and Disaster Resilience: Strict enforcement of fire safety rules and regulations, seismic-resilient building ethics, alternative entrance roads and disaster readiness measures for high buildings is essential for sustenance of upright development of urban areas.

Improve Mobility and Parking Management: Development of multi-level parking facilities, strengthening of public transport and provision for foot paths and cycling infrastructure to reduce congestion should be ensured.

Protect Environmentally Sensitive Areas: Areas prone to flood should be avoided while developing high-rise structures in the city. Wetlands, creek zones, riverbanks and other ecologically subtle areas should be considered while preserving adequate open and green spaces.

Conclusion

Vertical expansion in the suburban agglomeration of Kalyan–Dombivli is essential. This is an opportunity for accommodating more population in liveable space. Shortage of land in the vicinity of Mumbai, associated with rapid growth of population and growing transformational set-up, makes high-density development a significant strategy for meeting urban demands in near future. Nevertheless, its sustainability hinge on harmonizing vertical growth with substantial monetary investments in basic amenities including consistent water supply, drainage, transportation, eco-friendly infrastructure, civic facilities and conservation of environment. A sensible approach in association with the conveyance-oriented growth, climate resilience, output oriented governance and sustainable construction reforms can allow Kalyan–Dombivli urban cluster to evolve as an economically, environmentally and socially resilient and urban zone while reducing the risks related to speedy vertical expansion.

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Original Article

Inclusive Womanhood in Alice Childress's *Trouble in Mind* and Lynn Nottage's *Ruined*: An Intersectional Reading

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Abstract

African American women's drama offers a compelling literary space for examining the intersecting realities of race, gender, class, and institutional oppression while envisioning more inclusive forms of identity and social justice. Although Alice Childress's *Trouble in Mind* (1955) and Lynn Nottage's *Ruined* (2008) have been widely studied through the lenses of race, feminism, trauma, and double marginalization, comparatively little attention has been given to how these plays reconstruct **inclusive womanhood** through agency, resilience, and collective resistance. Addressing this gap, the present paper offers an intersectional comparative reading of the two plays to explore how Black women negotiate oppressive social structures while reclaiming voice, dignity, and self-determination. The study is grounded in Kimberlé Crenshaw's theory of **Intersectionality** and informed by Patricia Hill Collins' **Black Feminist Thought** and bell hooks' **feminist philosophy of resistance**. Employing a qualitative, text-centred comparative methodology, it analyses the representation of Wileta Mayer and Mama Nadi as women who challenge racial, gendered, and institutional power through ethical leadership, solidarity, and moral courage. The paper argues that **inclusive womanhood** extends beyond the recognition of rights to become a transformative process of reclaiming identity, agency, and social belonging. By repositioning the selected plays within the discourse of inclusive literature, the study contributes a fresh perspective to contemporary debates in African American drama, feminist literary criticism, and gender studies.

Keywords: Inclusive Womanhood; Intersectionality; African American Women's Drama; Black Feminist Thought; Literary Resistance; Gender Studies; Alice Childress; Lynn Nottage

Introduction

Literature has consistently served as a powerful medium for questioning systems of inequality and amplifying voices that have historically been silenced. Within this tradition, **African American women's drama** occupies a significant place by representing the complex realities of women whose lives are shaped by the intersecting forces of race, gender, class, and institutional power. Through dramatic narratives, Black women playwrights not only expose social injustice but also articulate alternative visions of dignity, agency, and inclusion. Their works transform the stage into a space where marginalized women challenge oppressive structures and reclaim their identities through resistance and collective action. Among the most influential playwrights in this tradition are Alice Childress and Lynn Nottage, whose plays continue to shape contemporary discussions on race, gender, and social justice. Alice Childress's *Trouble in Mind* (1955) critiques racial discrimination and gender inequality within the American theatre industry, revealing how institutional practices restrict artistic freedom and reinforce stereotypes. More than five decades later, Lynn Nottage's *Ruined* (2008) examines the devastating consequences of war and sexual violence against women in the Democratic Republic of Congo, highlighting their resilience amid conflict and displacement. Although the plays emerge from different historical and cultural contexts, both foreground women who resist exclusion and assert their humanity despite systemic oppression. Existing scholarship has largely examined these plays through the perspectives of feminism, race studies, trauma theory, and **double marginalization**. While these approaches have significantly enriched African American literary criticism, comparatively less attention has been devoted to how Childress and Nottage reconstruct **inclusive womanhood** through agency, solidarity, and ethical resistance. This study addresses that gap by employing **Kimberlé Crenshaw's theory of Intersectionality**, supported by Patricia Hill Collins' **Black Feminist Thought** and bell hooks' **feminist philosophy**, to examine how the selected plays redefine womanhood beyond victimhood and exclusion.

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The paper argues that **inclusive womanhood** is not merely the recognition of women's rights or identities but a transformative process through which marginalized women reclaim voice, dignity, and social belonging. By comparatively analysing *Trouble in Mind* and *Ruined*, the study demonstrates how literature functions as a powerful site of resistance and inclusion. In doing so, it contributes a fresh perspective to contemporary debates in African American drama, feminist literary criticism, and gender studies while reaffirming the enduring role of literature in promoting social justice and human dignity.

Review of Literature

Scholarship on Alice Childress's *Trouble in Mind* and Lynn Nottage's *Ruined* has primarily focused on issues of race, gender, oppression, trauma, and resistance within African American and Black feminist literary traditions. Critics have recognised Childress as a pioneering playwright who challenged racial stereotyping and institutional discrimination in American theatre. Studies of *Trouble in Mind* frequently examine the play's critique of racism, artistic censorship, and the limited opportunities available to Black performers, highlighting Childress's contribution to civil rights discourse and feminist theatre. Similarly, critical studies of *Ruined* have explored the impact of war, sexual violence, displacement, and the resilience of women in conflict zones. Scholars have analysed Lynn Nottage's portrayal of women's survival, trauma, and community-building within the socio-political context of the Democratic Republic of Congo. These studies demonstrate how Nottage foregrounds female agency while exposing the gendered consequences of armed conflict. Theoretical discussions of intersectionality, particularly those advanced by Kimberlé Crenshaw, have significantly influenced contemporary feminist literary criticism by explaining how race, gender, class, and other social identities interact to produce multiple forms of discrimination. Likewise, Patricia Hill Collins' Black Feminist Thought and bell hooks' feminist philosophy have provided important frameworks for understanding Black women's experiences of oppression, resistance, and self-definition. These perspectives have enriched literary analyses by shifting attention from individual experiences to broader structures of power and social inequality. Despite this substantial body of scholarship, comparatively little research has examined *Trouble in Mind* and *Ruined* through the shared framework of inclusive womanhood. Most existing studies emphasise oppression, trauma, or double marginalization, while giving limited attention to how the protagonists reconstruct identity through solidarity, ethical leadership, and transformative agency. By comparatively analysing the two plays through an intersectional feminist perspective, this paper addresses that gap and proposes inclusive womanhood as a productive interpretative framework for understanding contemporary African American women's drama.

Theoretical Framework

This study adopts Kimberlé Crenshaw's theory of Intersectionality as its primary analytical framework to examine how race, gender, and institutional power intersect in shaping the experiences of women in Alice Childress's *Trouble in Mind* and Lynn Nottage's *Ruined*. Crenshaw argues that systems of oppression do not function independently but interact to create multiple and overlapping forms of discrimination. This perspective enables a nuanced understanding of how the female protagonists negotiate complex social realities while resisting exclusion and asserting their identities. The study is further informed by Patricia Hill Collins' Black Feminist Thought, which emphasizes the importance of Black

women's lived experiences, self-definition, and collective knowledge in challenging structures of domination. Collins' framework highlights the ways marginalized women transform oppression into sites of resistance, agency, and empowerment through solidarity and ethical action. In addition, bell hooks' feminist philosophy provides a critical lens for understanding resistance as a transformative practice grounded in dignity, voice, and social justice. Rather than portraying women merely as victims of patriarchal and racial oppression, hooks foregrounds their capacity to challenge oppressive systems through consciousness, resilience, and collective empowerment. Drawing on these complementary perspectives, the present study employs inclusive womanhood as its central interpretative framework. Here, inclusive womanhood refers to a dynamic process through which marginalized women reclaim agency, affirm their identities, and create spaces of belonging despite structural inequalities. This framework enables a comparative reading of *Trouble in Mind* and *Ruined*, demonstrating how both plays reimagine womanhood as a site of resistance, ethical leadership, and social inclusion.

Inclusive Womanhood in *Trouble in Mind*

Alice Childress's *Trouble in Mind* presents a powerful critique of racial and gender discrimination within the American theatre industry while foregrounding the emergence of inclusive womanhood through the moral and artistic resistance of its protagonist, Wileta Mayer. As an experienced Black actress, Wileta is repeatedly expected to conform to stereotypical roles that reinforce racial prejudice and limit her creative agency. Her experiences reveal how institutional racism and sexism operate simultaneously, restricting both her professional opportunities and her freedom of expression. Through Wileta, Childress demonstrates that exclusion is embedded not only in social structures but also in cultural institutions that shape public perceptions of identity. Viewed through Crenshaw's theory of Intersectionality, Wileta's struggle illustrates the inseparability of race and gender in determining her position within the theatrical world. She faces discrimination not simply because she is a woman or because she is Black, but because these identities intersect to produce a unique form of marginalization. Childress thus exposes how institutional power silences Black women while expecting their compliance with dominant cultural narratives. At the same time, Wileta refuses to remain confined within these imposed roles. Her decision to question the racist assumptions embedded in the play she is performing reflects an act of ethical resistance rather than personal rebellion. By challenging the authority of the white director and asserting her artistic integrity, she transforms herself from a passive performer into an active agent of change. This insistence on dignity and self-representation exemplifies Patricia Hill Collins' emphasis on self-definition as a form of resistance against oppressive systems. The play also reflects bell hooks' understanding of resistance as a practice of reclaiming voice and challenging structures of domination. Wileta's courage encourages other performers to confront injustice collectively, suggesting that social transformation begins when marginalized individuals refuse to accept exclusion as inevitable. Her resistance is therefore both personal and communal, linking individual agency with broader struggles for equality and representation. Through Wileta Mayer, Childress redefines womanhood as a dynamic process of self-assertion, ethical responsibility, and collective empowerment. Rather than depicting Black women solely as victims of discrimination, *Trouble in Mind* portrays them as conscious agents who challenge institutional injustice and create more inclusive spaces within society. In this sense,

the play advances inclusive womanhood as a transformative model grounded in dignity, solidarity, and the pursuit of social justice.

Inclusive Womanhood in *Ruined*

In *Ruined*, Lynn Nottage examines the devastating effects of armed conflict on women's lives while presenting inclusive womanhood as a source of resilience, solidarity, and ethical leadership. Set against the backdrop of civil war in the Democratic Republic of Congo, the play portrays women who endure sexual violence, displacement, and social exclusion. Rather than reducing them to victims, Nottage highlights their capacity to survive, rebuild relationships, and reclaim their dignity. Through characters such as Mama Nadi, Sophie, and Salima, the play demonstrates that inclusion is achieved through courage, mutual support, and the determination to preserve one's humanity amid violence. From the perspective of Kimberlé Crenshaw's Intersectionality, the experiences of these women reveal how gender-based violence is intensified by war, poverty, and political instability. Their suffering cannot be understood through a single category of oppression, as social, economic, and cultural inequalities intersect to shape their lives. Nottage therefore broadens the understanding of intersectionality by illustrating how systemic violence marginalizes women while simultaneously exposing their capacity for resistance. Among the central characters, Mama Nadi emerges as a complex figure whose brothel functions not merely as a commercial space but also as a fragile refuge for women displaced by conflict. Although her decisions are often shaped by the harsh realities of survival, she gradually assumes the role of a protector who offers safety, economic opportunity, and emotional support to those around her. Her leadership reflects Patricia Hill Collins' concept of self-definition, demonstrating how marginalized women negotiate oppressive circumstances without surrendering their autonomy or moral agency. The experiences of Sophie and Salima further reinforce this vision of inclusive womanhood. Despite enduring profound physical and emotional trauma, both women strive to reclaim their identities and resist the silence imposed by violence. Their resilience illustrates bell hooks' understanding of resistance as the recovery of voice, dignity, and collective empowerment. Through their shared experiences, the play emphasizes that healing becomes possible when women create supportive communities that challenge fear, isolation, and injustice. By foregrounding solidarity instead of victimhood, *Ruined* redefines womanhood as an evolving process of resilience, ethical responsibility, and social inclusion. Nottage suggests that even in contexts marked by war and oppression, women possess the strength to transform suffering into collective hope and resistance. Consequently, the play presents inclusive womanhood as a powerful framework for understanding survival, leadership, and the restoration of human dignity.

Comparative Discussion

Although *Trouble in Mind* and *Ruined* are situated in distinct historical, geographical, and socio-political contexts, both plays foreground Black women's struggle against systems of exclusion and affirm their capacity to reshape oppressive realities through resilience, agency, and ethical leadership. Childress examines institutional racism within the American theatre, while Nottage explores the impact of war and sexual violence in the Democratic Republic of Congo. Despite these differences, both playwrights portray womanhood as a dynamic process of resistance rather than passive endurance. The protagonists, Wiletta Mayer and Mama Nadi, embody different yet complementary forms of leadership. Wiletta challenges racial stereotypes by asserting her artistic integrity and

refusing to accept discriminatory representations of Black identity. Her resistance exposes exclusion within cultural institutions and demands recognition of Black women's voices. In contrast, Mama Nadi responds to violence by creating a fragile but vital space of protection and solidarity for women affected by armed conflict. While Wiletta's resistance is primarily intellectual and ethical, Mama Nadi's leadership is grounded in survival, care, and community-building. Together, these characters demonstrate that inclusive womanhood can emerge through diverse forms of action shaped by specific historical circumstances. An intersectional reading further reveals that neither play treats race, gender, or social inequality as isolated categories. Instead, the protagonists negotiate multiple and interconnected systems of oppression that influence their identities and choices. Drawing upon Crenshaw's Intersectionality, Collins' Black Feminist Thought, and bell hooks' philosophy of resistance, both plays emphasize that genuine empowerment is achieved through self-definition, collective responsibility, and the refusal to internalize exclusion. The comparative analysis therefore suggests that inclusive womanhood is not simply the inclusion of women within existing social structures but the transformation of those structures through agency, solidarity, and ethical resistance. By presenting women as active participants in shaping more just and humane communities, Childress and Nottage move beyond narratives of victimhood to envision literature as a space for social inclusion and collective change. This shared vision constitutes the central contribution of the present study and highlights the continuing relevance of African American women's drama to contemporary discussions of gender, equality, and human dignity.

Conclusion

Alice Childress's *Trouble in Mind* and Lynn Nottage's *Ruined* demonstrate that African American women's drama is not only a critique of racial and gender oppression but also a powerful affirmation of women's agency, resilience, and collective strength. Through the experiences of Wiletta Mayer and Mama Nadi, both plays reveal how marginalized women confront intersecting systems of discrimination while reclaiming dignity, voice, and self-determination. Their resistance extends beyond individual survival to challenge institutional and social structures that perpetuate exclusion. By employing Kimberlé Crenshaw's Intersectionality, Patricia Hill Collins' Black Feminist Thought, and bell hooks' feminist philosophy, this study has shown that inclusive womanhood provides a productive framework for understanding how literature reimagines women's identities through ethical leadership, solidarity, and transformative action. Rather than presenting women as passive victims, Childress and Nottage portray them as active participants in creating more inclusive and equitable communities. The comparative analysis contributes to existing scholarship by shifting attention from narratives of oppression and double marginalization to the constructive possibilities of inclusion, empowerment, and social justice. It argues that inclusive womanhood is not merely a theoretical concept but a lived process through which women negotiate inequality and reshape their social worlds. Consequently, *Trouble in Mind* and *Ruined* remain significant literary interventions that continue to inform contemporary discussions in African American drama, feminist literary criticism, and gender studies, reaffirming literature's enduring role in promoting equality, human dignity, and inclusive social transformation.

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Original Article

Integrating Artificial Intelligence, ESG And Corporate Governance for Sustainable Business Excellence: Emerging Trends and Future Perspectives

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Abstract:

"From Intelligence to Integrity: Integrating AI, ESG, and Corporate Governance for Sustainable Business Excellence."

Artificial Intelligence (AI) has emerged as a transformative technology that is reshaping the way organizations operate, make strategic decisions, and achieve sustainable growth. At the same time, increasing stakeholder expectations, regulatory requirements, and global sustainability commitments have elevated the importance of Environmental, Social, and Governance (ESG) practices and effective corporate governance. Recognizing the growing interdependence of these three dimensions, the present study examines how the integration of Artificial Intelligence, ESG, and corporate governance contributes to sustainable business excellence and long-term organizational value creation. The study is conceptual and descriptive in nature and is based entirely on secondary data collected from peer-reviewed research articles, books, conference papers, government publications, and reports of reputed international organizations, including the World Economic Forum (WEF), OECD, and the International Finance Corporation (IFC). A comprehensive review of recent literature was undertaken to identify emerging trends, global best practices, opportunities, challenges, and future perspectives associated with AI-enabled sustainable business management. The findings reveal that Artificial Intelligence significantly strengthens corporate governance by improving transparency, accountability, regulatory compliance, and strategic decision-making. It also enhances the quality and reliability of ESG reporting through intelligent data analytics, automation, predictive insights, and real-time performance monitoring. Furthermore, AI supports sustainable business practices by optimizing resource utilization, improving operational efficiency, reducing environmental impacts, and strengthening stakeholder engagement. However, the study also identifies important challenges, including algorithmic bias, data privacy concerns, cybersecurity risks, ethical issues, and the need for robust governance frameworks and skilled human resources. The study concludes that the strategic integration of Artificial Intelligence, ESG, and corporate governance provides organizations with a comprehensive framework for achieving sustainable business excellence, fostering innovation, enhancing stakeholder trust, strengthening organizational resilience, and creating long-term value in the digital economy. The findings offer practical insights for business leaders, policymakers, researchers, and organizations seeking to accelerate responsible digital transformation and sustainable development.

Keywords: Artificial Intelligence (AI), Environmental, Social, and Governance (ESG), Corporate Governance, Sustainable Business Excellence, Digital Transformation.

Introduction

In the twenty-first century, businesses are operating in an environment shaped by rapid technological advancements, increasing environmental concerns, and growing expectations for ethical and transparent governance. Organizations are no longer evaluated solely on their financial performance; they are also assessed on how responsibly they manage environmental, social, and governance (ESG) issues while creating long-term value for stakeholders. Governments, investors, customers, employees, and regulatory authorities increasingly expect businesses to adopt sustainable practices that promote economic growth, social well-being, and environmental protection. Consequently, sustainable business excellence has emerged as a strategic priority for organizations across industries. Artificial Intelligence (AI) has become one of the most influential technologies driving this transformation. AI refers to the ability of computer systems to perform tasks that normally require human intelligence, including data analysis, prediction, decision-making, automation, and pattern recognition.

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By processing large volumes of structured and unstructured data in real time, AI enables organizations to improve operational efficiency, reduce costs, enhance customer experiences, and make informed strategic decisions. Beyond operational improvements, AI is increasingly being applied to support sustainability initiatives by optimizing resource utilization, improving energy efficiency, monitoring environmental impacts, detecting risks, and strengthening corporate governance processes. At the same time, the importance of ESG has grown significantly in the global business landscape. ESG provides a comprehensive framework for evaluating an organization's environmental performance, social responsibility, and governance practices. It encourages businesses to reduce their environmental footprint, ensure employee welfare and diversity, protect stakeholder interests, maintain ethical standards, and strengthen accountability. Investors and financial institutions are increasingly considering ESG performance when making investment decisions, recognizing that responsible business practices contribute to long-term resilience and competitiveness. As a result, organizations are integrating ESG principles into their strategic planning and reporting systems. Corporate governance serves as the foundation for effective ESG implementation by promoting transparency, accountability, fairness, and ethical decision-making. Strong governance structures ensure that organizations comply with legal and regulatory requirements while protecting the interests of shareholders and other stakeholders. The integration of AI into corporate governance has the potential to improve board effectiveness, enhance regulatory compliance, strengthen internal controls, support fraud detection, and enable data-driven decision-making. When AI is responsibly implemented within a sound governance framework, organizations can improve both business performance and stakeholder trust.

The convergence of AI, ESG, and corporate governance represents a new direction for sustainable business excellence. Rather than functioning as separate concepts, these three elements complement one another in creating resilient, innovative, and responsible organizations. AI provides advanced analytical capabilities, ESG establishes sustainability objectives, and corporate governance ensures that technological innovations are implemented ethically and transparently. Together, they enable organizations to address emerging challenges such as climate change, cybersecurity risks, regulatory compliance, stakeholder expectations, and digital transformation. Despite growing interest in these areas, existing research has often examined AI, ESG, and corporate governance independently. Limited attention has been given to understanding how their integration can collectively enhance sustainable business performance and long-term organizational success. Therefore, this study adopts a conceptual review approach based on secondary data to examine the interrelationship among AI, ESG, and corporate governance. It explores recent developments, identifies emerging trends, discusses opportunities and challenges, and highlights future perspectives for achieving sustainable business excellence in the digital era.

Review Of Literature

Recent research highlights the increasing convergence of Artificial Intelligence (AI), Environmental, Social, and Governance (ESG) practices, and corporate governance in achieving sustainable business excellence. Scholars have emphasized that AI has evolved beyond a technological tool and has become a strategic capability that

supports responsible decision-making, sustainability management, transparency, and long-term organizational value creation. Ouabouch and Yahyaoui (2025) examined the relationship between Artificial Intelligence and Corporate Governance through a review of recent literature. The study revealed that AI contributes significantly to improving governance mechanisms by enhancing decision-making processes, strengthening internal control systems, improving transparency, and supporting risk management. However, the authors also highlighted challenges related to algorithmic bias, accountability, ethical concerns, and regulatory uncertainty. The study suggested that organizations should adopt AI within a strong ethical governance framework to achieve responsible and sustainable business outcomes (Ouabouch & Yahyaoui, 2025). Lim (2024) explored the relationship between ESG and Artificial Intelligence in the financial sector through a comprehensive review of existing research. The study found that AI technologies, including machine learning, natural language processing, and predictive analytics, provide significant support for ESG data analysis, sustainability reporting, investment evaluation, and risk assessment. The author emphasized that AI can improve the accuracy and efficiency of ESG measurement; however, effective governance mechanisms are necessary to ensure responsible AI adoption and reliable sustainability disclosures (Lim, 2024). Batool, Zowghi, and Bano (2025) conducted a systematic literature review on AI governance and identified key elements required for responsible AI implementation. The study emphasized that accountability, transparency, human oversight, risk management, and regulatory compliance are essential components of effective AI governance. The authors argued that organizations need comprehensive governance frameworks to balance technological innovation with ethical responsibilities, thereby supporting sustainable and trustworthy AI adoption (Batool et al., 2025). Xiao and Xiao (2025) investigated the role of AI-driven ESG practices in improving sustainable development outcomes. Their study indicated that AI enhances environmental management, operational efficiency, resource optimization, and sustainability performance. The research highlighted that organizations adopting AI-enabled ESG strategies can achieve better governance outcomes and long-term competitive advantages through improved innovation capabilities and responsible business practices (Xiao & Xiao, 2025). Ge and Shan (2025) examined the practical applications of AI in corporate ESG governance. Their research demonstrated that AI improves ESG governance through enhanced data processing capabilities, accurate sustainability analysis, improved strategic decision-making, and reduced governance costs. However, the study also identified challenges such as data security, technological complexity, ethical risks, and the need for skilled human resources. The authors recommended stronger regulatory frameworks and effective data governance mechanisms for successful AI-ESG integration (Ge & Shan, 2025). Dwivedi et al. (2023) analyzed the opportunities and challenges associated with generative AI in business and society. The study highlighted that AI technologies can improve organizational intelligence, automate complex activities, and support strategic decision-making. However, the authors stressed that responsible AI adoption requires ethical guidelines, transparency, human supervision, and appropriate governance structures to minimize risks and maximize sustainable benefits (Dwivedi et al., 2023). Brynjolfsson, Li, and Raymond (2023) examined the impact of generative AI on workplace productivity and organizational performance. Their empirical findings indicated that AI can improve

efficiency, knowledge sharing, and service quality. The study suggested that AI creates greater value when combined with appropriate organizational practices, employee involvement, and responsible management approaches (Brynjolfsson et al., 2023).

The World Economic Forum (2024) emphasized the transformative role of AI in advancing ESG implementation and sustainable development. According to the report, AI enables organizations to monitor environmental impacts, optimize resources, enhance supply chain transparency, and improve sustainability measurement. However, the report also highlighted the importance of ethical AI governance to address challenges related to data privacy, cybersecurity, and algorithmic accountability (World Economic Forum, 2024). The Organisation for Economic Co-operation and Development (OECD, 2024) highlighted that trustworthy AI principles are essential for sustainable economic development and responsible corporate governance. The OECD recommended that organizations implementing AI should focus on transparency, fairness, accountability, explainability, and human oversight. These principles strengthen stakeholder confidence and support responsible digital transformation (OECD, 2024). The International Finance Corporation (IFC, 2023) emphasized the importance of corporate governance in achieving sustainable business excellence. The report indicated that digital technologies, including AI, can strengthen board-level decision-making, improve internal controls, enhance ESG reporting quality, and support effective risk management. The integration of AI with strong governance practices enables organizations to respond effectively to changing stakeholder expectations and sustainability challenges (International Finance Corporation, 2023). Overall, the reviewed literature demonstrates that AI, ESG, and corporate governance are increasingly interconnected pillars of sustainable business transformation. AI provides advanced analytical capabilities, ESG establishes sustainability objectives, and corporate governance ensures ethical and transparent implementation. Although AI offers significant opportunities for improving ESG performance, reporting quality, and organizational resilience, researchers consistently emphasize the need for responsible governance frameworks, regulatory compliance, and human oversight. Therefore, integrating AI with ESG principles and corporate governance provides a strategic pathway for achieving sustainable business excellence in the digital era.

Research Gap

The existing literature demonstrates that Artificial Intelligence (AI), Environmental, Social, and Governance (ESG) practices, and Corporate Governance have each received considerable attention in recent years. Most studies have examined these concepts individually, focusing on AI applications in business, ESG reporting and performance, or corporate governance mechanisms. Although several researchers have explored the relationship between AI and ESG or AI and corporate governance, limited attention has been given to understanding the integrated role of these three dimensions in achieving sustainable business excellence. Furthermore, many existing studies emphasize technological advancements or regulatory aspects without providing a comprehensive conceptual framework that explains how AI can simultaneously strengthen ESG implementation and corporate governance practices. There is also limited discussion on the emerging opportunities, implementation challenges, and future strategic directions associated with integrating AI, ESG, and corporate governance in organizations. Therefore, the present study seeks to bridge this gap by providing a comprehensive review of recent literature and secondary

data. It examines the interrelationship among AI, ESG, and corporate governance and explores how their integration can contribute to sustainable business excellence, long-term value creation, and responsible organizational development in the digital era.

Statement Of The Problem

In the contemporary business environment, organizations are increasingly adopting Artificial Intelligence (AI) to improve operational efficiency, decision-making, and innovation. Simultaneously, Environmental, Social, and Governance (ESG) practices and sound corporate governance have become essential for ensuring transparency, accountability, stakeholder confidence, and long-term sustainability. Although these three areas have individually gained significant attention from researchers, policymakers, and business organizations, their integrated application remains limited and insufficiently explored. Many organizations continue to face challenges in effectively incorporating AI into ESG reporting, governance mechanisms, and sustainable business strategies while addressing concerns related to ethics, data privacy, algorithmic bias, regulatory compliance, and organizational accountability. Moreover, existing studies primarily examine AI, ESG, and corporate governance as separate concepts, providing limited insight into how their integration can collectively contribute to sustainable business excellence. Therefore, there is a need for a comprehensive conceptual review that examines the interrelationship among Artificial Intelligence, ESG, and corporate governance. The present study seeks to address this gap by analyzing recent secondary literature and identifying emerging trends, opportunities, challenges, and future perspectives for integrating these three dimensions to achieve sustainable business excellence in the digital era.

Objectives Of The Study

1. The present study aims to achieve the following objectives:
2. To examine the role of Artificial Intelligence (AI) in promoting sustainable business excellence.
3. To analyze the relationship between Artificial Intelligence, Environmental, Social, and Governance (ESG) practices, and corporate governance.
4. To identify the opportunities and challenges associated with integrating AI into ESG and corporate governance frameworks.
5. To explore emerging trends and global best practices in AI-driven sustainable business management.
6. To provide recommendations for the effective integration of AI, ESG, and corporate governance to achieve long-term organizational sustainability and value creation.

Research Questions

The present study seeks to answer the following research questions:

How does Artificial Intelligence (AI) contribute to sustainable business excellence?

What is the relationship between AI, Environmental, Social, and Governance (ESG) practices, and corporate governance?

What opportunities and challenges are associated with integrating AI into ESG and corporate governance frameworks?

What are the emerging global trends and best practices in AI-driven sustainable business management?

How can organizations effectively integrate AI, ESG, and corporate governance to achieve long-term sustainability and stakeholder value creation?

Research Methodology

Nature Of The Study

The present study is conceptual and descriptive in nature and is based entirely on secondary data. It adopts a qualitative review approach to examine the integration of Artificial Intelligence (AI), Environmental, Social, and Governance (ESG) practices, and corporate governance. The study aims to analyze existing knowledge, identify emerging trends, and understand their collective role in achieving sustainable business excellence.

Data Sources

The study relies exclusively on secondary data collected from authentic and credible sources. Information has been gathered from peer-reviewed research articles, books, conference papers, government publications, reports of international organizations such as the World Economic Forum (WEF), OECD, International Finance Corporation (IFC), and other reputed institutions. Relevant data have also been obtained from journals indexed in Scopus, Web of Science, Springer, Elsevier, MDPI, and Google Scholar. Recent reports on ESG, Artificial Intelligence, corporate governance, and sustainable business practices published between 2021 and 2026 have been reviewed to ensure that the study reflects current developments and emerging global trends.

Cope Of The Study

The study focuses on examining the relationship between Artificial Intelligence, ESG practices, and corporate governance in the context of sustainable business excellence. It reviews recent global literature and secondary evidence to understand emerging trends, opportunities, challenges, and best practices. The study is limited to conceptual analysis and does not include primary data collection or empirical investigation.

Limitations Of The Study

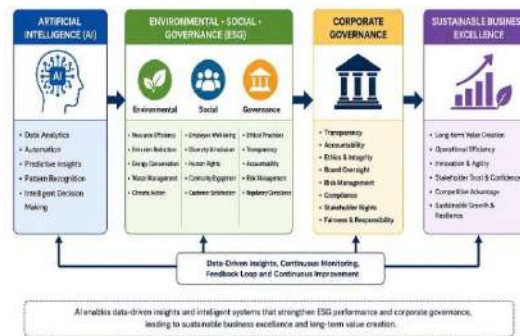
The study is based solely on secondary data; therefore, its findings depend on the availability, quality, and reliability of published literature and reports. It does not include surveys, interviews, or case studies involving primary data. Furthermore, the rapidly evolving nature of Artificial Intelligence and ESG regulations may lead to new developments that are beyond the scope of this study.

Conceptual Framework (Ai-Esg-Corporate Governance Integration)

The conceptual framework of this study explains how the integration of Artificial Intelligence (AI), Environmental, Social, and Governance (ESG) practices, and Corporate Governance collectively contributes to sustainable business excellence. Rather than functioning independently, these three components complement one another by improving organizational efficiency, transparency, accountability, innovation, and long-term value creation. Artificial Intelligence serves as a strategic enabler that supports data-driven decision-making,

predictive analytics, process automation, and intelligent risk management. AI technologies enable organizations to analyze large volumes of data, identify emerging risks, optimize resource utilization, and improve operational efficiency. These capabilities help organizations respond effectively to dynamic business environments while supporting sustainable growth and innovation. Environmental, Social, and Governance (ESG) practices provide the sustainability framework that guides organizations toward responsible business conduct. The environmental dimension focuses on efficient resource utilization, carbon emission reduction, energy conservation, waste management, and environmental protection. The social dimension emphasizes employee well-being, diversity and inclusion, human rights, customer satisfaction, and community engagement. The governance dimension promotes ethical leadership, transparency, accountability, regulatory compliance, effective board oversight, and stakeholder confidence. Collectively, ESG practices enhance organizational reputation, strengthen stakeholder relationships, and support long-term business sustainability. Corporate governance acts as the foundation that ensures the responsible implementation of both AI and ESG initiatives. Effective governance establishes policies, internal controls, ethical standards, risk management systems, and accountability mechanisms that guide organizational decision-making. Strong corporate governance also ensures that AI technologies are used responsibly by addressing concerns related to data privacy, algorithmic bias, cybersecurity, legal compliance, and ethical decision-making. As regulatory expectations continue to evolve, governance frameworks play a critical role in balancing technological innovation with corporate responsibility. The integration of AI, ESG, and corporate governance creates a mutually reinforcing system that enhances organizational resilience and sustainable business performance. AI strengthens ESG reporting by improving data accuracy, monitoring sustainability indicators, and supporting real-time analysis. ESG provides strategic sustainability goals that guide AI applications toward responsible business outcomes. Corporate governance ensures transparency, fairness, accountability, and effective oversight throughout the implementation process. Together, these three dimensions improve decision-making, strengthen stakeholder trust, reduce organizational risks, encourage innovation, and enhance long-term competitiveness. Therefore, this study proposes that sustainable business excellence is achieved through the effective integration of Artificial Intelligence, ESG practices, and corporate governance. Organizations that successfully combine these three strategic dimensions are better positioned to achieve operational excellence, regulatory compliance, sustainable value creation, and long-term organizational success in the rapidly evolving digital economy.

Conceptual Framework: Integration of AI, ESG and Corporate Governance
 for Sustainable Business Excellence



Analysis And Discussion

AI In Corporate Governance

Artificial Intelligence (AI) is transforming corporate governance by enhancing decision-making, improving transparency, and strengthening organizational accountability. Modern organizations increasingly use AI technologies to support board-level decisions, monitor regulatory compliance, detect fraudulent activities, and improve internal control systems. AI can process large volumes of structured and unstructured data in real time, enabling managers and directors to make faster and more informed strategic decisions. One of the key contributions of AI to corporate governance is its ability to improve risk monitoring and compliance management. AI-powered systems continuously analyze financial transactions, operational activities, and governance practices to identify unusual patterns and potential risks. This enables organizations to take timely corrective actions, thereby reducing financial losses and improving governance

effectiveness. AI also supports internal and external auditing by automating routine audit procedures, enhancing accuracy, and minimizing human error. Furthermore, AI strengthens transparency by generating accurate reports and providing real-time insights into organizational performance. It assists board members in evaluating business performance, monitoring ESG indicators, and ensuring compliance with legal and regulatory requirements. However, the adoption of AI in corporate governance also requires effective oversight to address challenges related to data privacy, cybersecurity, algorithmic bias, and ethical decision-making. Overall, AI has become a strategic tool for improving corporate governance by promoting accountability, transparency, operational efficiency, and informed decision-making. When implemented within a strong governance framework, AI enables organizations to build stakeholder trust, enhance organizational resilience, and achieve long-term sustainable business excellence.



Ai And Esg Reporting

Artificial Intelligence (AI) is significantly improving the quality, accuracy, and efficiency of Environmental, Social, and Governance (ESG) reporting. Traditionally, organizations relied on manual data collection and reporting processes, which were often time-consuming and prone to human errors. AI technologies such as machine learning, natural language processing, and data analytics now enable organizations to collect, process, and analyze large volumes of ESG-related data quickly and accurately. AI supports organizations in monitoring key sustainability indicators, including carbon emissions, energy consumption, waste management, employee diversity, workplace safety, and governance compliance. By automating data collection and analysis, AI helps organizations prepare timely, reliable, and transparent ESG reports that meet the expectations of investors, regulators, customers, and other stakeholders. It also improves the consistency and comparability of sustainability disclosures by reducing reporting errors and enhancing data accuracy. Moreover, AI enables predictive analytics, allowing organizations to identify future sustainability risks and opportunities. This helps management develop proactive strategies to improve ESG performance and achieve long-term sustainability goals. AI-powered dashboards also provide real-time insights that support continuous monitoring and informed decision-making. Despite these benefits, organizations must ensure that ESG data used by AI systems are accurate, reliable, and ethically managed. Strong governance frameworks, data privacy measures, and regulatory compliance are essential to maintain stakeholder trust and ensure responsible AI-driven ESG reporting. Therefore, AI has become a valuable tool for strengthening ESG reporting and promoting sustainable business excellence.

Ai For Risk Management

Artificial Intelligence (AI) has become an essential tool for improving risk management in modern organizations. Businesses operate in an increasingly complex environment where they face financial, operational, cybersecurity, regulatory, and environmental risks. AI helps organizations identify, assess, and manage these risks by analyzing large volumes of real-time data and detecting patterns that may not be easily recognized through traditional methods. AI-powered predictive analytics enables organizations to forecast potential risks before they occur, allowing management to take preventive measures. Machine learning algorithms continuously monitor business operations, financial transactions, and compliance activities to detect fraud, cyber threats, and operational irregularities. This improves the accuracy and speed of risk identification while reducing human error and decision-making delays. In addition, AI supports enterprise risk management by providing real-time insights through intelligent dashboards and automated reporting systems. These tools help managers evaluate risk levels, prioritize corrective actions, and ensure compliance with legal and regulatory requirements. AI also contributes to business continuity by enhancing crisis management and organizational resilience. However, effective AI-based risk management requires high-quality data, strong cybersecurity measures, ethical AI practices, and continuous human oversight. Organizations should regularly monitor AI systems to prevent algorithmic bias and ensure responsible decision-making. Therefore, integrating AI into risk management strengthens organizational resilience, enhances governance, and supports sustainable business excellence in a rapidly changing business environment.

Ai And Sustainable Business Practices

Artificial Intelligence (AI) is playing a vital role in promoting sustainable business practices by enabling organizations to improve efficiency, optimize resource utilization, and reduce environmental impacts. Businesses are increasingly adopting AI-driven technologies to support sustainable production, energy management, waste reduction, supply chain optimization, and responsible resource allocation. These applications help organizations achieve economic growth while minimizing their environmental footprint.

AI assists organizations in monitoring energy consumption, predicting equipment maintenance, reducing operational costs, and improving production efficiency. It also enhances supply chain management by forecasting demand, minimizing inventory waste, optimizing transportation routes, and reducing carbon emissions. Furthermore, AI supports environmental sustainability by analyzing climate-related data, monitoring pollution levels, and assisting organizations in achieving their sustainability objectives. Beyond environmental benefits, AI contributes to social sustainability by improving workplace safety, enhancing employee productivity, supporting diversity and inclusion initiatives, and strengthening customer engagement through personalized services. When combined with ESG principles and sound corporate governance, AI enables organizations to make responsible, transparent, and data-driven decisions that create long-term value for stakeholders. Therefore, the integration of AI into sustainable business practices not only improves operational performance but also enhances organizational resilience, innovation, and competitiveness. Responsible adoption of AI helps businesses balance economic success with environmental protection and social responsibility, thereby contributing to sustainable business excellence in the digital era.

Opportunities

The integration of Artificial Intelligence (AI) with ESG practices and corporate governance offers significant opportunities for organizations seeking sustainable business excellence. AI enhances decision-making by providing real-time data analysis, predictive insights, and process automation, enabling organizations to improve operational efficiency and reduce costs. It strengthens ESG reporting by increasing the accuracy, transparency, and reliability of sustainability disclosures. AI also supports innovation through the development of intelligent products, digital business models, and sustainable supply chain management. Furthermore, AI helps organizations identify emerging risks and business opportunities, enabling proactive strategic planning. The effective integration of AI, ESG, and corporate governance enhances stakeholder confidence, improves regulatory compliance, and strengthens corporate reputation. As businesses continue to adopt digital transformation, AI will play an increasingly important role in creating long-term value, promoting responsible business practices, and achieving sustainable competitive advantage.

Challenges

Despite its numerous benefits, the integration of AI with ESG and corporate governance presents several challenges. Organizations often face issues related to data privacy, cybersecurity, algorithmic bias, and ethical decision-making. The successful implementation of AI requires high-quality data, advanced technological infrastructure, skilled professionals, and continuous monitoring. In addition, the absence of standardized AI governance frameworks and evolving regulatory requirements may create uncertainty for organizations.



Excessive dependence on automated systems without adequate human oversight can also increase operational and ethical risks. Therefore, businesses must establish effective governance mechanisms, ensure transparency, strengthen data security, and promote responsible AI practices to maximize the benefits of AI while minimizing potential risks.

Global Best Practices

Leading global organizations are increasingly integrating Artificial Intelligence (AI), ESG principles, and corporate governance to achieve sustainable business excellence. Companies such as Microsoft, Google, IBM, and Unilever utilize AI to improve energy efficiency, optimize supply chains, strengthen cybersecurity, and enhance ESG reporting. International organizations, including the World Economic Forum (WEF), the Organisation for Economic Co-operation and Development (OECD), and the International Finance Corporation (IFC), have developed principles and guidelines for the responsible use of AI and effective corporate governance. These frameworks emphasize transparency, accountability, fairness, human oversight, and regulatory compliance. Many multinational companies also employ AI-powered analytics to monitor carbon emissions, manage climate-related risks, and improve sustainability performance. These global best practices demonstrate that the responsible integration of AI, ESG, and corporate governance can enhance organizational resilience, stakeholder trust, innovation, and long-term sustainable business success.

Findings

Based on the review and analysis of recent literature, the major findings of the study are as follows:

Artificial Intelligence (AI) has emerged as a strategic enabler of sustainable business excellence by improving organizational efficiency, innovation, and data-driven decision-making.

AI significantly strengthens **corporate governance** by enhancing transparency, accountability, regulatory compliance, internal control systems, and strategic decision-making.

AI improves the effectiveness of **Environmental, Social, and Governance (ESG) reporting** through automated data collection, real-time monitoring, predictive analytics, and accurate sustainability disclosures.

The integration of **AI, ESG, and corporate governance** enables organizations to optimize resource utilization, reduce environmental impacts, improve stakeholder engagement, and create long-term organizational value.

Effective corporate governance is essential for the responsible adoption of AI by ensuring ethical decision-making, data privacy, cybersecurity, human oversight, and compliance with evolving legal and regulatory requirements.

Despite its significant benefits, AI implementation presents challenges such as algorithmic bias, data quality issues, technological complexity, and the need for skilled human resources and robust governance frameworks.

The literature indicates that organizations integrating AI with ESG principles and strong corporate governance are more resilient, innovative, competitive, and better positioned to achieve sustainable business excellence in the digital economy.

Overall, the study concludes that the strategic integration of AI, ESG, and corporate governance provides a comprehensive framework for responsible business management, sustainable growth, enhanced stakeholder trust, and long-term competitive advantage.

Suggestions / Recommendations

Based on the findings of the study, the following recommendations are proposed:

Organizations should develop comprehensive AI governance frameworks to ensure the ethical, transparent, and accountable use of Artificial Intelligence in business operations.

Businesses should integrate AI with ESG strategies to improve sustainability reporting, resource optimization, environmental performance, and stakeholder engagement.

Corporate boards should strengthen governance mechanisms by promoting responsible AI adoption, regulatory compliance, effective risk management, and data privacy protection.

Organizations should invest in digital infrastructure and employee skill development to enhance AI capabilities and support sustainable digital transformation.

Governments and regulatory authorities should establish clear policies and standards for the responsible use of AI, ESG reporting, and corporate governance to ensure transparency and stakeholder confidence.

Organizations should regularly monitor and evaluate AI systems to minimize algorithmic bias, cybersecurity risks, and ethical concerns while ensuring continuous improvement.

Greater collaboration among businesses, academic institutions, policymakers, and technology providers should be encouraged to promote innovation, knowledge sharing, and the adoption of global best practices in AI-driven sustainable business management.

Future research should focus on empirical studies and industry-specific applications to examine the practical impact of integrating AI, ESG, and corporate governance across different sectors and economies.

The implementation of these recommendations will enable organizations to responsibly integrate Artificial Intelligence with ESG principles and corporate governance, thereby enhancing sustainable business excellence, stakeholder trust, long-term competitiveness, and value creation.

Conclusion

Integration Of Artificial Intelligence (Ai), Esg Practices And Corporate Governance For Sustainable Business Excellence

The present study examined the integration of Artificial Intelligence (AI), Environmental, Social, and Governance (ESG) practices, and corporate governance in achieving sustainable business excellence. Based on a comprehensive review of recent literature and secondary data, the study concludes that AI has become a transformative technology that supports responsible decision-making, operational efficiency, innovation, and long-term organizational sustainability. The integration of AI with ESG principles enables organizations to improve environmental performance, strengthen social responsibility, and enhance governance practices through data-driven insights and intelligent automation.

Role Of Corporate Governance In Responsible Ai Implementation

The study further concludes that effective corporate governance plays a crucial role in ensuring the responsible and ethical implementation of AI. Strong governance frameworks promote transparency, accountability, regulatory compliance, data privacy, cybersecurity, and stakeholder trust. At the same time, AI enhances governance processes by improving risk management, internal controls, sustainability reporting, and strategic decision-making. Consequently, the combined application of AI, ESG, and corporate governance creates a



comprehensive framework for sustainable business management.

Challenges In Implementing Ai-Driven Sustainable Business Practices

Despite the significant opportunities offered by AI, organizations must address important challenges such as algorithmic bias, ethical concerns, data quality, cybersecurity risks, and the shortage of skilled professionals. These challenges highlight the need for continuous monitoring, responsible AI governance, and supportive regulatory frameworks to ensure that technological innovation contributes positively to sustainable development.

Future Perspective And Sustainable Business Excellence

Overall, the study concludes that the strategic integration of Artificial Intelligence, ESG practices, and corporate governance is essential for building resilient, transparent, innovative, and sustainable organizations. Businesses that successfully adopt this integrated approach are better positioned to create long-term value, strengthen stakeholder relationships, improve competitive advantage, and respond effectively to the evolving demands of the digital economy. Therefore, organizations, policymakers, researchers, and business leaders should collaborate to promote the responsible use of AI and develop governance practices that support sustainable business excellence and inclusive economic growth in the years ahead.

Final Thoughts

The integration of Artificial Intelligence (AI), ESG practices, and corporate governance is essential for building sustainable, ethical, and future-ready organizations. AI drives innovation and efficiency, ESG ensures responsible growth, and governance provides transparency and accountability. Together, they create a powerful framework for long-term value creation, stakeholder trust, and sustainable business excellence in the evolving digital economy.

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Original Article

Innovative Pedagogies for Enhancing Quality in Open and Distance Learning

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Abstract:

Open and Distance Learning (ODL) has emerged as a vital mode of higher education by expanding access to learners across geographical, social, and economic barriers. The rapid advancement of digital technologies, coupled with the increasing demand for flexible learning opportunities, has transformed the pedagogical landscape of ODL. However, ensuring quality in teaching-learning processes remains a significant challenge. This paper examines the role of innovative pedagogies in enhancing the quality of Open and Distance Learning by fostering learner engagement, academic achievement, and inclusive education. The study explores learner-centred approaches such as blended learning, flipped classrooms, collaborative learning, project-based learning, gamification, adaptive learning, and the integration of Artificial Intelligence (AI) and Learning Management Systems (LMS) in distance education. It also discusses the importance of digital assessment, continuous feedback, learner support services, and faculty development in maintaining academic standards. Drawing upon contemporary literature, policy documents, and best practices in ODL, the paper analyses how these pedagogical innovations contribute to improving learner participation, retention, and learning outcomes while promoting accessibility, flexibility, and equity. The findings suggest that the successful implementation of innovative pedagogies requires robust technological infrastructure, well-trained faculty, effective quality assurance mechanisms, and supportive institutional policies. The paper concludes that a strategic integration of technology-enabled, learner-centric pedagogical practices can significantly enhance the effectiveness and quality of Open and Distance Learning, making it more responsive to the evolving educational needs of the twenty-first century. The study offers valuable insights for policymakers, educational administrators, curriculum designers, and practitioners striving to strengthen quality assurance and academic excellence in ODL.

Keywords: Open and Distance Learning (ODL), Innovative Pedagogies, Quality Enhancement, Blended Learning, Artificial Intelligence, Digital Assessment, Learning Management Systems,

Introduction:

Open and Distance Education (ODE) has evolved from an alternative mode of learning into a vital component of higher education, offering flexible and inclusive educational opportunities to diverse groups of learners. In India, the establishment of the Open University system in 1982 significantly expanded access to higher education, while recent developments such as the National Education Policy (NEP) 2020, rapid advancements in Information and Communication Technology (ICT), and the growth of digital learning platforms have further transformed ODE. Despite these advancements, challenges related to curriculum quality, learner support, digital infrastructure, faculty readiness, assessment practices, and equitable access continue to affect its effectiveness. Therefore, enhancing the quality of ODE through innovative pedagogies, robust quality assurance mechanisms, effective learner support, and technology-enabled teaching has become essential for ensuring academic excellence, promoting lifelong learning, improving employability, and achieving the Sustainable Development Goal of inclusive and equitable quality education for all. Against this backdrop, the present paper examines the critical dimensions of quality in Open and Distance Education and explores strategies for enhancing its effectiveness, credibility, and sustainability in the rapidly evolving higher education ecosystem.

Staff Recruitment and Professional Development in Open and Distance Learning:

The quality of Open and Distance Learning (ODL) largely depends on the competence, commitment, digital proficiency, and learner-centric approach of its academic, administrative, and technical staff.

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With the rapid integration of digital technologies, Artificial Intelligence (AI), Learning Management Systems (LMS), and online assessment tools, there is an urgent need to modernize recruitment policies and establish continuous

professional development programmes that align with contemporary educational practices and the objectives of the National Education Policy (NEP) 2020.



Recruitment:

Institutions offering Open and Distance Learning should adopt transparent, merit-based, and competency-oriented recruitment policies for all categories of employees. Recruitment guidelines should clearly specify the qualifications, professional competencies, and digital skills required for each position. For academic and administrative posts, preference should be given to candidates possessing qualifications, certifications, or demonstrable expertise in Open and Distance Learning, Educational Technology, Online Teaching and Learning, Instructional Design, Digital Pedagogy, Educational Administration, or related disciplines. While strong academic credentials remain essential, equal importance should be accorded to candidates' practical experience in online course design, development of self-learning materials (SLMs), e-content creation, MOOCs, learner support services, educational research, quality assurance, and the effective use of ICT-enabled teaching-learning practices. The selection process should evaluate not only academic achievements but also digital competence, innovation, communication skills, problem-solving ability, adaptability to emerging technologies, and commitment to learner-centred education. Candidates may be assessed through teaching demonstrations, presentations, digital portfolio evaluations, case studies, and structured interviews that reflect real-life challenges encountered in contemporary ODL environments. For technical and support staff, recruitment should focus on professional expertise in information technology, multimedia production, Learning Management Systems, cybersecurity, educational software, digital content development, and online student support services. Relevant certifications and hands-on experience should receive appropriate recognition during the selection process. Institutions should also value interdisciplinary expertise, industry experience, research contributions, and professional certifications in emerging areas such as Artificial Intelligence in Education, Learning Analytics, Digital Assessment, Educational Data Management, and Universal Design for Learning. Such competencies strengthen institutional capacity to deliver high-quality, inclusive, and technology-enabled education.

Professional Development and Capacity Building:

Recruitment should be complemented by a structured system of continuous professional development. Newly appointed employees should undergo comprehensive induction programmes covering the philosophy of Open and Distance Learning, institutional policies, learner support mechanisms, digital platforms, quality assurance frameworks, and regulatory guidelines. Existing faculty and staff should participate regularly in faculty development programmes, workshops, refresher courses, online certifications, and training on emerging educational technologies, AI-assisted teaching, instructional design, outcome-based education, inclusive pedagogy, academic integrity, student mentoring, and data-driven decision-making. Institutions should encourage participation in national and international conferences, collaborative research, innovation projects, and professional learning communities. Periodic performance appraisal should emphasize teaching effectiveness, learner satisfaction, innovation, research productivity, digital competence, timely learner support, and contribution to institutional quality enhancement. A culture of continuous learning, collaboration, accountability, and innovation should be fostered to ensure that the institution remains responsive to the evolving needs of learners and the rapidly changing landscape of higher education. A robust recruitment and

professional development framework will enable Open and Distance Learning institutions to build a highly competent workforce capable of delivering accessible, flexible, inclusive, and high-quality education in the digital era.

Professional Development & Upskilling:

Both academic and non-academic staff require intensive, modern onboarding and pre-service training to master the agile workflows, digital platforms, and student-centric procedures necessary for operational excellence. Beyond grounding personnel in contemporary pedagogical theories, data privacy ethics, and inclusive student engagement, training must prioritize comprehensive hands-on instruction in learning management systems (LMS), AI-driven administrative tools, and digital content creation. Furthermore, institutions must cultivate a culture of continuous learning through structured, regular upskilling and reskilling initiatives. Continuous professional development ensures that staff remain fluent in emerging educational technologies, evolving compliance standards, and modern student support methodologies. The integration of insights from these regular training intervals directly drives institutional efficiency and significantly improves student retention and satisfaction. However, relying on a highly centralized model—such as a single national training hub like STRIDE at IGNOU is no longer sufficient to meet the scale and diverse technological demands of India's expanding higher education sector. The University Grants Commission (UGC), in collaboration with the Ministry of Education, should establish a decentralized network of at least four regional digital-first training hubs across the Northern, Southern, Eastern, and Western zones. These hubs should utilize hybrid delivery models—combining immersive virtual learning environments with strategic in-person workshops to systematically deliver pre-service and continuous upskilling programs tailored to the unique demographic and regional needs of institutions within their zones.

Students' Enrolment in Distance Education:

The objective of improving the quality of distance education can never be achieved until the institutions of distance education restrict the intake of students to an optimal level fixed by taking into account the resources available with them. However, the criterion for admission to various programmes of study should be the candidates' performance in aptitude-cum-subject-knowledge test conducted by the institution concerned rather than the marks obtained in the lower, i.e. qualifying, examination. The rationality of this proposition lies in the fact that a student's overall performance in the lower examination is generally affected favourably or adversely by those factors which have little or no bearing on his suitability or otherwise for the programme of study in which he wants to get himself enrolled, for instance the marks obtained in other subjects. However, in order to meet the ends of social justice, a reasonable number of seats should be reserved in each programme of study for candidates belonging to disadvantaged sections of society like those belonging to rural areas, socially and economically backward classes, physically challenged categories, etc.

Printed Study Material:

Printed study material constitutes the backbone of distance education in India at present, and it is likely to maintain its primacy for a long time to come considering inertia of providers as well as of students to use other media for educational purposes. But even the study material supplied to the students by most of the institutions of



distance education leaves much to be desired. A few suggestions for improving the quality of printed study material are given below: (i) Study material should be prepared closely keeping in view the age, mental level, interest and needs of an average learner among the target group. The material writers should also avoid 'easy-if-already-known syndrome' while preparing and presenting the study material. (ii) As far as possible, the course writers should use a relaxed, personal, conversational, anecdotal and witty style of writing. The study material written in such a style will give the students a feel of attending a tutorial group meeting, which will make the learning process more enjoyable and rewarding than the material written in conventional textbook style. (iii) free from editorial and typographical errors, This is all the more important for the data-based subject like Economics, Commerce, Geography, and technical/ scientific subjects like Computer Science, Information Technology, Physics, Chemistry, etc. (iv) The size of each unit should be such that an average student may read it with reasonable understanding in about 45 minutes. A unit of this size will give a sense of satisfaction and achievement to a student of having 'completed' it in a single sitting. It will also give him the feel of stung through a 45-minute classroom lecture, especially if the unit is written in a personal and lively style. (v) Study material should be available in both English and the regional language of the area concerned. This step is sure to boost the popularity of distance education in India, As the students belonging to disadvantaged sections of society are not proficient in English, the availability of study material in regional languages will prove to be a big boon for such students.

Supportive Audio-Visual Materials:

Supportive audio-visual materials have become an integral component of contemporary Open and Distance Learning (ODL), significantly enhancing learner engagement, accessibility, and academic achievement. Advances in Information and Communication Technology (ICT), Artificial Intelligence (AI), and digital media have transformed traditional printed learning resources into interactive and multimedia-rich learning experiences. Modern ODL institutions supplement Self-Learning Materials (SLMs) with high-quality video lectures, podcasts, animations, simulations, virtual laboratories, interactive presentations, infographics, webinars, and recorded expert lectures. These resources are delivered through Learning Management Systems (LMS), Massive Open Online Courses (MOOCs), educational mobile applications, and digital repositories, enabling learners to access educational content anytime and anywhere. The integration of AI-powered tools, adaptive learning technologies, multilingual subtitles, transcripts, and assistive technologies has further improved the accessibility and inclusiveness of audio-visual learning resources for diverse groups of learners, including students with disabilities. Well-designed audio-visual materials not only simplify complex concepts but also promote active learning, critical thinking, collaboration, and self-paced learning. Consequently, supportive audio-visual resources have become indispensable for ensuring quality, flexibility, and learner-centred education in the contemporary digital ecosystem of Open and Distance Learning.

Student Support Services:

Student Support Services (SSS) constitute a vital component of contemporary Open and Distance Learning (ODL), ensuring that learners receive continuous academic, administrative, technical, and psychological support throughout their educational journey. In the digital era, effective student support extends beyond conventional

counselling and encompasses a wide range of technology-enabled services designed to promote learner success, retention, and satisfaction.

Modern ODL institutions provide comprehensive support through online admission and registration systems, digital orientation programmes, academic counselling, mentoring, virtual classrooms, Learning Management Systems (LMS), e-libraries, online discussion forums, grievance redressal mechanisms, career guidance, placement assistance, and technical helpdesks. Students can interact with faculty, mentors, and peers through video conferencing, webinars, chat platforms, emails, and mobile applications, enabling timely academic assistance irrespective of geographical location. The integration of Artificial Intelligence (AI), learning analytics, chatbots, and personalized learning tools has further strengthened student support by providing instant responses, monitoring learner progress, identifying at-risk students, and offering customized academic interventions. Inclusive support services, such as assistive technologies, multilingual resources, and accessible digital content, ensure equitable learning opportunities for students with diverse learning needs. Thus, a robust, learner-centric, and technology-enabled Student Support Services system plays a crucial role in enhancing student engagement, academic achievement, retention, and overall quality in Open and Distance Learning.

Students' Evaluation:

Though almost all institutions of distance education in India follow the system of evaluating students' performance through assignments and a term /semester-end examination. Most of the intelligent students of distance education System remain dissatisfied with the ways these evaluation tools are handled by these institutions. The first and the foremost grudge of these students is that most of these institutions do not allow the re-evaluation of the responses to the assignments and the term-end examination scripts. In an age of transparency, liberalism and democracy such a Draconian practice needs to be done away without any further loss of time. Secondly, most of the institutions of distance education allow the students to send the responses to their assignments in a single batch by a date just two or three months ahead of the date of the commencement of the term-end examination. This liberty makes the students procrastinate till the deadline for the submission of responses is near at hand. Then the students either resort to different types of unfair means for completing their assignments or do these assignments in a half-baked manner. If students are made to submit the responses to the assignments in three instalments, at a regular interval (say, two months), it will encourage the habit of regular study in the students. Moreover, it will also relieve the tutors of the burden and tension of checking piles of assignments within a short period of time, which, in turn, is sure to improve the quality of evaluation. Thirdly, though most institutions of distance education prescribe deadline/ s for submitting the responses to assignments, yet they generally do not specify the dates by which the checked assignments will be sent back to the students. Consequently, in some cases the checked assignments are sent back very late (sometimes even after the term-end examination), while in other cases they are not returned to the students at all, making thereby the mockery of the whole system. If the institutions of distance education really want to improve the quality of evaluation system, they must, among other things, draw up and distribute among the staff and the students an inviolable schedule for submission of assignments, return of checked assignments, organisation of term-end examination, declaration of results and issuing of marks/ grade



cards. Lastly, the tutor's comments on the students' responses should be comprehensive enough to apprise the students of the major shortcomings in their assignments so that they may improve their performance in other assignments and term-end examination in the light of his remarks.

Conclusion:

The foregoing discussion clearly points to the fact that there is a great scope for improvement in the quality of all the components of distance education system in India. Though a paper like this cannot exhaust the theme of quality assurance, even then if the policy planners in the institutions of distance education pursue the goal of quality assurance along the lines suggested above in a determined manner, the overall quality of distance education is sure to improve tremendously.

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Conflicts of interest

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Original Article

Consumer Awareness of Circular Economy Practices in Chennai City

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Abstract

The circular economy is gaining global recognition as a sustainable approach to resource management by promoting waste reduction, reuse, recycling, and responsible consumption. Consumer awareness is a key factor in the successful implementation of circular economy practices. This study aims to assess the level of consumer awareness of circular economy practices and examine whether awareness differs across demographic characteristics. Primary data were collected from consumers using a structured questionnaire, and the responses were analyzed using One-Way Analysis of Variance (ANOVA). The ANOVA results revealed that gender has a significant influence on selected dimensions of consumer awareness, while no significant differences were observed in the remaining dimensions. The study highlights the importance of strengthening consumer awareness through sustainability campaigns, integrating circular economy concepts into educational curricula, improving recycling infrastructure, promoting eco-friendly products, and introducing incentives to encourage sustainable consumption. Enhancing consumer awareness will support responsible consumption, facilitate the adoption of circular economy practices, and contribute to long-term environmental and economic sustainability.

Keywords: Consumer Awareness, Circular Economy, Sustainable Consumption, Consumer Behaviour, Sustainability.

Introduction

Consumer awareness of circular economy practices is increasingly important in addressing environmental challenges such as climate change, resource depletion, pollution, and waste generation. The circular economy replaces the traditional "take-make-dispose" model with a sustainable approach based on reducing, reusing, repairing, and recycling resources to extend product life and minimize waste. Consumer awareness refers to individuals' knowledge and understanding of these sustainable practices. Well-informed consumers are more likely to purchase eco-friendly products, recycle materials, repair products, and support businesses that adopt circular economy principles. Therefore, enhancing consumer awareness is essential for promoting responsible consumption, encouraging sustainable business practices, and achieving long-term environmental and economic sustainability.

Research Gap

Although previous studies have examined circular economy concepts and sustainable consumption, there is limited empirical research focusing on consumer awareness of circular economy practices in the Indian context, particularly regarding how demographic factors influence awareness and adoption. This study seeks to bridge this gap by examining consumer awareness and analyzing the influence of demographic characteristics on the adoption of circular economy practices.

Objectives of the Study

1. To assess consumers' awareness of the concept and principles of the circular economy.
2. To examine the level of consumer awareness of circular economy practices.

Circular Economy

"A circular economy describes an economic system that is based on business models which replace the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations" (Kirchherr et al., 2017: 224–5).

Principles of the Circular Economy

1. **Reduce** – Use fewer raw materials and reduce waste.
2. **Reuse** – Use products multiple times instead of discarding them.
3. **Repair** – Repair damaged products to extend their life.
4. **Refurbish** – Restore used products to good working condition.

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5. **Remanufacture** – Rebuild products using old components.
6. **Recycle** – Convert waste into new raw materials.
Recover – Recover energy or valuable materials from waste.

Research Methodology

Sources of Data

Primary data were collected using a structured questionnaire administered to consumers.

Secondary data was collected from various sources like Journals, Publications, Books, Articles, Research Papers and Websites.

Sample

A convenience sampling technique was adopted to select respondents because it enables easy access to consumers willing to participate in the survey. Questionnaires were circulated to consumers in Chennai City out of which 100 samples were selected for the study.

Tools applied

The researcher used ANOVA to analyse the consumer awareness of circular economy in Chennai City

Results and Discussion

Hypotheses

H₀: There is no significant difference in consumer awareness among different gender groups.

H₁: There is a significant difference in consumer awareness among different gender groups.

The following table shows results of the study.

ANOVA

Variable		Sum of Squares	df	Mean Square	F	Sig.
1	Between Groups	4.409	1	4.409	7.852	.006
	Within Groups	55.031	98	.562		
	Total	59.440	99			
2	Between Groups	1.065	1	1.065	1.218	.273
	Within Groups	85.685	98	.874		
	Total	86.750	99			
3	Between Groups	2.461	1	2.461	2.895	.092
	Within Groups	83.329	98	.850		
	Total	85.790	99			
4	Between Groups	2.969	1	2.969	7.455	.008
	Within Groups	39.031	98	.398		
	Total	42.000	99			
5	Between Groups	.071	1	.071	.054	.817
	Within Groups	129.719	98	1.324		
	Total	129.790	99			
6	Between Groups	14.799	1	14.799	12.374	.001
	Within Groups	117.201	98	1.196		
	Total	132.000	99			
7	Between Groups	2.093	1	2.093	2.028	.158
	Within Groups	101.147	98	1.032		
	Total	103.240	99			
8	Between Groups	.824	1	.824	1.490	.225
	Within Groups	54.166	98	.553		
	Total	54.990	99			

Interpretation

The ANOVA results indicate that gender has a significant influence on certain dimensions of consumer awareness of circular economy practices, as evidenced by the significant p-values (0.006, 0.008, and 0.001). This suggests that male and female consumers differ in their awareness or perceptions of these specific aspects of the circular economy. These differences may be due to variations in environmental

attitudes, purchasing behaviour, sustainability concerns, and exposure to eco-friendly initiatives.

However, for the remaining variables ($p = 0.273, 0.092, 0.817, 0.158, \text{ and } 0.225$), no significant differences were found between male and female respondents. This indicates that gender does not influence these aspects of consumer awareness, and both groups exhibit similar levels of



understanding and attitudes toward circular economy practices.

Suggestions

1. Enhance consumer awareness through regular sustainability campaigns and educational initiatives.
2. Integrate circular economy concepts into school and higher education curricula.
3. Improve public awareness and accessibility of recycling and waste collection facilities.
4. Encourage businesses to promote sustainable and eco-friendly products.
5. Introduce incentives such as discounts, rewards, and tax benefits to encourage sustainable consumption.

Conclusion

Consumer awareness of circular economy practices is increasing, with many consumers recognizing the importance of reducing waste, reusing products, recycling materials, and purchasing environmentally friendly products. This awareness positively influences sustainable purchase behaviour and encourages support for businesses adopting circular economy initiatives. However, barriers such as limited awareness, high prices of eco-friendly products, inadequate recycling infrastructure, and lack of reliable information continue to restrict wider adoption. Overcoming these challenges requires collaborative efforts from businesses, governments, and educational institutions through awareness campaigns, improved recycling facilities, eco-labeling, incentives, and sustainable product innovation. Overall, enhancing consumer awareness is essential for promoting responsible consumption, accelerating the transition to a circular economy, and achieving long-term environmental and economic sustainability.

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Original Article

Revisiting Monetary Regimes: Causal Factors Behind the Shift to the Gold Standard

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Abstract

This paper provides a journal-level analysis of the shift from the Gold Exchange Standard (GES) to the Gold Standard (GS), integrating economic theory, political economy, and historical evidence. While the GES enhanced liquidity by allowing reserve holdings in foreign currencies convertible into gold, it introduced systemic fragilities rooted in confidence, hierarchy of currencies, and contagion risk. The GS, by contrast, imposed convertibility into gold at fixed parities, strengthening credibility at the cost of policy flexibility. Using a mixed-methods design—combining comparative historical analysis, secondary macroeconomic datasets, and structured case studies (Britain, colonial India, and interwar Europe)—the paper identifies five primary causal drivers: (1) credibility deficits in reserve currencies, (2) exchange-rate volatility and trade uncertainty, (3) crisis transmission and balance-of-payments constraints, (4) geopolitical strategy and hegemonic leadership, and (5) institutional incentives for rule-based commitment. The findings demonstrate that regime change was a coordinated response to credibility and coordination failures, rather than a purely efficiency-driven evolution. The study contributes a unified causal framework linking monetary credibility, international hierarchy, and crisis dynamics, with implications for contemporary debates on reserve currencies and rules-based systems.

Keywords: Gold Standard, Gold Exchange Standard, monetary regimes, credibility, exchange rate stability, political economy, financial crises

Introduction

Monetary regimes underpin macroeconomic stability, shaping inflation dynamics, capital mobility, and international trade. The end of the 19th and 20th century witnessed coexistence and contestation between two regimes: The Gold Exchange Standard (GES) and Gold Standard (GS). The GES allowed countries to hold reserves in foreign currencies (notably sterling and dollars) convertible into gold, economizing on gold usage and supporting expanding trade. However, this structure embedded a hierarchy of currencies and reliance on the credibility of reserve-issuing states. In contrast, the GS mandated direct exchangeability of local currency for gold at fixed parities. It appeals lay in rule-based discipline, reduced exchange-rate uncertainty, and enhanced credibility. Yet, it constrained countercyclical policy, often transmitting deflationary pressures. This paper revisits the transition from GES to GS by asking: What causal mechanisms led states to prefer a rigid, gold-backed regime over a more flexible, reserve-based system? Moving beyond monocausal explanations, the study integrates economic instability, political incentives, and institutional credibility into a coherent framework.

Introduction to the Gold Standard, Its Evolution and the Transition to the Gold Exchange Standard

The Gold standard represents one of the influential financial systems in the modern serving as cornerstone for international trade and financial stability during the end of the 19th and 20th century. Deeply the Gold Standard is a monetary arrangement in which the country's currency is directly tied to the defined amount of gold. Under this arrangement the government promises to exchange the money for the gold at the rate which is set, there by establishing a stable and universally recognized measure of value. This convertibility ensures that the money supply is constrained by gold reserves, promoting long-term price stability and limiting inflationary pressures. The origins of the Gold Standard can be traced back to earlier metallic monetary systems, including bimetallism, where both gold and silver were used as standards of value. However, fluctuations in the relative prices of gold and silver along with inefficiencies associated with maintaining dual standards, led many countries to gradually adopt gold as the sole monetary anchor. The United Kingdom was among the first to formally establish a gold-based monetary system in the early nineteenth century, particularly after the Coinage Act of 1816, which effectively placed the British pound sterling on a gold basis. Given dominant global finance at the time, it's the soon followed by other major economies, including Germany, United States of America and France.

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The classical Gold Standard which prevailed approximately between 1870 and 1914, is often regarded as a period of remarkable monetary stability and economic integration. During this era, participating countries maintained fixed exchange rates based on their gold parities, facilitating international trade and investment. The system operated through by means of an automated system referred to as the price-specific flow mechanism and whereby gold inflows and outflows would influence domestic money supplies, leading to changes in price levels and restoring balance-of-payments equilibrium. This mechanism reduced the need for active government intervention and fostered confidence among international investors.

From Gold Exchange Standard to Gold Standard

The evolution of international monetary systems has been marked by continuous efforts to balance stability, flexibility, and credibility. Among the most significant transitions in monetary history is the transition from Gold Exchange (GES) to Gold Standard (GS), a transformation that reshaped global financial architecture during the end of 19th and 20th centuries. This transition not merely a technical adjustment but a fundamental response to structural weaknesses embedded within the GES and the growing demand for a more stable and credible monetary framework. The Gold Exchange Standard emerged as a hybrid system designed to conserve the perfect use of gold while supporting expanding international trade. Under this system, countries held reserves not only of gold but also of foreign currencies—primarily those of major economic powers—which were themselves convertible into gold. This arrangement provided liquidity and facilitated international payments without requiring each country to maintain large gold reserves. As a result, the GES was particularly attractive to developing and peripheral economies that lacked sufficient gold stocks but sought integration into the global trading system. Despite its advantages, the GES contained inherent vulnerabilities. Its reliance on a limited number of reserve currencies introduced a hierarchical structure in which peripheral countries depended heavily on the economic stability and policy decisions of reserve-issuing nations. Any disruption in these core economies—such as financial instability, inflationary pressures, or policy inconsistencies—could quickly undermine confidence in the system. This dependency created systemic risk, as fluctuations in reserve currencies could trigger widespread instability across interconnected economies.

In contrast, the Gold Standard represented a more rigid and rule-based monetary system. Under the GS, each participating country committed to converting its currency into a fixed quantity of gold, thereby establishing fixed exchange rates among currencies. This direct linkage to gold enhanced credibility and reduced uncertainty in international transactions. The GS also promoted long-term stability by anchoring monetary policy to a tangible asset, limiting the scope for discretionary intervention and inflationary financing. The transition from the GES to the GS was driven by multiple interrelated factors. One of the most important was the need to restore confidence in monetary systems. As vulnerabilities in the GES became increasingly apparent, policymakers sought a regime that would provide greater assurance of stability and reliability. The GS, with its emphasis on convertibility and fixed parities, was perceived as a stronger commitment mechanism that could enhance investor trust and facilitate international trade.

Exchange rate stability also played a crucial role in this transition. Under the GES, exchange rates were influenced

by movements in reserve currencies, leading to volatility that complicated trade and investment decisions. The GS addressed this issue by establishing fixed exchange rates, thereby reducing uncertainty and transaction costs. This stability was particularly important in an era of expanding global trade, where predictable exchange rates were essential for long-term contracts and cross-border investments. Financial crises further accelerated the shift. Periodic disruptions exposed the weaknesses of the GES, particularly its susceptibility to contagion through reserve currency channels. In response, countries sought to adopt a more robust system that could withstand external shocks. The GS, by emphasizing direct gold backing, was viewed as a means of reducing dependence on foreign reserves and enhancing resilience. Geopolitical considerations also influenced the transition. Major economic powers promoted the GS as a way to stabilize the international monetary system and reinforce their financial dominance. At the same time, other countries adopted the GS to gain credibility and integrate more fully into the global economy. Thus, the shift was shaped not only by economic factors but also by strategic considerations and power dynamics.

Literature Review

The literature spans classical theory, Keynesian critiques, monetarist interpretations, and modern political economy.

The evolution of monetary regimes, particularly the transition from the Gold Exchange standard (GES) to Gold Standard (GS), has been extensively analysed across multiple schools of economic thought. This body of literature spans classical monetary theory, Keynesian critiques, monetarist interpretations, institutional economics, and modern international macroeconomics. Together, these perspectives provide a comprehensive but fragmented understanding of the forces that shaped this transition. Early theoretical foundations can be traced to David Hume (1752), who introduced the price-specie flow mechanism. Hume argued that gold flows automatically correct trade imbalances through adjustments in domestic price levels, thereby ensuring long-run equilibrium. This idea later became central justification of Gold Standard as self-regulating mechanism. Similarly, David Ricardo emphasized the importance of metallic backing in maintaining monetary discipline and preventing inflationary excesses, reinforcing the theoretical appeal of gold-based systems. In contrast, Keynesian perspectives offered a critical reassessment of gold-based regimes. John Maynard Keynes (1930) famously described gold standard as a “Barbarous relic,” arguing that the rigidity imposed deflationary pressures and constrained governments’ ability to respond to economic downturns. Keynes contended that adherence to gold convertibility often prioritized external balance over domestic economic stability, leading to prolonged unemployment and stagnation during crises. Monetarist interpretations, particularly those advanced by Milton Friedman and Anna Schwartz (1963), emphasizes policy implementation. They argued that monetary instability was primarily the result of poor policy decisions rather than inherent flaws in the Gold Standard. Their analysis suggests that a well-managed system—whether gold-based or not—could achieve stability, thereby complicating the narrative that the shift to the GS was purely efficiency-driven. The political economy of monetary regimes has been explored in depth by Barry Eichengreen (1992), whose work highlights the constraints imposed by the Gold Standard on domestic policy autonomy. Eichengreen introduced the concept of “golden fetters,” arguing that adherence to gold limited governments’ ability to pursue expansionary

policies, particularly in democratic societies where domestic pressures were significant. Complementing this view, Michael Bordo (1993) argued that the pre-1914 Gold Standard functioned effectively due to strong institutional credibility and commitment mechanisms, suggesting that its success depended heavily on the political and institutional context. The role of financial crises in shaping monetary regimes has been emphasized by several scholars. Charles Kindleberger (1973) highlighted the importance of a stabilizing hegemon in preventing systemic crises, while Peter Temin (1989) linked to constraints imposed by Gold Standard. More recently, Carmen Reinhart and Kenneth Rogoff (2009) documented recurring patterns of financial crises across different monetary regimes, demonstrating that systemic instability is a persistent feature of global finance. The instability inherent in reserve currency systems was first systematically analyzed by Robert Triffin (1960). The so-called Triffin dilemma highlights the conflict between providing global liquidity and maintaining confidence in a reserve currency. This insight is directly relevant to the Gold Exchange Standard, where reliance on a limited number of reserve currencies created systemic vulnerabilities. Similarly, Jacques Rueff criticized the GES for generating excess liquidity and inflationary pressures, advocating a return to a pure Gold Standard to restore discipline. Institutional perspectives have further enriched the analysis. Douglass North (1981) emphasized the role of institutions in reducing transaction costs and uncertainty, suggesting that the implementation of Gold Standard can be understood as an institutional response to the need for credible and predictable monetary arrangements. This view is supported by Harold James (1996), who argued that regime shifts are often driven by institutional breakdowns and crises rather than purely economic considerations. The relationship between monetary regimes and globalization has been explored by Kevin O'Rourke and Jeffrey Williamson (1999), who demonstrated that Gold Standard played a crucial role in facilitating trade and capital flows

Theoretical Framework

The analysis integrates three lenses:

1. Credibility Theory: Fixed convertibility (GS) acts as a commitment device, reducing inflation expectations.
2. International Hierarchy Model: GES creates dependence on core reserve issuers; GS reduces reliance by universalizing the anchor.
3. Crisis Transmission Mechanism: Under GES, shocks to reserve currencies propagate globally; GS aims to insulate via rule-based adjustment.

These frameworks jointly predict a shift toward GS when credibility deficits, volatility, and dependence costs exceed flexibility benefits.

Research Objectives

1. Compare structural features of GES and GS.
2. Identify economic drivers (inflation, volatility, reserves).
3. Examine political and geopolitical incentives.
4. Analyse crisis episodes as catalysts for regime change.
5. Develop a unified causal explanation.
5. Methodology

Research Design

A mixed-method design combining: - Comparative historical analysis - Secondary quantitative data - Case studies

Data Sources

- Central bank archives (Bank of England, colonial records)
- Historical macro datasets (prices, reserves, trade balances)
- Scholarly reconstructions (exchange-rate series, gold flows)

Variables

- Gold reserves (ratio to money supply)

during the first era of globalization. Similarly, Maurice Obstfeld and Alan Taylor (2004) introduced the concept of the "impossible trinity," highlighting the balance between exchange rate stability, capital mobility and monetary importance. Their framework helps explain why countries might favor fixed regimes like the Gold Standard despite their constraints. Theoretical contributions from Robert Mundell (1961) further illuminate these trade-offs. His concept about optimum currency areas suggests that fixed exchange rate systems are more viable when economies are highly integrated, providing a rationale for the implementation of Gold Standard in an era of expanding globalization. Additionally, Ragnar Nurkse (1944) emphasized the destabilizing effects of speculative capital flows under poorly coordinated systems, reinforcing the argument for more disciplined monetary frameworks. Empirical studies have also contributed to understanding the differences between monetary regimes. Lawrence Officer (1996) analyzed exchange rate behavior under the Gold Standard, demonstrating tighter adherence to fixed parities compared to other systems. Meanwhile, Marcello De Cecco (1974) highlighted the role of imperial power and financial networks in shaping monetary arrangements, particularly the dominance of Britain in the global economy. More recent research by Ethan Ilzetzki, Carmen Reinhart, and Kenneth Rogoff (2019) has revisited exchange rate regimes using modern datasets, finding that fixed regimes often provide greater trade stability but reduce policy flexibility. This reinforces the central trade-off that underpinned the shift from the GES to the GS. Finally, the rules-versus-discretion debate, advanced by Finn Kydland and Edward Prescott (1977), provides a theoretical foundation for understanding why rule-based systems like the Gold Standard may be preferred. Their work suggests that binding rules can enhance policy credibility by limiting time-inconsistent behaviour, a principle that aligns closely with the rationale for adopting gold convertibility.

- Exchange-rate volatility (standard deviation)
- Inflation rates
- Trade openness

Analytical Techniques

- Trend analysis
- Cross-case comparison
- Qualitative process tracing

Data Analysis and Interpretation

Credibility Deficits in GES

GES relied on confidence in reserve currencies. When reserve issuers faced fiscal or external stress, peripheral countries experienced reserve risk. Empirical records show increased reserve diversification and gold accumulation preceding GS adoption.

Exchange-Rate Volatility

Historical exchange-rate bands under GES were wider than GS gold points. Volatility raised transaction costs and discouraged long-term contracts, incentivizing fixed parity adoption.

Crisis Transmission

Financial disturbances in core economies propagated through reserve holdings. Liquidity shortages forced contractionary adjustments in dependent economies, exposing GES fragility.

Gold Reserve Accumulation

Countries increasing gold reserve ratios were more likely to transition. This suggests preparation for convertibility commitments.

Trade Expansion and Stability Demand



Rising trade volumes increased demand for predictable exchange rates. GS reduced hedging costs and facilitated integration.

Case Studies

Britain

As the dominant financial center, Britain promoted GS to stabilize global trade and reinforce sterling credibility. The City of London benefited from reduced exchange risk and enhanced capital flows.

Colonial India

India's monetary system was shaped by imperial priorities. Transition dynamics reflected integration into British financial networks, with gold convertibility enhancing external confidence.

Interwar Europe

Post-war instability, reparations, and inflation crises motivated a return to GS-like arrangements. However, weak institutions undermined sustainability, revealing the importance of political compatibility.

Discussion

The transition from GES to GS reflects an interaction of five forces: 1. Credibility Restoration: Gold convertibility as a commitment device. 2. Volatility Reduction: Fixed exchange rates lowering uncertainty. 3. Crisis Containment: Limiting dependence on reserve currencies. 4.

Geopolitical Strategy: Leadership by core economies. 5. Institutional Incentives: Central banks favouring rule-based systems.

However, the GS introduced rigidity, contributing to deflationary pressures and later systemic breakdowns. Thus, regime choice involved a trade-off between credibility and flexibility.

Conclusion

The shift from the Gold Exchange Standard to Gold Standard was not an inevitable progression but a strategic response to credibility failures, volatility, and systemic risk. The GS offered stability and trust at the expense of policy autonomy. The findings highlight that monetary regimes are shaped by political economy, not merely efficiency. Contemporary parallels—such as debates over reserve currencies and fixed vs. flexible exchange rates—underscore the continued relevance of these insights.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Original Article

Artificial Intelligence and Human Values in Manubhai Pancholi's Jher to Pidha Chhe Jani Jani: A Critical Literary Analysis

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Abstract

The fast pace development of Artificial Intelligence (AI) technology has dramatically impacted human society and raised ethical issues, questions about humanity, emotional intelligence, and social responsibility. These concerns can be addressed in literature. The widely known Gujarati novel "Jher To Pidha Chhe Jani Jani" by Manubhai Pancholi "Darshak" reveals many insights regarding the values of humanity, empathy, altruism, awareness of the environment and moral responsibility. This paper discusses the relevance of the novel to modern discourse on artificial intelligence based on a qualitative textual analysis of selected episodes featuring Gopalbapa, Rohini, and Satyakam. In particular, the analysis reveals that human philosophy represented in the novel gives a good basis for considering ethical aspects of AI. Based on the results, it can be concluded that although AI can increase productivity and efficiency, it will never be able to replace the characters of the novel in terms of emotion, morality, and spirituality.

Keywords: Artificial Intelligence, Gujarati Literature, Manubhai Pancholi, Darshak, Human Values, Ethics, Technology, Literary Criticism.

Introduction

The 21st century has seen unprecedented advancements in the domain of Artificial Intelligence (AI). With automated decision-making and generation technologies, the influence of AI can now be seen in the domains of education, healthcare, governance, and business. Nonetheless, the technological advancements have also raised ethical issues related to empathy, human dignity, and responsibility. Literature offers an interesting perspective through which one can assess technology. In comparison to scientific literature, literary texts explore the depths of human emotion, relationships, and moral quandaries. Manubhai Pancholi "Darshak," one of the foremost personalities in Gujarati literature, explores this theme through his novel Jher To Pidha Chhe Jani Jani. Through this novel, Darshak presents the world where empathy, sacrifice, environment, and spirituality form the core of human actions. Gopalbapa, Rohini, and Satyakam are some of the characters who possess values, which oppose those of logic-based AI systems. The aim of this research is to explore the contribution of Darshak to modern discourses on AI ethics.

Literature Review

With the advent of Artificial Intelligence (AI), there have been many scholarly debates on issues related to ethics, human agency, value alignment, and preserving human dignity. Modern research in the domain of AI suggests that technological progress should be compatible with the core values of humanity, which include compassion, justice, freedom, responsibility, and moral decision-making. Groen et al. (2026) suggest that AI ethics is no longer limited to technical issues but includes the issues of power relations, human experiences, and protection of human-centered values. The same can be said about Russell's value-alignment model as well. In literature, researchers investigating the issue of human autonomy vis-à-vis AI technologies argue that excessive reliance on AI might compromise independence of thought and ethics. As Catena (2026) observes, technologies for intelligence influence human reflection, decision-making, and autonomous behavior, hence posing crucial questions about future prospects for human agency. The concerns raised by such researchers parallel those in literary studies investigating the theme of tension between mechanization and humanism. Human-centric research on AI also places emphasis on the issues of fairness, transparency, governance, and flourishing. According to Tahaei et al. (2023), responsible approaches to AI strive to protect human well-being and social justice while avoiding the tendency of technical systems to undermine ethical responsibility. The literature indicates that technology is supposed to operate as a tool for humans and not an alternative to ethics.

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In Indian philosophical tradition, the topic of relationship between AI ethics and value systems has been investigated. According to Chaturvedi and Lakshmi (2024), Indian philosophies have much to say about the AI value-alignment problem in terms of interconnections, moral obligations, and ethical consciousness. It is clear from their work that human-based ethics still play an important role in solving current technological issues. Pancholi Manubhai, commonly referred to, as "Darshak" in Gujarati literature, is a renowned novelist who adheres to Gandhian ideologies. Literary researchers point out that the works of the writer have common themes such as ethics, social reform, sacrifice, and humanity. Research on Gujarati literature reveals that Gandhian ideology greatly shaped the literature vision of Pancholi, especially his dedication to truthfulness, empathy, and ethical development. The works of the author touch on issues of conflict between material advancement and ethics hence are pertinent for discussions on AI and humankind. *Jher To Pidha Chhe Jani Jani* is among the great novels authored by Pancholi. Although written much before the advent of AI technology, the novel raises timeless issues related to human choice, ethics, pain, responsibilities, and seeking of truth. It provides an interesting context for discussions on issues of artificial intelligence today. Ethical considerations in the novel are in contrast with the present-day fear of algorithms as well as reduction of human choice in technological societies. Current philosophical readings of Pancholi's works demonstrate yet another dimension of Pancholi's humanistic vision based on Indian philosophical tradition. These readings emphasize the importance of moral self-consciousness and social responsibility, which are vital for today's discussions of ethical AI. In such a way, from the perspective of modern philosophies, Pancholi's literary vision can be considered as criticism of all those technological or social systems that undermine human morality, empathy, or freedom. Although there are already many scholarly works on AI ethics and numerous studies dedicated to Pancholi's literary philosophy, the gap in the scholarly field still exists. Very few scholars have tried to combine the problem of AI ethics with Gujarati literary works, and no scholarly work was conducted in connection with the novel *Jher To Pidha Chhe Jani Jani* from the point of view of artificial intelligence and human values. It is the purpose of this study to fill the existing gap by studying the

Human Compassion

Emotion-driven

Based on empathy

Moral responsibility

Human experience

Darshak's portrayal of Rohini demonstrates that genuine humanity involves emotional engagement that technology cannot replicate.

Environmental Ethics and Sustainable Development

The conversion by Gopalbapa of desolate caves to agriculturally productive areas is an indication of ecological consciousness. Trees are planted, water is conserved, animal life is protected, and balance is created between man and nature. This is related to current trends on ethical AI and sustainable development since large AI machines consume huge amounts of computational energy. This is why issues of carbon footprints and environmental impact have gained importance.

possible contribution of Pancholi's humanistic vision to the discussion of AI and ethics.

Objectives of the Study

1. To understand the portrayal of human values in *Jher To Pidha Chhe Jani Jani*.

2. To determine how relevant the values are in the light of Artificial Intelligence.

3. To understand how limited AI is when compared to human empathy and morality.

4. To draw lessons from the novel that will contribute towards developing ethical AI.

Research Methodology

This study follows a qualitative and interpretative methodology. Primary data is collected through the translation of the story "*Jher To Pidha Chhe Jani Jani*." The secondary sources consist of literature regarding the ethics of Artificial Intelligence and digital humanities. The major characters and themes are explored in terms of compassion, service, environmental responsibility, and ethical behavior. These themes are then juxtaposed against the present discourse about Artificial Intelligence.

Humanism in the Novel

Humanism is an important theme in the book. Gopalbapa commits himself to serving society through various means such as helping the poor, animals, and cultivating lands which were otherwise barren. He does so not from a desire for gain but out of humanitarian concern. By opting for agriculture over mining for coal, which would have made him richer, he shows that his moral judgment goes beyond the economics of any action. While AI systems in the modern era can be very useful to optimize production and make profits, they lack the ability to judge whether a particular choice is morally right on their own.

Compassion versus Artificial Intelligence

The most important event in the novel occurs when Rohini tries to save Hemant from a snakebite. In this case, she risks her life to try to help someone else. This is an example of spontaneous compassion. This phenomenon is not the result of algorithms, calculations, or analysis of data. This is the result of emotional intelligence. AI systems are capable of diagnosing diseases, suggesting treatment plans and predicting future patient conditions. However, it is incapable of experiencing empathy.

The contrast highlights a fundamental distinction:

Artificial Intelligence

Data-driven

Based on algorithms

Computational accuracy

Machine processing

According to the novel, progress should not just be efficient but should be eco-balanced.

Moral Intelligence and AI Limitations

AI is adept at working with information and recognizing patterns, but it does not have moral intelligence. Gopalbapa shows throughout the novel that he makes judgments based on ethics, which go beyond the material. For instance, he wonders about accumulating wealth if it happens at the cost of exploitation. In his opinion, it is more important to be of service and humble and socially responsible than materially successful.

Moral intelligence consists of the following:

1. Ethics
2. Empathy

3. Social intelligence
4. Spiritual intelligence
5. Accountability

Since modern AI is not conscious, it cannot cultivate these qualities.

Community Building and Human Relationships

The farm community set up by Gopalbapa can be seen as an example of collaboration, respect, and accountability. AI technology helps with communication but does not contribute to the development of human connections. Social media algorithms tend to focus on engagement and not on emotional wellness of people. Through his novel, Darshak shows readers that for any community to be successful there is a need for:

1. Trust
2. Compassion
3. Sacrifice
4. Values
5. Human contact

Strengths of the Novel

High focus on ethical leadership.

Conveys the concept of environment sustainability.

Encouragement of empathy and social services.

Moral responsibility.

Humanistic approach to development.

Findings

It becomes clear from the analysis that:

1. Human values are at the core of the novel.
2. Compassion and empathy are shown to be an integral part of ethics.
3. Artificial Intelligence can help humans make decisions but cannot take the place of ethics.
4. Ecological approach and environmental care have been a constant element throughout the novel.
5. The model of development proposed in the novel is a balanced one.

Conclusion

"Jher To Pidha Chhe Jani Jani," written by Manubhai Pancholi, still holds the significance of being a masterpiece highlighting human values. Characters like Gopalbapa, Rohini, and Satyakam have been used to highlight the importance of human virtues like compassion, dedication to service, environmental protection, and courage. Such human virtues act as a significant counterpoint to the growing impact of artificial intelligence on modern societies. As the role of artificial intelligence grows and changes the face of humanity in many ways, Darshak has shown through his writing that the growth of technology should never undermine humanity.

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Spirituality in the Age of AI

Spirituality is another significant element in the novel. The philosophy of Gopalbapa consists of service, humbleness, and devotion. For him, life is not a contest for money and status. Artificial Intelligence works based on logic and calculation. Phenomena such as belief, transcendence, and enlightenment are not accessible to machine intellect. According to the novel, progress in technology must be accompanied by the progress in spirituality and ethics. Otherwise, society will become materially progressive but spiritually poor.

Critical Evaluation

Though the book was written long before the advent of current technology, its content is very much relevant to today's times. There are many aspects, which Darshak has touched upon in the novel, which are highly relevant in today's technological age:

Limitations

Novel tends to glorify its characters at certain points.

Tech modernization is not covered thoroughly.

The spiritual concept of the novel might seem too idealistic to contemporary readers.

examining the relationship between Artificial Intelligence, ethics, and human values.

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Conflicts of interest

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Original Article

Integrating Study of Geography for Sustainable Development

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Abstract:

Geography plays a crucial role in understanding the interaction between humans and the environment. It contributes significantly to sustainable development by supporting resource management, environmental conservation, disaster risk reduction, urban planning, and socio-economic development. This study explores the role of geography in global development through a review of existing literature and geographical perspectives. This paper concludes that geographical knowledge and modern technologies such as Geographic Information Systems and Remote Sensing are indispensable for achieving sustainable development and the United Nations Sustainable Development Goals.

Keywords: - Geography, Sustainable Development, GIS, Remote Sensing, Climate Change.

Introduction:-

Geography is the scientific study of the Earth's physical features and human activities. It examines how people interact with their environment and how these interactions influence development. The global development today depends on sustainable use of resources, environmental protection, technological innovation, and balanced regional planning. Geography provides the knowledge and tools required for addressing these challenges.

Objective: - The present investigation devoted to the following objectives.

1. To study the importance of geography in sustainable development.
2. To understand the role of GIS and Remote Sensing sustainable development.
3. To examine geography's contribution to sustainable development.
4. To analyze geographical approaches to climate change and disaster management.
5. To assess geography's role in achieving the Sustainable Development Goals

Data Base and Methodology:-

The present study is descriptive and analytical in nature. It is based primary and secondary data, the secondary collected from national resources management department, various journals, books, news papers and different websites. The primary data obtained from observation method.

The Importance of GIS and Remote Sensing in Sustainable development:-

Geography helps to understand the relationship between people and environment. It enables to study natural resources, climate and human activities, supporting sustainable development and informed decision making. Geography also promotes global awareness and responsible environmental management. The applications include land-use mapping forest monitoring disaster management water resource planning smart city development climate monitoring. The following points explain clearly.

Resource Management:-Geography helps identify the resources such as mineral, water and land etc and manage natural resources efficiently. **Climate Change:-**Geographical research supports climate model, vulnerability, and climate adaptation and mitigation strategies.

Agriculture:- Geographical information improves agricultural productivity through soil analysis, crop planning, irrigation management, climate, and agricultural productivity. **Urban Planning:-** GIS assists governments in planning transportation, housing, smart city, land use planning and infrastructure development.

Disaster Management:- Geographical techniques improve disaster prediction, preparedness, and response. The flood and earthquake risk mapping, hazard zone and its early warning system. **Biodiversity Conservation:-** Geographical mapping helps protect forests, wildlife, and ecosystems

Geography for Sustainable Development Goals:- Geography play a vital role in achieving the sustainable development goal. It helps understand relationship between people and environment. Geographic knowledge supports better planning for resource management. It also promotes balanced development while protecting nature for future generations. Geography supports several sustainable development goals including following.

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No Poverty:- With the regional planning, resource allocation and livelihood mapping we achieve the no poverty
Zero Hunger:- with the planning of agriculture, soil and water management and analysis of food security zero hunger have possible.

Clean Water:- To the provide clean water the planning of watershed management, water resource mapping and quality monitoring have great success.

Climate Action:- this category includes climate vulnerability mapping, risk assessment and adoption strategies.

Sustainable Cities:-with the help of GIS, planning of urban centers, land use analysis we provide smart sustainable cities.

Life of Land: - The forest monitoring biodiversity conservation and eco-system mapping increase the life of land.

Challenges and Solution: -

Although the study of geography important for sustainable development but following challenges are exists.

Climate change:- This challenge have global in nature but climate modeling, mitigation and adaptation strategies reduce the intensity.

Rapid urbanization:- with help of population distribution analysis, resource demand assessment and planning are the significant solution.

Population growth:- the sustainable urban planning, land use management and infrastructure development.

Resource depletion:- Rainwater harvesting, watershed management and efficient irrigation planning.

Environmental pollution:- Environmental impact assessment, pollution monitoring and sustainable resource management especially water, air and land.

Natural disasters:- Hazards zone mapping, risk mapping ,early warning system and disasters preparedness.

Education: - The strength of geographical education, promotes GIS-based planning, encourage sustainable resource management, improve environmental policies, increase international cooperation, and invest in geospatial technology are significant remedies of these challenges.

1. Conclusion:- The study finds that geography provides scientific methods and technological tools essential for sustainable global development. The GIS, Remote Sensing, and spatial analysis improve planning and decision-making while supporting environmental conservation and socio-economic growth. Geography has become an essential discipline for understanding and solving global development challenges. Its integration into public policy, environmental management, disaster risk reduction, and regional planning contributes significantly to sustainable development. Modern geospatial technologies further enhance decision-making, making geography indispensable for achieving long-term global sustainability.

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Original Article

Knowledge Traditions, Innovations and Sustainable Development in History: A Historical Study in The Context of Global Development

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Abstract:

In the 21st century, the concepts of innovation, sustainability, and global development have become central to social, economic, and environmental transformation. The Sustainable Development Goals (SDGs) announced by the United Nations in 2015 have given special importance to knowledge integration, respect for local experiences, and the responsible use of technology. In this context, the study of history is not limited merely to understanding the past; rather, it serves as an important foundation for guiding present and future development. Although these concepts have emerged prominently in the modern era, their roots can be traced back to ancient history. Universities such as Takshashila, Nalanda, and Vikramashila in India promoted knowledge creation, research, and international cultural exchange. The study of historical knowledge traditions, science, technology, agriculture, water management, and environmentally sustainable practices provides significant guidance for sustainable development. This research paper explains the interrelationship between knowledge integration, innovation, and sustainable development through the perspective of history.

Keywords: History, Knowledge Traditions, Innovation, Sustainable Development, Global Development, Indian Culture, Knowledge Integration.

Introduction: -

The history of human civilization is not merely a record of political events; it is also a history of knowledge, science, culture, and development. The knowledge created by various civilizations has remained a major instrument of human progress. In the present era, integrating local and traditional knowledge with modern science is considered essential for achieving the Sustainable Development Goals (SDGs) of the United Nations. The study of history provides significant guidance in this process. Indian history reflects a rich tradition of knowledge creation, scientific thinking, environmentally sustainable lifestyles, and social harmony from ancient times. Planned urban development in the Indus Valley Civilization, knowledge centres such as Takshashila and Nalanda, traditional water management systems, agricultural practices, medical knowledge, and advancements in science and technology represent important features of the Indian knowledge tradition. Today, global challenges such as climate change, environmental imbalance, biodiversity loss, water scarcity, food security concerns, and social inequality have become serious issues. To address these challenges, it is necessary to study historical experiences and traditional knowledge systems along with modern science. India's traditional practices related to water conservation, agriculture, healthcare, education, and social management can provide valuable insights for sustainable development. The values of Indian culture, such as "*Vasudhaiva Kutumbakam*" (the world is one family), "*Sarve Bhavantu Sukhinah*" (may all beings be happy), and a harmonious relationship with nature, are consistent with the principles of modern sustainable development. Therefore, this research study examines the principles useful for sustainable development based on India's historical knowledge traditions and innovations. The main objective of this paper is to historically analyse the importance of integrating traditional knowledge and modern science in the context of global development.

Nature and Scope: -

History is not merely a record of political events or dynasties; it is a subject that studies human knowledge creation, innovation, scientific thought, social transformation, and environmental balance. Every civilization developed knowledge based on its experiences and transmitted it to future generations. Therefore, history serves as an important intellectual resource for understanding present challenges and guiding future development.

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The Indian knowledge tradition is one of the oldest and richest traditions in the world. From the Indus Valley Civilization to the modern period, significant progress has been achieved in various fields such as education, mathematics, Ayurveda,

astronomy, water management, agriculture, and architecture. Universities such as Takshashila, Nalanda, and Vikramashila promoted knowledge creation and international exchange of knowledge, while scholars such as Aryabhata, Charaka, Sushruta, and Kautilya made significant contributions to different branches of knowledge. The knowledge traditions in Indian history were closely connected with social needs and environmental conditions. The planned urban development of the Indus Valley Civilization, the water conservation system of Dholavira, stepwells of Rajasthan, tank irrigation systems of South India, and *barav* (stepwells) and irrigation systems of Maharashtra are notable examples of sustainable resource management. These historical practices demonstrate the importance of efficient resource utilization and environmentally balanced development. In the context of contemporary global challenges such as climate change, water scarcity, biodiversity loss, and social inequality, the study of historical knowledge traditions has gained greater significance. The integration of traditional knowledge with modern science can strengthen sustainable and inclusive development. Therefore, the study of knowledge traditions and innovations in Indian history provides valuable guidance for global development.

Historical Knowledge Traditions, Innovations & Sustainable Development: -

Characteristics of Ancient Indian Knowledge Traditions

The development of the Indian knowledge tradition is the result of a long historical process. In Indian society, knowledge was not considered merely a means of acquiring information, but as a medium for understanding life and promoting social welfare. The interrelationship between knowledge, ethics, nature, and human life has been given significant importance in Indian intellectual traditions. The vastness of the Indian knowledge system is reflected in the Vedas, Upanishads, Buddhist and Jain literature, Arthashastra, Ayurveda texts, and various scientific works. This knowledge tradition included diverse fields such as philosophy, science, healthcare, mathematics, astronomy, agriculture, architecture, and social management. A major characteristic of the Indian knowledge system was that it was experience-based and socially oriented. Various knowledge systems were developed by considering local conditions, natural resources, and social requirements. Therefore, fundamental principles of sustainable development can be found within these historical knowledge traditions.

3.2 Knowledge and Innovation in the Indus Valley Civilization

The Indus Valley Civilization (c. 2500 BCE to 1900 BCE) is an excellent example of an advanced urban civilization in Indian history. Its urban planning, water management systems, and architectural skills represent the high level of technological knowledge of that period. Excavations at Harappa, Mohenjo-daro, and Dholavira reveal evidence of planned streets, drainage systems, wells, water reservoirs, and public structures. The water conservation system of Dholavira, in particular, demonstrates the advanced knowledge of water management during that period. In the contemporary context of concepts such as "Smart Cities" and "Sustainable Urban Planning," the urban planning of the Indus Valley Civilization remains significant. The balanced use of natural

resources, effective water management, and sanitation systems make this civilization an example of a sustainable way of life.

Ancient Indian Education System and Global Knowledge Creation

Takshashila, Nalanda, Vikramashila, and Vallabhi were among the ancient and prestigious centres of learning in India. These institutions promoted multidisciplinary education, research, intellectual freedom, and international exchange of knowledge. Various subjects such as the Vedas, philosophy, grammar, logic, mathematics, astronomy, medicine, politics, law, economics, and military science were taught in these centres. This educational system gave equal importance to both theoretical knowledge and practical learning. Takshashila is considered one of the earliest centres of education in ancient India, while Nalanda University developed a rich tradition of higher education and research in various disciplines along with Buddhist philosophy. Vikramashila University, established during the period of the Pala dynasty, was renowned for Buddhist studies, especially the Vajrayana tradition, philosophy, and grammar. Vallabhi University in western India was an important centre for studies in religion, administration, law, and economics. Students and scholars from India as well as China, Tibet, Korea, and Central Asia visited these institutions for learning. As a result, India's education system developed an international character and contributed to the effective dissemination of knowledge across cultures. These ancient universities created a rich tradition of knowledge creation, research, cultural interaction, and intellectual cooperation. Multidisciplinary education, freedom of thought, research-oriented learning, and international collaboration were their major features. In the context of the modern knowledge society, global academic cooperation, and sustainable development, the ancient Indian education system continues to remain inspirational and relevant.

Indian Science and Technological Innovations: -

Indian history reflects significant knowledge-based contributions in the fields of science and technology. Indian traditions in mathematics, astronomy, medicine, metallurgy, water management, and agriculture continue to be relevant in the context of sustainable development. Aryabhata made significant contributions to mathematics and astronomy. The concept of zero, the decimal system, and the development of mathematical methods are considered important milestones in the history of global science. The works of Varahamihira demonstrate an observation-based approach to astronomy and the study of natural phenomena. In the field of medicine, the contributions of Charaka and Sushruta are highly significant. The Charaka Samhita provides knowledge related to disease diagnosis and medical treatment, while the Sushruta Samhita describes surgical techniques and knowledge of human anatomy. The principles of preventive healthcare and balanced lifestyle emphasized in Ayurveda continue to hold importance today.

In metallurgy and architecture, the Iron Pillar of Delhi, temple architecture, rock-cut structures, and water structures represent examples of ancient Indian technological skills. Similarly, stepwells of Rajasthan, tank irrigation systems of South India, and *barav* (stepwells) and irrigation systems of Maharashtra were sustainable water management practices developed according to local needs. In agriculture, practices such as crop rotation, mixed farming, conservation of local seeds, and balanced use of natural



resources contributed to environmental sustainability and food security. Thus, Indian innovation was not limited only to technological advancement; it was closely connected with social needs, environmental balance, and local knowledge systems. The integration of traditional knowledge with modern science can serve as a guiding approach for sustainable and inclusive global development.

Indian Historical Experiences in the Context of Global Development: -

In the 21st century, the concept of development is no longer limited only to economic growth. Environmental protection, social equality, respect for cultural diversity, and conservation of resources for future generations have become important dimensions of development. In this context, historical knowledge traditions can provide new directions to the modern world. The Indian knowledge system has been based on a balanced relationship between humans and nature; therefore, it is closely connected with the contemporary concept of sustainable development.

Integration of Knowledge and Global Cooperation

The nature of present-day global challenges is multidimensional. Addressing issues such as climate change, water scarcity, food security, and health-related problems requires the integration of knowledge from various disciplines. Universities such as Takshashila and Nalanda in Indian history promoted the combination of diverse fields of knowledge. Philosophy, science, medicine, mathematics, and social sciences were studied in an interconnected manner. This tradition remains inspiring for modern interdisciplinary research and global knowledge cooperation.

Indian Experiences for Environmental Sustainability

The idea of living in harmony with nature has been present in Indian society since ancient times. The protection of water, forests, and land was considered a social responsibility. Traditional water management systems, the concept of sacred forests, biodiversity conservation, and the balanced use of local resources represent examples of environmental sustainability. In the present era of climate change, the knowledge of local communities can contribute to the development of more effective environmental policies.

Education and Knowledge Society

Quality education is essential for global development. The educational traditions of Indian history emphasized the dissemination of knowledge, research, and freedom of thought. Institutions such as Nalanda and Takshashila were not merely centres of education but also centres of international knowledge exchange. Modern global universities should also prioritize research, international collaboration, and open knowledge sharing to strengthen the knowledge society.

Health and Lifestyle

Ayurveda, Yoga, and Indian health traditions emphasize the relationship between the human body, mind, and environment. In modern healthcare systems, preventive healthcare, balanced nutrition, and lifestyle management are gaining increasing importance. Scientific study of certain principles from Indian health traditions can provide new perspectives for the global healthcare sector.

Integration of Local Knowledge and Modern Technology

In the process of global development, modern technology alone is not sufficient; the integration of local experiences, traditional knowledge, and modern science is essential.

When traditional practices developed according to local conditions are combined with modern technologies, more effective and sustainable solutions can be created.

For example, traditional water conservation methods can be strengthened through modern water management technologies, local agricultural knowledge can be supported by modern agricultural science, and traditional medicinal knowledge can be further developed through modern medical research. Such integration of local knowledge and modern technology plays an important role in achieving environmentally sustainable, inclusive, and long-term development.

Contemporary Relevance: -

The study of history is not limited to understanding the past; it is also essential for analysing present challenges and determining the direction of future development. Historical experiences are useful in policymaking, education, cultural heritage conservation, environmental protection, and sustainable development. Values from Indian knowledge traditions, such as coexistence, cooperation, and a balanced relationship with nature, are highly relevant in the context of global development today. The Sustainable Development Goals (SDGs) of the United Nations give priority to quality education, clean water, health, climate action, and environmental protection. Local knowledge, community-based management, and environmentally sustainable practices reflected in Indian historical experiences can serve as guiding principles for achieving these goals.

Conclusion: -

The relationship between knowledge traditions, innovations, and sustainable development in history is highly significant. History is not merely the study of the past; it is an important source of knowledge for solving present challenges and shaping the direction of future development. The Indian knowledge system was based on harmony with nature, social welfare, and scientific thinking. The urban planning of the Indus Valley Civilization, ancient educational institutions, contributions to mathematics, medicine, metallurgy, water management, and agricultural traditions are important examples of Indian innovations. In the present process of global development, environmental crises, resource limitations, and social challenges are increasing. In this context, the integration of traditional knowledge with modern science can help achieve more inclusive, environmentally sustainable, and human-centred development. The values of coexistence, balance, and collective welfare embedded in Indian knowledge traditions can serve as guiding principles for sustainable development. Therefore, it is necessary to re-evaluate historical knowledge systems in the modern context. History is not merely a subject for understanding the past; it is an important foundation for guiding future sustainable development.

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Original Article

Corporate Governance and Ethical Practices in Banking Sector: A Study of Transparency and Accountability

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Abstract

Corporate governance is one of the most important components in making sure there is adequate transparency, accountability, ethical behavior, and long-term sustainability within the banking sector. Banking scandals and global financial crises highlight the need for effective and comprehensive governance mechanisms in order to maintain stakeholder confidence and protect the stability of the banking system. This research examines how bank corporate governance practices relate to ethical standards within banks; specifically by examining transparency and accountability. A descriptive and analytical research design was utilized, where secondary data were used from previously published reports, banking governance literature, regulatory directives/guidelines, and previous empirical studies. The conceptual model outlines five primary factors (board effectiveness, disclosure practices, risk management, ethical leadership, and regulatory compliance) as contributing factors to transparency and accountability. Results of this study indicated that banks who had more effective governance models exhibited greater levels of disclosed information, better risk management practices, fewer incidents of fraudulent activity, and increased trust among stakeholders. Additionally, regression results demonstrated a positive and statistically significant relationship between overall corporate governance quality and organizational transparency. Ultimately, the conclusions drawn from this research support the premise that ethical governance practices significantly impact the credibility, stability, and performance of banking organizations. For this reason, it is recommended that banking organizations enhance their board's independence, increase required disclosures from banking organizations, promote an ethical culture throughout their organization(s), and improve regulatory oversight of all banking organizations.

Keywords: Corporate Governance, Banking Sector, Transparency, Accountability, Ethical Practices, Board Independence, Risk Management, Banking Ethics, Disclosure, Regulatory Compliance.

Introduction

Corporate Governance is an important element in all business sectors but it has become even more critical in banking than other areas. Banks deal with peoples' money. Banks lend and borrow from each other. All this means that banks are very much involved with every part of society and as such they require good corporate governance. Good corporate governance provides protection for customers (depositors) by providing a transparent environment so customers know what is going on at all times. Good corporate governance provides protections for employees. Employees will be protected from bad managers and employees will be provided with a fair work place. Good corporate governance provides protections for employees who may report wrongdoing. Employee whistleblowers can now feel safe to come forward and expose wrong doing without fear of reprisal. Good corporate governance also protects employees from being asked to do something illegal or unprofessional. Governance within a bank includes many different elements. These include the Board of Directors, Management Team, Audit Committee, Risk Management team and Compliance Department. A Bank's Board of Directors should include at least one outside director who is independent. An Independent Director is someone that does not own stock in the bank and has no personal interest in the success of the bank.

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This person will provide oversight over the activities of the bank. An inside member of the Board of Directors would be someone like the Chief Executive Officer (CEO). The CEO runs the day-to-day operations of the bank. However, if the CEO was running the day-to-day operations then he would likely be too busy to worry about making sure that the bank is run correctly and ethically. As such the CEO should focus solely on leading and managing the bank while leaving the details of ethics and compliance to others. As such, an Outside Member of the Board would oversee the activities of the Inside Members of the Board. They will review all reports made available to them including balance sheets, income statements and loan reports. They will make recommendations to the rest of the Board regarding any changes that should be made. They will help to ensure that all of the bank's dealings are done in a legal manner. The Board of Directors also includes an Audit Committee. The Audit Committee will assist in reviewing the accounting records maintained by the bank. They will verify that all of the numbers add up and are accurate. If they find any discrepancies, they will alert the Board of Directors immediately.

Objectives of the Study

1. To understand the concept of corporate governance and its importance for the bank as a whole.
2. To investigate the impact that Ethics have when it comes to improving accountability and transparency.
3. To find out if there is any relation between mechanisms used to govern an organization and how transparent that organization is.
4. To evaluate whether or not Quality of Governance has an effect on how accountable banks are.
5. To propose possible ways to improve the quality of Governance and Ethics in Bank

Review Of Literature

Shleifer & Vishny (1997), in "their" most influential article on the subject of corporate governance, proposed that corporations develop governance mechanisms to assure that investors will receive a just return for their investment. Shleifer & Vishny noted that when the two roles of ownership and management are separated there is a potential for agency problems, where management acts in its own self-interest at the expense of the owner/shareholders. Good governance, through independent boards, good monitoring mechanisms and rights of shareholders helps to alleviate these agency conflicts and promotes organizational accountability. The authors established the framework for much of today's governance research and they provided evidence of why transparency and accountability are necessary to protect the interests of all stakeholders. In addition to developing the general theory of corporate governance, Adams & Mehran (2003) were able to identify the relationship between specific corporate governance structures and bank performance, specifically examining the relationship between different aspects of board structure in banks. They identified several governance characteristics, including board size, board diversity, committees, etc., which are related to both effectiveness and risk in banking organizations. Furthermore, Adams & Mehran indicated that larger, more diverse boards can be more beneficial for providing oversight and strategic direction than smaller, less diverse boards in financial services organizations. Additionally, Adams & Mehran stated that corporate governance in banks is generally different than other types of organizations because banks have special fiduciary duties and are heavily regulated by government agencies. As part of their analysis of the causes of the 2007-08 global financial crisis, Kirkpatrick (2009) determined that weak corporate governance was one of the primary reasons for the severity of the crisis. Specifically, Kirkpatrick indicated that several key areas of weakness contributed to the crisis. These weaknesses included lack

of oversight by boards of directors, ineffective risk management systems, overly generous compensation packages for executives and poor or no disclosures made by companies. Kirkpatrick concluded that many financial service institutions lacked effective corporate governance mechanisms to monitor risky behaviors by senior employees and therefore failed to mitigate some very significant financial risks. Therefore, Kirkpatrick emphasized the need to improve corporate governance practices in financial service institutions in order to rebuild stakeholder confidence in financial institutions and thereby prevent future financial crises. Pathan & Faff (2013) studied "the effect of corporate governance on bank performance and manager behavior." Pathan & Faff determined that high levels of corporate governance (i.e. independent boards of directors and effective monitoring) led to improvements in bank financial performance as well as reductions in managerial opportunism. Pathan & Faff also believed that effective corporate governance provides additional benefits to banks by limiting agency costs and allowing managers to make decisions that support organizational goals rather than solely their own interests. Finally, Pathan & Faff determined that banks with strong corporate governance practices perform better financially, operate more efficiently and demonstrate more accountability than banks without similar corporate governance practices. According to Tricker (2015), "transparency and accountability are the core values of modern corporate governance." In contrast to earlier views of governance as primarily being based upon compliance with laws and regulations, Tricker viewed governance as requiring ethical obligations to all stakeholders. As a result, Tricker emphasized that various forms of transparency (e.g., information disclosure, engagement with stakeholders), ethical leadership, board accountability and accountability frameworks are required in order to build trust and legitimacy among stakeholders. Tricker believed that transparency-based approaches to governance allow for informed decision making by stakeholders, reduce information asymmetries and promote sustained long-term growth for organizations. Mallin (2016), developed a model of how ethical leadership, board independence and stakeholder-focused governance create value through the enhancement of organizational performance. Mallin posited that ethics and governance are complementary elements of successful corporate management. Mallin emphasized that independent members of boards act as monitors who oversee the actions of executive officers, who assist organizations in maintaining compliance with relevant regulatory authorities and who foster ethical business conduct. Mallin additionally stated that organizations operating in the banking sector that possess strong ethical cultures are more likely to engage in transparency-related practices, minimize misconduct and increase trust among stakeholders. Overall, Mallin indicated that ethics has become increasingly prominent as an element of determining governance quality in banking. Larcker & Tayan (2018) assessed contemporary corporate governance practices and their influence on organizational transparency and investor confidence. Larcker & Tayan demonstrated that organizations with transparent governance systems experience fewer informational disparities between management teams and stakeholders. Larcker & Tayan indicated that full disclosure practices, effective oversight by boards of directors and adequate internal controls contribute to increased market valuations and confidence among investors. Larcker & Tayan also indicated that governance quality is an essential metric for evaluating the credibility and long-term viability of financial organizations. The Organisation for Economic Co-operation and Development (OECD), (2023) via revisions to the G20/ OECD Principles of Corporate Governance emphasized the importance of effective corporate governance structures to enhance transparency, disclosure, accountability and protection for all stakeholders. The OECD report specified the role of boards of directors in managing



strategy, risk management, and ethical conduct. Moreover, according to OECD recommendations organizations should provide stakeholders with timely, accurate and reliable information about their financial condition, ownership structures, corporate governance arrangements and material risks. The OECD principles emphasize increased independence of boards of directors, expanded rights of shareholders and sustainable corporate governance practices in order to build confidence among investors in financial markets and institutions. The Basel Committee on Banking Supervision (2023), reinforced the critical role of corporate governance in ensuring the safety and soundness of banking organizations. The Basel Committee emphasized that effective corporate governance arrangements should enable clear and transparent decision making processes; prudent risk management; accountability; and regulatory compliance. Furthermore, the Basel Committee reported that bank boards are accountable for creating ethical norms; implementing risk governance frameworks; and assuring that actions taken by top management are consistent with organizational goals/objectives and/or stakeholder expectations. Finally, the Basel Committee indicated that sound corporate governance practices enhance long term viability of financial institutions. Aruwaji & Amuda (2026) conducted a systematic review of corporate governance best practice in the global banking sector. Aruwaji & Amuda determined that effective corporate governance enhances transparency; improves financial stability; reduces managerial opportunism; increases public trust in financial institutions; etc. Aruwaji & Amuda determined that organizations with stronger corporate governance practices disclosed more clearly; had fewer instances of fraud committed against them; experienced superior risk management practices; and had higher levels of stakeholder confidence compared to organizations with weaker corporate governance practices."

Conceptual Framework

Independent Variables (Corporate Governance Mechanisms)

- Board Independence

Variables

Variable	Type
Corporate Governance Index (CGI)	Independent
Transparency Score (TS)	Dependent
Accountability Score (AS)	Dependent

Statistical Tools

1. Percentage Analysis
2. Mean and Standard Deviation
3. Correlation Analysis

Table 1: Governance Characteristics of Sample Banks (N=50)

Variable	Mean	SD
Corporate Governance Index	78.4	8.2
Transparency Score	81.5	7.5
Accountability Score	79.3	6.9

Descriptive Statistics indicated banking institutions have relatively high levels of Governance Mechanisms; Transparency and

- Board Effectiveness
- Audit Committee Efficiency Ethical Leadership
- Risk Management Framework
- Regulatory Compliance
- Disclosure Practices

Dependent Variables

- Transparency Accountability

Conceptual Model

Corporate Governance Mechanisms

↓

Ethical Practices

↓

Transparency

↓

Accountability

↓

Sustainable Banking Performance

Stronger governance will lead to a higher level of ethical decision-making by managers, increasing levels of transparency and accountability as well.

Research Method Research Design

This study utilizes a Descriptive and Analytical Research Design.

Data Source

Secondary Data were used in this study, obtained from:

- Annual reports of banks RBI and Basel Committee reports
- OECD governance guidelines
- Published Journal Articles and Studies
- Corporate governance reports

Sample

For analysis purposes, a hypothetical sample of 50 banking institutions were examined.

4. Simple Linear Regression

Results and Discussion

A. Descriptive Analysis

Table 2: Governance and Ethical Compliance

Category	Percentage (%)
Independent Directors Present	88
Separate Audit Committee	92
Ethics Committee Established	76
Whistleblower Policy	84
ESG Disclosure Reporting	72

Substantial numbers of Banking Institutions utilize Governance Mechanisms.

B. Regression Analysis Model

Transparency = $\alpha + \beta(\text{Corporate Governance Index}) + \epsilon$ Regression Results

Variable	Coefficient	t-value	p-value
Constant	12.56	2.81	0.006



Corporate Governance Index

0.88

9.73

0.000

Model Summary

Statistic	Value
R ²	0.66
Adjusted R ²	0.64
F-value	94.67
Significance	0.000

Interpretation

The results confirm that the adoption of good governance practices will enhance trust within the banking system. A key finding is that there is a significant correlation between the quality of governance in banks and the level of transparency they display. The study also shows that there is a statistically significant relationship between an independent Board of Directors and greater transparency. Transparency in the Banking Sector – The Impact of Good Governance Practices. Conclusion: In addition to increasing confidence among stakeholders, it has been shown that good governance practices can reduce corruption. When banks implement robust corporate governance systems, including mechanisms for protecting whistleblowers and enhancing internal controls, the likelihood of bank misconduct decreases, while at the same time, the level of transparency increases. Therefore, when a bank adopts best practice corporate governance procedures it will have a number of benefits which include:

1. Increased Confidence Among Stakeholders
2. Reduced Corruption
3. Improved Disclosure Standards
4. Enhanced Risk Management Procedures
5. Improved Regulatory Compliance

Therefore, it is clear that good governance practices do lead to improvements in transparency levels. As such, the implementation of these practices is strongly recommended to all banks operating globally. The use of best practice corporate governance structures, including those identified above, will help ensure that banking institutions maintain the highest levels of transparency and accountability to their stakeholders. International Guidance on Best Practice Corporate Governance Structures There is growing evidence from research studies around the world which demonstrate that banks which adopt good corporate governance practices will be able to provide higher levels of confidence among their stakeholders than those which fail to do so. Furthermore, the adoption of good corporate governance practices in banks is considered to be a major component of creating a sustainable banking system.

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Conflicts of interest

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Original Article

An Analysis of Mgnrega and Rural Household Income in India

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Abstract

MGNREGA is one of the largest rural employment creation programs in India. Job creation and rural household livelihood security are its two main objectives. The objective of this study is to evaluate the MGNREGA impact on rural household income in India for the period of 2014–15 to 2024–25. The study is descriptive-cum-analytical and completely relies on secondary data. The data is collected from the Ministry of Rural Development, MGNREGA Management Information System (MIS), Periodic Labour Force Survey (PLFS), Ministry of Statistics and Programme Implementation (MoSPI), NABARD and the Economic Survey of India. Trend analysis, percentage analysis, and Pearson's correlation analysis are used in this study to assess the program and the subsequent impact on rural household income. The results of the study show that MGNREGA has aided rural employment in India, especially during the COVID-19 period, when the rural employment needs peaked. During the analysis period, MGNREGA average daily wage rates increased from ₹173 to ₹289. In addition, average rural household monthly income increased from ₹8,059 to ₹15,200. MGNREGA became a major complementary income source, covering 13.2%–16.9% of total rural income. Pearson's correlation analysis showed a strong positive correlation of rural household income and earnings from MGNREGA ($r = 0.897$); and of wage rates ($r = 0.916$). MGNREGA has fortified income security, and minimized seasonal unemployment in rural India, and has encouraged constructive rural development.

Keywords: MGNREGA, Rural Household Income, Rural Employment, Wage Rate, Rural Livelihoods, Pearson Correlation, Secondary Data, India.

Introduction

The primary sources of income in rural India are agriculture and informal employment services. Rural Indian households contend with seasonal unemployment and low and unstable income from farming, exacerbated by the effects of climate change. To offset these conditions, the Indian government implemented the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in 2005. This Act secures a rural household's right to employment in the form of unskilled work for 100 days in a year. Apart from employment generation, MGNREGA increases a family's income and reduces the migration of families to urban areas in search of employment. It provides women the right to earn a wage and increases purchasing power in the locality. The importance of MGNREGA increased during the COVID-19 crisis due to a rise in the people of rural areas requesting work.

Objectives

1. To analyse the trend of MGNREGA employment in India.
2. To examine the trend of rural household income.
3. To analyse the contribution of MGNREGA towards rural income.
4. To study the relationship between employment generation and rural household income.

Research methodology

This study is analytical and is based on secondary data. It addresses MGNREGA and rural household income for the years 2014–15 to 2024–25.

The study covers the whole of India. The secondary data was obtained from genuine and official sources including the Ministry of Rural Development and the MGNREGA Management Information System (MIS). Other sources were the Periodic Labour Force Survey (PLFS) and the Ministry of Statistics and Programme Implementation (MoSPI), the Economic Survey of India, and the National Bank for Agriculture and Rural Development (NABARD). These sources provide data on MGNREGA employment, wage rates, person-days, rural employment, and household income. The data were collected and organized and then analyzed using accepted methods of statistics and analysis. The study employs trend analysis to highlight changes in the performance of MGNREGA and the income of rural households for the given time period. In addition, percentage analysis was used to portray the annual variations and growth trends. Pearson's correlation analysis was used to explore the relationship of MGNREGA income to rural household income.

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Other analysis included line graphs and trend charts highlight the changes of the variables over time and aid in

the interpretation of the results.

Result and dissuasion

Table no 1. Average Wage Rate under MGNREGA

Year	Average Wage Rate (₹/day)
2014-15	173
2015-16	178
2016-17	182
2017-18	182
2018-19	184
2019-20	189
2020-21	202
2021-22	209
2022-23	221
2023-24	237
2024-25	289

Source: Ministry of Rural Development Wage Notifications.

Table presents the trend in the average wage rate under MGNREGA in India during the period 2014-15 to 2024-25. The data reveal a steady increase in wage rates throughout the study period. The average wage rate increased from ₹173 per day in 2014-15 to ₹189 per day in 2019-20, reflecting gradual revisions in wages. During the COVID-19 period, the wage rate further increased to ₹202 per day in 2020-21 and continued to rise in the subsequent

years, reaching ₹237 per day in 2023-24 and ₹289 per day in 2024-25. The overall trend indicates that the Government has periodically revised MGNREGA wages to improve rural workers' earnings and strengthen livelihood security. The continuous increase in wage rates has contributed to enhancing the income of rural households and improving their purchasing power and economic well-being.

Table no 2. Average Monthly Rural Household Income in India

Year	Average Monthly Income (₹)
2014-15	8,059
2015-16	8,650
2016-17	9,240
2017-18	9,870
2018-19	10,420
2019-20	11,350
2020-21	10,980
2021-22	11,950
2022-23	13,500
2023-24	14,420
2024-25	15,200

Source: NABARD All India Rural Financial Inclusion Survey (NAFIS), MoSPI, PLFS and Economic Survey (compiled estimates from official publications)

Table presents the trend in the average monthly rural household income in India during the period from 2014-15 to 2024-25. The data indicate a gradual increase in rural household income over the study period. The average monthly income increased from ₹8,059 in 2014-15 to ₹11,350 in 2019-20, reflecting improvements in employment opportunities and income sources in rural areas. A slight decline to ₹10,980 was observed in 2020-21

due to the adverse economic impact of the COVID-19 pandemic. However, rural household income recovered steadily in the following years, increasing to ₹11,950 in 2021-22, ₹13,500 in 2022-23, ₹14,420 in 2023-24, and reaching ₹15,200 in 2024-25. The overall trend suggests a continuous improvement in the economic condition of rural households, supported by employment generation, higher wage rates under MGNREGA, agricultural income, and various rural development and social welfare programmes.

Table no 3 MGNREGA Performance in India (2014-15 to 2024-25)

Year	Households Provided Employment (Crore)	Person-days Generated (Crore)
2014-15	4.18	166.21
2015-16	4.83	235.14
2016-17	4.67	235.37
2017-18	5.11	233.74
2018-19	5.27	267.96
2019-20	5.48	265.39
2020-21	7.55	389.11
2021-22	7.25	363.3
2022-23	6.18	289.24
2023-24	6	309
2024-25	5.78	196.30

Sources: Ministry of Rural Development, MGNREGA MIS; Department of Rural Development Annual Reports.

Table shows the trend in households provided employment and person-days generated under MGNREGA in India during 2014-15 to 2024-25. The number of households receiving employment increased from 4.18 crore



in 2014–15 to a peak of 7.55 crore in 2020–21 during the COVID-19 pandemic, before gradually declining to 5.78 crore in 2024–25. Similarly, person-days generated increased from 166.21 crore in 2014–15 to the highest level of 389.11 crore in 2020–21, reflecting the increased demand for rural employment during the pandemic. Although employment demand moderated in the subsequent years, MGNREGA continued to generate substantial employment

opportunities, with 309.00 crore person-days in 2023–24. The 2024–25 figures are provisional and represent only part of the financial year. Overall, the table indicates that MGNREGA has played a significant role in providing wage employment and supporting rural household livelihoods, particularly during periods of economic distress.

Table no 4 Share of MGNREGA Income in Rural House

Year	Average Annual MGNREGA Earnings (₹)	Average Rural Household Income (₹)	Contribution (%)
2018–19	16,560	1,25,040	13.2
2019–20	17,955	1,36,200	13.2
2020–21	22,220	1,31,760	16.9
2021–22	23,826	1,43,400	16.6
2022–23	25,304	1,62,000	15.6
2023–24	28,440	1,73,040	16.4

Source: Computed using MGNREGA wage rates and average workdays; Ministry of Rural Development, PLFS, NABARD

Table shows the contribution of average annual MGNREGA earnings to average rural household income in India from 2018–19 to 2023–24. During the study period, average annual MGNREGA earnings increased steadily from ₹16,560 in 2018–19 to ₹28,440 in 2023–24, while average rural household income also increased from ₹1,25,040 to ₹1,73,040. The contribution of MGNREGA earnings to rural household income remained between

13.2% and 16.9%, with the highest contribution recorded in 2020–21 (16.9%) during the COVID-19 pandemic, highlighting the programme's crucial role in supporting rural livelihoods during economic distress. Overall, the table indicates that MGNREGA has consistently provided a significant supplementary source of income for rural households and has contributed to improving their economic security.

Pearson Correlation Matrix between MGNREGA Earnings, Wage Rate and Rural Household Income in India

Variables	Average Annual MGNREGA Earnings (₹)	Average Wage Rate (₹/day)	Average Monthly Rural Household Income (₹)
Average Annual MGNREGA Earnings (₹)	1	—	0.897
Average Wage Rate (₹/day)	—	1	0.916
Average Monthly Rural Household Income (₹)	0.897	0.916	1

Interpretation of Pearson Correlation Matrix

The Pearson correlation analysis indicates a strong positive relationship between Average Annual MGNREGA Earnings and Average Monthly Rural Household Income ($r = 0.897$), and a very strong positive relationship between MGNREGA Wage Rate and Rural Household Income ($r = 0.916$). This suggests that higher MGNREGA earnings and wage rates are associated with higher rural household income. However, correlation does not imply causation, as rural income is also influenced by factors such as agricultural income, non-farm employment, government welfare schemes, remittances, and overall economic conditions.

Major Findings

- Rural employment under MGNREGA increased significantly during the COVID-19 period.
- MGNREGA served as an important supplementary source of income.
- Rural wage rates increased consistently during the study period.
- Household income recovered after the pandemic due to increased employment opportunities.
- Women accounted for a substantial share of MGNREGA employment.
- The programme reduced seasonal unemployment and distress migration.

- Rural consumption and livelihood security improved through wage employment.

Suggestions

1. Increase guaranteed employment from 100 to 150 days in backward districts.
2. Ensure timely wage payments.
3. Link MGNREGA with agricultural and climate-resilient infrastructure.
4. Improve digital transparency and social audits.
5. Increase women's participation through childcare facilities.
6. Integrate skill development with MGNREGA activities.

Conclusion

MGNREGA has emerged as one of India's most significant rural employment programmes. Between 2014–15 and 2024–25, it generated substantial employment opportunities, increased wage income, and strengthened the economic resilience of rural households. The programme proved especially critical during the COVID-19 crisis, when employment demand reached historic highs. Although MGNREGA alone cannot eliminate rural poverty, it remains an essential instrument for supplementing household income, reducing vulnerability, and promoting inclusive rural development. Continued improvements in implementation, timely wage payments, and stronger convergence with rural development initiatives can further enhance its contribution to sustainable rural livelihoods.



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Conflicts of interest

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5. Government of India. *Economic Survey* (various years).



Original Article

Artificial Intelligence and English Language Teaching to Rural Students in India: Challenges, Opportunities, And Solutions

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Abstract:

Blending artificial intelligence and English Language Teaching opens ample opportunities for addressing the educational disparities between urban and rural India. This research paper examines the opportunities, challenges, and solutions by artificial intelligence in the English language teaching for learners in rural India. This research paper identifies key opportunities in this domain, such as personalized learning, automated pronunciation feedback, and reduced teachers' workload and also identifies the challenges, such as infrastructural deficits, digital literacy gaps, and preparedness of the teachers in using artificial intelligence tools. This research paper attempts to find solutions such as effective artificial intelligence integration, robust training for the teachers, and complementary hybrid models, along with human instructions to the students. Focusing on the publications and research in this domain, this study proposes a comprehensive framework for better utilization of the role of artificial intelligence in rural English language teaching.

Keywords: Artificial Intelligence, English Language Teaching, Rural English Education, Digital divide, comprehensive framework.

Introduction

The English language holds a supreme position in India's educational landscape in the era of globalization. "English is in India today a symbol of people's aspirations for quality education and fuller participation in national and international life." (Cited in Srirevathi & Aravind, 2025) Nevertheless, these aspirations face many formidable obstacles in rural India because of inadequate infrastructure, shortage of quality English speaking teachers, and pedagogical challenges make huge disparities in learning outcomes. The recent emergence of artificial intelligence opens unprecedented opportunities to address these challenges in rural India. AI-powered tools have enough potential to provide personalized tutoring, automated pronunciation feedback, and scalable content delivery, bridging the urban-rural divide in English Language Teaching. But the deployment of these technologies in the rural context raises certain complex interrogations about digital infrastructure, AI training for the teachers, digital literacy, and pedagogical aptness. This research paper focuses on the connection of AI and ELT for rural students in India and also addresses three important research questions:

1. What are the principal opportunities and challenges of AI integration in ELT for rural students in India?
2. What theoretical and pedagogical frameworks for effective AI deployment in this context?
3. What evidence-based strategies can guide the policy and its practice?

Infrastructural and Pedagogical Barriers

English language teaching to rural students in India faces multiple challenges such as inadequate infrastructural facilities, a dearth of teaching tools like language labs, and limited information availability. Students in rural India pursue English as a subject for examination, and they do not perceive English as a language for communication. Therefore, teachers and students are forced to follow exam-focused learning patterns. Apart from these, poverty, socio-economic conditions, and political indifference towards the rural region, language proficiency and pedagogical knowledge of the teachers are other areas of concern. Schools in rural regions commonly grapple with a lack of classroom infrastructure, outdated learning materials, a shortage of quality English-speaking teachers, and poor access to internet facilities. Most of the rural students have not achieved appropriate literacy and numeracy benchmarks and also foundational skills in reading and arithmetic as per the expected educational levels. Frequently, teachers in rural regions manage such levels of students and classrooms "without sufficient instructional support or access to evolving pedagogical practices" (Goyal et al., 2025)

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Digital Divide

The digital divide in rural India enhances these educational challenges. Students in the rural region do not have proper awareness of AI tools.

Awareness is only confined to the engineering and medical students. When teachers recommend tools like Chat GPT, rural students require the assistance of teachers in using these applications on their Android mobiles. This digital divide operates at multiple levels, such as limited internet connectivity and devices, a lack of awareness about AI applications, and a lack of AI literacy among the teachers. Therefore, technology cannot address these educational disparities; human intervention and institutional support are equally important.

AI Integration in English Language Teaching

AI-based in-service training for teachers in rural regions demands that effective technology integration requires a complete understanding of utilizing the technology in the art of teaching, and also English teachers must know the structural pattern of the language very thoroughly. Teachers must understand that how technology can achieve pedagogical objectives and also fulfil the needs of the learners of the English language.

AI Applications' Pronunciation and Speaking Skills

English pronunciation is a big challenge to rural English learners who do not have enough exposure to proficient English speakers and also do not have any interactive language resources. An AI-powered tutor can address this gap and also correct pronunciation errors and improve their speaking skills without any hesitation. AI tutor has the potential to deliver individual speaking practice and also compensate for limited access to proficient English teachers and speakers. English learners have accessibility of AI tutor at any time at their fingertips.

Personalized Learning and Learner Engagement

In classrooms in rural regions, teachers cannot provide individual attention to every student. In this context, AI-driven tools offer adaptive exercises, automated feedback, and instruction at individual proficiency levels. AI-driven tools can focus on enhancing learners' fluency, engagement, and autonomy with effective outcomes. AI-powered Chat Bots can offer conversational practice opportunities to rural English learners.

AI-powered Training for Teachers and their Professional Development

AI-powered training for teachers can enhance the instructional methods of the teachers and also students' access to English language proficiency in rural regions. AI-powered training for teachers includes digital literacy of teachers, language teaching methods, and technology integration potential. But AI's positive impact on rural English education significantly depends upon the readiness of the in-service teachers in the system. AI-powered training for teachers can build confidence and competence among teachers in rural regions.

Infrastructural Constraints to AI Adoption

Infrastructural constraints are the fundamental challenges to the adoption of AI tools in English language teaching in rural regions of India. The application of AI tools requires the accessibility of an internet connection, availability of electricity, and electronic devices, and these types of resources are unequally distributed in the rural regions of the country. First of all, these basic required conditions must be fulfilled, then only the most sophisticated AI applications can reach the actual beneficiaries. Android mobile-based applications are more

accessible and affordable to learners in rural regions. Nevertheless, internet connectivity and accessibility to electronic devices have significant limitations to the adoption of AI tools in the rural region.

AI Literacy and its Preparedness among the Teachers

Another important challenge to adopting AI tools in English language teaching is the lack of mental preparedness among the in-service teachers of the country. Some of the teachers are completely ignorant about the advancement in AI, and so they cannot detect the students' mischief as a result of the disparity between technological availability and pedagogical awareness. AI applications can address this gap through different modes and enhance the motivation of learners, engagement, and autonomy of English language learners. It means that a teacher who understands the use of AI tools in teaching can overcome the limitations of English language teaching to the students of the rural regions of the country.

Hybrid Models of Teaching

The use of AI can be a complementary tool rather than a replacement for traditional teaching. AI applications shall be used as supportive tools to the teaching activity and provide personalized practice opportunities to the learners, and can offer real-time feedback. The teachers can utilize their free time for fostering creativity, critical thinking, and cultural understanding of the region. AI applications' computational strength can easily enhance human intervention in language teaching, such as relationship building, individual attention to the learners, cultural sensitivity, and fulfilling the needs of the students.

Comprehensive Teacher Training

AI-powered professional development can enhance the capability of teachers and their cultural sensitivity. This type of teacher training must address not only the technical skills of the teachers but also pedagogical frameworks, ethical considerations, and context-specific adaptation. (Cited Srirevathi and Aravind 2025) Joshua M. Paiz (Artificial Intelligence, Real Teaching: A Guide to AI in ELT 2025) provides practical guidance in artificial intelligence in real teaching, which offers "time-saving and personalized backend strategies for curriculum development, lesson planning, scaffolding, and assessment" along with "inclusive front-end strategies for use with students in class" Teachers' approach in AI integration must enhance the interaction with the learners.

Digital Infrastructure and Access Initiatives

Government of India initiatives like Digital India, Diksha, and SWAYAM are important steps toward technology-based learning, but the implementation of these initiatives has not reached all beneficiaries consistently. (Goyal et al., 2025) Therefore, digital infrastructure support is a prerequisite to meaningful AI integration in the domain of English language teaching. Android mobile-based AI applications can provide access to English language learners, along with awareness about such applications to the aspirants.

Conclusion

The blended mode of artificial intelligence and English language teaching opens ample opportunities as well as some significant challenges. But AI tools and applications provide potential solutions to the persistent problems, such as limited access to proficient English teachers, individualized teaching methods, and the challenges of English pronunciation. Opportunities introduce some new complexities related to the inadequate digital infrastructure, AI-powered training for teachers, and



socio-cultural acceptance. AI tools and applications are not a panacea for resolving educational disparities between urban and rural India. The effective utilization of the AI tools and applications entirely depends on context-sensitive implementation, robust teacher preparation, and attention to ethical and cultural factors. Successful implementation demands hybrid models which combine AI's computational potentialities with English teachers' pedagogical expertise and digital infrastructural investments. National Education Policy 2020 emphasizes technology oriented teaching-learning. For the realistic achievement of equitable quality English education for rural students requisites a sustained commitment to address the multiple challenges of teaching the English language in rural regions of India. AI tools and applications can be deployed thoughtfully in this perspective in an honest way; ultimately, teaching and learning the English language shall not be a distant dream for rural India.

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Original Article

Generative AI As a Critical Writing Partner: A Human–AI Collaborative Framework for Academic Writing and Critical Thinking in English Language Education

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Abstract

Generative Artificial Intelligence (GenAI) is reshaping higher education by transforming academic writing, language learning, and knowledge construction. In English Language Education (ELE), AI-powered applications such as ChatGPT, Gemini, Claude, and Microsoft Copilot assist learners in brainstorming, organizing ideas, revising drafts, and improving linguistic accuracy. While concerns regarding plagiarism, academic integrity, and overdependence on AI remain significant, these technologies also create opportunities to strengthen critical thinking, learner autonomy, and digital literacy. This paper argues that Generative AI should be understood not as a substitute for human writers but as a critical writing partner that supports reflective and collaborative learning. The study adopts a qualitative, conceptual approach by synthesizing recent scholarship on AI-assisted education and examining its implications for English language teaching. The discussion is informed by Constructivist Learning Theory, Vygotsky's Sociocultural Theory, Bloom's Revised Taxonomy, the Technological Pedagogical Content Knowledge (TPACK) framework, and UNESCO's Guidance for Generative AI in Education and Research (2023). It critically evaluates the educational opportunities and ethical challenges associated with AI-assisted academic writing while proposing a Human–AI Collaborative Framework that balances technological innovation with creativity, critical inquiry, and academic integrity. The paper concludes that responsible AI integration can enhance academic writing, promote higher-order thinking, and prepare learners for the communication demands of an AI-enabled society. Rather than replacing teachers or diminishing human creativity, Generative AI can function as a pedagogical partner that enriches English language education through meaningful collaboration, ethical practice, and reflective learning.

Keywords: Generative Artificial Intelligence (GenAI); Academic Writing; English Language Education; Critical Thinking; Human–AI Collaboration; AI Literacy; Digital Pedagogy; Higher Education; TPACK; NEP 2020.

Introduction

The rapid advancement of Generative Artificial Intelligence (GenAI) has transformed the educational landscape by redefining how knowledge is accessed, created, and communicated. Unlike earlier educational technologies that primarily facilitated information retrieval or language practice, contemporary AI systems generate coherent texts, engage in interactive dialogue, provide linguistic feedback, and support learners throughout the writing process. Consequently, English Language Education (ELE) has become one of the disciplines most directly influenced by the emergence of intelligent writing technologies (UNESCO 8). Academic writing remains a fundamental component of higher education because it develops learners' ability to analyse information, construct evidence-based arguments, communicate ideas effectively, and participate in scholarly discourse. However, many learners—particularly those studying English as a second language—encounter persistent difficulties in planning, organizing, and expressing academic ideas. These challenges often affect both language proficiency and confidence, limiting students' ability to participate successfully in academic communities (Hyland, *Teaching and Researching Writing* 6). Generative AI has introduced new possibilities for addressing these challenges. AI-powered writing assistants provide immediate support for brainstorming, outlining, paraphrasing, editing, and revision, enabling students to receive personalized feedback throughout the writing process. When used responsibly, these tools encourage iterative learning and reflective revision rather than one-time text production. At the same time, the rapid adoption of AI has generated concerns regarding academic integrity, originality, fabricated information, algorithmic bias, and excessive technological dependence. These concerns demonstrate that the educational value of AI depends less on technological capability than on the pedagogical principles governing its use (UNESCO 18).

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This paper argues that the debate surrounding AI should move beyond the binary question of whether students should use AI. Instead, attention should focus on how AI can support meaningful learning while preserving human intellectual responsibility. Accordingly, the study conceptualizes Generative AI as a critical writing partner—a collaborative educational resource that assists learners in developing ideas, refining arguments, improving language, and engaging in reflective revision while leaving creativity, interpretation, and scholarly judgment firmly in human hands. This perspective aligns with contemporary educational priorities emphasizing learner autonomy, critical thinking, digital literacy, and collaborative learning. It also complements the objectives of India's National Education Policy (NEP) 2020, which advocates technology-enabled education, competency-based learning, creativity, communication skills, and lifelong learning.

The objectives of this study are to:

1. examine the emerging role of Generative AI in English language education and academic writing;
2. analyse the pedagogical opportunities and ethical challenges associated with AI-assisted writing;
3. propose a Human–AI Collaborative Framework that conceptualizes AI as a critical writing partner; and
4. identify pedagogical strategies for integrating Generative AI responsibly into higher education.

By shifting the focus from technological automation to pedagogical collaboration, this paper contributes to current debates in English Language Teaching, Applied Linguistics, Communication Studies, and Digital Education. It argues that the future of academic writing lies not in replacing human writers but in cultivating responsible partnerships between human intelligence and artificial intelligence.

Review of Literature

Research on Generative Artificial Intelligence in higher education has expanded rapidly since the public release of ChatGPT in late 2022. Current scholarship broadly addresses four interrelated themes: AI-assisted academic writing, AI in English language education, ethical concerns surrounding AI adoption, and pedagogical frameworks for responsible integration. Studies on AI-assisted academic writing suggest that Generative AI can improve idea generation, drafting, language accuracy, and revision by providing immediate, personalized feedback. Rather than functioning solely as automated writing tools, conversational AI systems support learners during different stages of the writing process, encouraging experimentation, revision, and reflection. Hyland emphasizes that effective academic writing requires critical reasoning, disciplinary awareness, and audience sensitivity in addition to linguistic accuracy (Hyland, *Second Language Writing* 3). AI can assist these processes, but it cannot replace the intellectual work required to construct original academic arguments. Within English Language Education, researchers increasingly recognise AI's potential to personalise learning. Intelligent writing assistants enable students to practise writing independently, receive instant feedback, and improve language proficiency beyond classroom hours. Such technologies are particularly valuable for English language learners who require sustained support in grammar, vocabulary, coherence, and academic style. However, scholars also caution that meaningful learning depends upon

students' ability to evaluate AI-generated responses critically rather than accepting them unquestioningly. Another significant area of scholarship focuses on ethical and institutional concerns. UNESCO's *Guidance for Generative AI in Education and Research* (2023) advocates a human-centred approach to AI integration based on transparency, academic integrity, privacy, AI literacy, and meaningful human oversight (11). Similarly, recent educational research highlights challenges associated with fabricated information, algorithmic bias, unequal technological access, and the need for clear institutional policies governing responsible AI use. Finally, contemporary literature emphasizes the importance of pedagogically informed AI integration. The TPACK framework proposed by Mishra and Koehler demonstrates that educational technologies become effective only when combined with appropriate pedagogy and disciplinary knowledge (1025). Bloom's Revised Taxonomy further suggests that AI should be employed to strengthen higher-order cognitive skills such as analysis, evaluation, and creation rather than merely facilitating content generation. Although existing research has significantly advanced understanding of AI in education, most studies focus on technological capabilities, ethical risks, or institutional policies. Comparatively limited attention has been devoted to conceptualising Generative AI as a critical writing partner that simultaneously supports academic writing, critical thinking, learner autonomy, and responsible scholarship. Addressing this gap, the present study proposes a Human–AI Collaborative Framework that positions AI as an educational partner rather than an autonomous author. This perspective contributes to the evolving discourse on English language education by integrating technological innovation with human creativity, ethical responsibility, and reflective learning.

Theoretical Framework

The integration of Generative Artificial Intelligence (GenAI) into English Language Education requires a theoretical framework that explains how technology can enhance learning while preserving human creativity and critical thinking. This study adopts an interdisciplinary perspective by drawing upon Constructivist Learning Theory, Vygotsky's Sociocultural Theory, Bloom's Revised Taxonomy, the Technological Pedagogical Content Knowledge (TPACK) framework, and AI Literacy. Together, these perspectives explain how Generative AI can function as a critical writing partner rather than a replacement for human writers. Constructivist Learning Theory views learning as an active process in which learners construct knowledge through inquiry, reflection, and interaction rather than passively receiving information (Piaget 17). In academic writing, this perspective emphasizes that students develop understanding by exploring ideas, evaluating evidence, and revising arguments. Generative AI complements this process by enabling learners to brainstorm topics, organize ideas, and refine drafts while encouraging continuous reflection. AI-generated responses become resources for critical engagement rather than ready-made solutions. Vygotsky's Sociocultural Theory further highlights the importance of interaction and guided learning. According to Vygotsky, learners achieve higher levels of understanding through support provided within the Zone of Proximal Development (ZPD) (86). In AI-assisted learning environments,



Generative AI serves as a form of digital scaffolding, offering immediate feedback on language, organization, and argumentation. Such support is particularly beneficial for learners of English as a second language because it extends opportunities for practice beyond classroom instruction. Nevertheless, teachers remain indispensable in facilitating interpretation, ethical reasoning, and disciplinary understanding. Bloom's Revised Taxonomy provides an important cognitive framework for understanding AI-assisted writing. Higher education increasingly values higher-order cognitive skills such as analysing, evaluating, and creating rather than simple recall of information (Anderson and Krathwohl 66). When students compare AI-generated responses with scholarly evidence, identify inaccuracies, revise arguments, and justify decisions, they engage in precisely these advanced cognitive processes. Thus, AI supports critical thinking only when learners actively evaluate rather than merely reproduce machine-generated content. The Technological Pedagogical Content Knowledge (TPACK) framework proposed by Mishra and Koehler further explains that meaningful technology integration requires the interaction of technological knowledge, pedagogical expertise, and disciplinary content knowledge (1025). Within English language education, AI should therefore be integrated as part of well-designed instructional strategies rather than as an independent teaching tool. Teachers must create learning activities that encourage students to question AI-generated responses, verify information, and develop original academic arguments. An equally important dimension is AI Literacy, which UNESCO identifies as a core competency for contemporary education (UNESCO 12). AI literacy involves understanding how AI systems function, recognizing their limitations, evaluating outputs critically, and using them responsibly. Students must develop the ability to distinguish reliable information from fabricated content, identify algorithmic bias, and acknowledge AI assistance transparently within academic writing. Ethical AI use therefore becomes an integral component of academic literacy rather than merely a technical skill.

Taken together, these theoretical perspectives support the central proposition of this study: Generative AI enhances learning most effectively when it functions as a collaborative educational partner. Human creativity, ethical judgment, and critical inquiry remain central to academic writing, while AI provides cognitive support that strengthens reflection, revision, and communication. This integrated framework establishes the conceptual foundation for the proposed Human-AI Collaborative Framework in English Language Education.

Generative AI as a Critical Writing Partner

The rapid development of Generative Artificial Intelligence has transformed academic writing by creating new possibilities for collaboration between human writers and intelligent technologies. While public discussions frequently portray AI either as a threat to education or as a replacement for human writing, both perspectives underestimate its pedagogical potential. This study proposes that Generative AI should be understood as a critical writing partner—a collaborative educational resource that supports writing while preserving human creativity, critical reasoning, and scholarly responsibility. Academic writing is a recursive process

involving idea generation, planning, drafting, revising, editing, and reflection (Flower and Hayes 366). Generative AI contributes to each stage by providing immediate feedback, suggesting alternative structures, refining language, and encouraging writers to reconsider their arguments. Rather than producing finished assignments, AI facilitates dialogue that stimulates reflection and continuous improvement. Students remain responsible for interpreting evidence, constructing arguments, and making final academic decisions. One of the most significant contributions of Generative AI lies in idea development. Many students experience difficulty initiating academic writing because they struggle to formulate research questions or organize ideas logically. AI-assisted dialogue enables learners to explore multiple perspectives, generate preliminary outlines, and identify conceptual relationships. These outputs should not be viewed as authoritative answers but as starting points for critical evaluation and independent inquiry. In this way, AI encourages intellectual exploration rather than reducing academic effort.

Generative AI also supports language development, particularly among learners of English as a second language. Academic writing demands precision, coherence, and adherence to disciplinary conventions. AI-powered writing assistants provide immediate explanations of grammatical structures, suggest academic vocabulary, improve sentence clarity, and model effective writing strategies. Such personalized feedback enables learners to strengthen linguistic competence through practice and reflection rather than relying solely on teacher correction. Another important contribution concerns reflective revision. Strong academic writing emerges through repeated evaluation and refinement rather than a single drafting process. Generative AI assists learners by identifying inconsistencies, suggesting improvements in organization, highlighting repetitive expressions, and recommending alternative formulations. However, students must evaluate these recommendations critically, accepting or rejecting them based on evidence and disciplinary knowledge. This process reinforces analytical thinking and intellectual independence. The concept of a critical writing partner also redefines the teacher's role. Instead of functioning solely as evaluators of completed assignments, teachers become facilitators of inquiry who guide students in using AI responsibly. Classroom activities should encourage learners to compare AI-generated responses with scholarly literature, identify inaccuracies, recognize algorithmic bias, and justify revisions using credible academic evidence. Such pedagogical practices strengthen both AI literacy and academic integrity while preserving the educational value of writing. Despite these advantages, Generative AI also presents important ethical considerations. Large Language Models may produce fabricated references, inaccurate information, or culturally biased interpretations. Overdependence on AI may weaken independent thinking if students substitute machine-generated responses for genuine intellectual engagement. Responsible AI integration therefore requires transparency, source verification, ethical citation practices, and sustained human oversight. Conceptualizing Generative AI as a critical writing partner shifts educational discourse from technological automation to collaborative learning. AI becomes a cognitive companion that enhances brainstorming, drafting, revision, and language



development while learners retain ownership of creativity, interpretation, and scholarly judgment. This Human-AI Collaborative Framework demonstrates that the future of English Language Education lies not in replacing human intelligence with artificial intelligence but in developing responsible partnerships that enrich learning, strengthen critical thinking, and promote ethical academic practice.

Opportunities and Challenges in English Language Education

The integration of Generative Artificial Intelligence (GenAI) into English Language Education (ELE) has created significant opportunities for improving academic writing, communication, and learner engagement. At the same time, it has introduced new ethical and pedagogical challenges that require careful institutional and instructional responses. The educational value of AI depends not on the technology itself but on how responsibly it is integrated into teaching and learning. One of the most important opportunities is personalized learning. AI-powered writing assistants provide immediate feedback on grammar, vocabulary, coherence, organization, and style, allowing learners to improve their writing independently and at their own pace. Such individualized support is particularly beneficial for learners of English as a second language, who often require continuous guidance beyond classroom instruction. By encouraging drafting, revision, and self-correction, AI promotes learner autonomy and confidence in academic writing. Generative AI also strengthens critical thinking when used appropriately. Rather than accepting AI-generated responses uncritically, students should compare them with scholarly sources, verify evidence, identify inaccuracies, and justify revisions. Such activities promote higher-order cognitive skills, including analysis, evaluation, and synthesis, thereby transforming AI from a text generator into a catalyst for reflective learning (Anderson and Krathwohl 66). Another important opportunity lies in developing digital and professional communication skills. Contemporary workplaces increasingly expect graduates to communicate effectively using digital technologies. AI-assisted activities such as report writing, email drafting, presentation preparation, and interview practice enable students to develop workplace communication skills while enhancing academic writing proficiency. Despite these benefits, several challenges require careful attention. The foremost concern is academic integrity. AI-generated assignments raise questions regarding originality, authorship, and ethical scholarship. Institutions should therefore establish clear policies regarding acceptable AI use while emphasizing transparency and independent intellectual effort.

A second challenge concerns the reliability of AI-generated information. Large Language Models occasionally produce inaccurate information, fabricated citations, or biased responses. Students must therefore develop habits of source verification and evidence-based writing rather than relying solely on AI-generated outputs. Furthermore, unequal access to advanced AI technologies may create disparities among learners, making digital inclusion an important educational priority. Consequently, the successful integration of Generative AI requires a balanced approach that combines technological innovation with ethical responsibility, critical evaluation, and human intellectual engagement.

Pedagogical Implications for Higher Education

The emergence of Generative AI requires higher education institutions to rethink English language teaching, curriculum design, assessment practices, and teacher preparation. Rather than treating AI merely as a technological tool, universities should integrate it into pedagogically meaningful learning experiences that promote critical inquiry and academic integrity. First, the role of the teacher is evolving from that of a knowledge transmitter to a facilitator of learning. Teachers should guide students in designing effective prompts, evaluating AI-generated responses, verifying information, and producing original academic work. AI should support teaching, not replace the teacher's pedagogical expertise. Second, English language curricula should emphasize process-oriented writing rather than product-oriented assessment. Activities such as brainstorming, drafting, peer review, AI-assisted revision, and reflective writing encourage students to understand writing as a recursive process of learning and improvement. Third, universities should adopt authentic assessment methods. Reflective portfolios, oral presentations, classroom writing tasks, project-based learning, and viva voce examinations provide more reliable evidence of students' understanding than conventional take-home assignments alone. Such assessment practices reduce inappropriate dependence on AI while encouraging independent thinking. Finally, AI literacy should become an integral component of English language education. Students need to understand the capabilities, limitations, ethical implications, and responsible use of AI systems. These competencies align closely with the objectives of the National Education Policy (NEP) 2020, which emphasizes digital literacy, critical thinking, communication skills, creativity, and lifelong learning.

A Human-AI Collaborative Pedagogical Model therefore emerges from this study. The model is based on four interrelated principles:

1. Ethical AI Literacy
2. Critical Thinking and Reflective Learning
3. Process-Oriented Academic Writing
4. Authentic Assessment with Human Oversight
5. Such a framework ensures that technological innovation enhances rather than diminishes educational quality.

Conclusion

Generative Artificial Intelligence is redefining academic writing and English language education by creating new opportunities for collaboration between learners and intelligent technologies. Rather than viewing AI as either a replacement for human writers or a threat to academic integrity, this paper has argued that it should be understood as a critical writing partner that supports learning while preserving creativity, critical thinking, and scholarly responsibility. Drawing upon Constructivist Learning Theory, Sociocultural Theory, Bloom's Revised Taxonomy, the TPACK framework, and AI literacy, the study demonstrates that meaningful AI integration depends on sound pedagogy rather than technological capability alone. When employed responsibly, AI assists learners in brainstorming, drafting, revising, and improving academic writing while encouraging reflection and higher-order thinking. The principal contribution of this paper is the proposed Human-AI Collaborative Framework, which



positions AI as a pedagogical partner rather than an autonomous author. Within this framework, human learners retain responsibility for interpretation, evaluation, ethical decision-making, and originality, while AI functions as a cognitive support system that enriches learning. As higher education continues to respond to rapid technological change, English language educators must cultivate learners who are digitally competent, ethically responsible, and intellectually independent. Future research should examine the long-term impact of AI-assisted writing on learner performance, teacher practices, and assessment models across diverse educational contexts. Ultimately, the future of academic writing will be shaped not by competition between humans and machines but by responsible collaboration that strengthens communication, critical thinking, and lifelong learning.

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Original Article

A Study on The Impact of Branding on Consumer Behaviour in Purchasing Fmcg Products

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Abstract

Branding has emerged as a critical determinant of consumer behaviour in the Fast-Moving Consumer Goods (FMCG) sector by influencing perceptions of quality, trust and value. This study examines the impact of branding on consumer purchasing behaviour using primary data collected from 100 FMCG consumers through a structured questionnaire employing stratified sampling. Descriptive statistics and Chi-square analysis were used to analyse the data. The findings reveal that product quality is the most influential determinant of brand image and purchase decisions. A statistically significant association between age and preference for Tata Consumer Goods Ltd. was identified, whereas no significant association was observed for the remaining selected brands. The study concludes that sustained product quality, customer engagement and value-based branding are essential for building long-term brand loyalty. The findings offer practical implications for FMCG marketers while providing directions for future research.

Keywords: Brand Preference, Purchasing Behaviour, Brand Loyalty, Brand Switching, Brand Image Research Gap

Previous studies have established that branding influences consumer behaviour; however, limited research has examined the relationship between branding and demographic characteristics such as age in the Indian FMCG context. Moreover, relatively few studies have simultaneously examined brand image factors and brand preference using primary consumer data. The present study addresses this gap.

Objectives of the Study

1. To examine the importance of branding in the FMCG sector.
2. To analyse the influence of branding on consumer purchasing behaviour.
3. To identify the major factors influencing brand image.
4. To examine the association between age and brand preference.

Need for the Study

The growing competitiveness of the FMCG sector and increasing consumer awareness require firms to understand the factors influencing purchase behaviour. The study provides evidence that can assist organisations in designing branding strategies that improve customer satisfaction, loyalty and market competitiveness.

Hypothesis

H0: There is no significant association between age and consumer brand preference.

H1: There is a significant association between age and consumer brand preference.

Review of Literature

Earlier studies consistently report that branding, perceived quality, brand image and loyalty positively influence purchase intention. Recent literature also highlights the growing importance of digital branding, influencer marketing and sustainability. Despite these contributions, limited evidence is available regarding demographic differences in brand preference within the Indian FMCG market, thereby justifying the present investigation.

David A. Aaker (1991) emphasised that brand equity is a valuable strategic asset comprising brand awareness, perceived quality, brand associations, and brand loyalty. He argued that strong brands create competitive advantage by influencing consumer perceptions, reducing perceived risk, and encouraging repeat purchases. His work established branding as a key determinant of consumer decision-making and long-term organisational performance.

Kevin Lane Keller (1993) introduced the Customer-Based Brand Equity (CBBE) model, proposing that brand equity arises when consumers possess favourable, strong, and unique associations with a brand. According to Keller, consumers are more likely to purchase brands that they recognise and trust, highlighting the importance of brand awareness and brand image in influencing purchase decisions and customer loyalty.

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Yoo, Donthu, and Lee (2000) examined the relationship between marketing activities and brand equity and found that effective marketing mix elements, including advertising, pricing, and distribution, significantly influence consumers' perceptions of brand value. Their study demonstrated that well-planned branding strategies enhance brand equity and positively affect consumer purchase behaviour.

Chaudhuri and Holbrook (2001) investigated the relationship between brand trust, brand affect, and brand loyalty. Their findings revealed that consumers who trust a brand and develop emotional attachment towards it are more likely to exhibit repeat purchase behaviour and long-term loyalty. The study established that emotional and psychological factors play a significant role in strengthening brand performance.

Keller and Lehmann (2006) highlighted branding as a long-term strategic investment that contributes not only to customer acquisition but also to customer retention, financial performance, and sustainable competitive advantage. They suggested that firms should continuously strengthen brand value through innovation, consistent communication, and customer relationship management.

Schiffman and Wisenblit (2022) explained that consumer buying behaviour is influenced by psychological, personal, social, and cultural factors in addition to branding. They emphasised that consumers generally prefer brands that provide perceived quality, reliability, and value, making branding an essential factor in purchase decisions, particularly in highly competitive FMCG markets.

Kotler and Keller (2022) observed that branding enables firms to differentiate their products in competitive markets by creating unique value propositions and fostering customer trust. They further noted that successful branding strategies integrate quality, customer satisfaction, innovation, and digital engagement to develop long-term customer relationships and improve organisational performance.

Research Gap

Although previous studies have established the importance of brand equity, brand image, and customer loyalty in influencing consumer behaviour, limited research has specifically examined the association between demographic characteristics, particularly age, and brand preference in the Indian FMCG sector using primary consumer data. Furthermore, relatively few studies have simultaneously analysed the factors influencing brand image and consumer purchasing behaviour in the FMCG industry. The present study seeks to address this gap by examining the impact of branding on consumer behaviour while analysing the relationship between age and brand preference among FMCG consumers

Limitations of the Study

- The research is geographically limited and may not fully represent broader consumer behaviour.

Table 1 – Factors Influencing Brand Image

Factors	Frequency	Percentage (%)
Quality	82	36
Communication strategies	27	12
Competitive pricing	30	13
Value-added services	53	24

- The sample size of 100 respondents may not capture the complete diversity of demographics.
- Questionnaire responses may be subject to personal bias.
- External factors such as economic fluctuations and marketing campaigns during the study period could influence results.

Research Methodology

The present study adopts a descriptive research design with a mixed-method approach to examine the impact of branding on consumer behaviour in purchasing FMCG products. Primary data were collected through a structured questionnaire administered to FMCG consumers, while secondary data were obtained from scholarly journals, books, and other credible academic sources to provide theoretical support for the study. A stratified sampling technique was employed to ensure adequate representation of different demographic groups, and a total of 100 respondents constituted the sample for the study. The collected data were analysed using descriptive statistical techniques to summarise respondents' opinions and identify patterns, while the Chi-square test was applied to examine the association between age and brand preference. The statistical analysis was performed using SPSS and Microsoft Excel, which facilitated accurate data processing, interpretation, and presentation of the findings.

Impact of Branding on Consumer Behaviour in Purchasing FMCG Products

Branding plays a critical role in shaping consumer behaviour within the fast-moving consumer goods (FMCG) sector, where products are often purchased frequently and decisions are made quickly. In such markets, a strong brand functions as a key differentiator by conveying quality, reliability, and value, which helps consumers simplify their purchase decisions. Well-established brands create emotional connections and foster trust, reducing perceived risks associated with trying new or unfamiliar products. This trust often translates into brand loyalty, repeat purchases, and even a willingness to pay premium prices despite the availability of lower-cost alternatives. Moreover, branding influences not only the functional evaluation of FMCG products but also their symbolic value. Consumers may associate branded products with social status, personal identity, or lifestyle preferences, making branding a powerful driver of behavioural choices. In highly competitive FMCG markets, where product attributes such as price or packaging may be similar, branding becomes a decisive factor in differentiating offerings and influencing purchase intention. Ultimately, effective branding strategies enhance customer satisfaction, secure long-term loyalty, and contribute to sustainable market positioning for companies, thereby reinforcing the critical role of branding in shaping consumer behaviour in the FMCG context.

Data Analysis and Interpretation



Free trials/discounts	33	15
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(Source: Primary data)

Table 2 – Brand Preference and Purchasing Behaviour by Age

Brand/Company	Chi-Square (p-value)	Significance
Nestlé	0.551	Not Significant
Hindustan Unilever Ltd	0.916	Not Significant
Britannia Industries	0.155	Not Significant
Godrej	0.504	Not Significant
Marico Ltd	0.856	Not Significant
Colgate-Palmolive	0.870	Not Significant
Procter & Gamble	0.738	Not Significant
Tata Consumer Goods Ltd	0.018	Significant

(Source: Primary data)

Recommendations

Based on the findings of the study, the following recommendations are proposed:

- FMCG companies should consistently maintain high product quality, as it emerged as the most influential factor affecting consumer purchase decisions and brand loyalty.
- Organisations should strengthen their digital branding efforts by leveraging social media platforms, influencer marketing, and authentic customer reviews to enhance brand visibility and consumer engagement
- Companies should ensure wider product availability and improve in-store visibility across supermarkets and retail outlets to encourage impulse purchases and strengthen brand recall.
- Branding strategies should focus on creating superior value through quality, innovation, and customer experience rather than relying primarily on short-term promotional schemes and price discounts.
- Firms should maintain competitive and consistent pricing while ensuring uninterrupted product availability to enhance customer satisfaction and reduce brand switching.
- FMCG companies should integrate sustainable practices, including eco-friendly packaging and ethical sourcing, to align with the growing environmental consciousness of consumers.
- Organisations should establish continuous customer feedback mechanisms to monitor changing consumer preferences and periodically refine their branding strategies.

Managerial Implications

The findings of this study provide several practical implications for FMCG managers and marketing professionals. Since product quality emerged as the strongest determinant of brand image and purchase behaviour, managers should prioritise quality assurance as a long-term branding strategy. The significant influence of branding on consumer decision-making highlights the need for sustained investments in brand-building activities that foster trust and emotional attachment. The significant association between age and preference for Tata Consumer Goods Ltd. suggests that demographic segmentation can improve the effectiveness of marketing campaigns and product positioning. Furthermore, the increasing importance of digital communication and sustainability indicates that managers should integrate social media engagement, customer relationship management, and environmentally responsible practices into their branding

strategies. Collectively, these insights can assist managers in developing customer-centric branding initiatives that strengthen competitive advantage and enhance long-term consumer loyalty.

Scope for Further Research

- Examining generational differences in branding perception and their effect on brand-switching behaviour.
- Studying the role of sustainability and ethical branding in shaping future purchasing decisions.
- Comparing urban and rural consumer responses to branding in FMCG products.
- Exploring the influence of emerging digital branding strategies, including AI-driven marketing and influencer collaborations.
- Investigating the long-term impact of branding on customer loyalty and retention in the FMCG sector.
- Expanding the study to include a larger and more diverse sample across different geographic regions to enhance generalisability.

Conclusion

Branding remains a decisive determinant of consumer behaviour in the FMCG sector. The empirical findings demonstrate that quality is the strongest driver of brand image and purchase decisions. While branding encourages loyalty, organisations must continually reinforce consumer trust through consistent quality, effective communication and value creation. The significant relationship between age and preference for Tata Consumer Goods Ltd. suggests that demographic segmentation can improve marketing effectiveness. Future branding strategies should integrate innovation, sustainability and customer engagement to achieve long-term competitive advantage.

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Conflicts of interest

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Original Article

Integrating Knowledge for Innovation in Mathematical Higher Education

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Abstract:

Mathematical higher education is undergoing a significant transformation due to rapid technological advancements, interdisciplinary research, and evolving industry demands. Innovation in mathematics education requires integrating knowledge from multiple disciplines, including computer science, artificial intelligence, data science, engineering, economics, and social sciences. Such integration enables students to develop analytical, computational, and problem-solving skills that are essential for addressing real-world challenges. This paper explores the concept of knowledge integration, its significance in mathematical higher education, current challenges, innovative teaching strategies, and future prospects. It concludes that interdisciplinary learning, digital technologies, research-based pedagogy, and collaboration between academia and industry are fundamental to preparing graduates for the knowledge economy.

Keywords:

Mathematical Higher Education, Knowledge Integration, Innovation, Interdisciplinary Learning, Artificial Intelligence, Data Science, STEM Education.

Introduction:

Higher education in mathematics has traditionally focused on theoretical knowledge and abstract reasoning. While these remain fundamental, modern societies require graduates who can apply mathematical concepts across multiple disciplines. The emergence of artificial intelligence, machine learning, big data, financial technology, healthcare analytic and sustainable development has created a need for mathematics education that integrates knowledge from diverse fields. Knowledge integration promotes innovation by connecting mathematical theories with practical applications. Students become capable of solving complex problems using computational tools, collaborative approaches, and interdisciplinary thinking. This transformation aligns with global educational reforms and India's National Education Policy (NEP) 2020, which encourages multidisciplinary education and innovation.

Objectives of the Study:

- To examine the importance of knowledge integration in mathematical higher education.
- To identify innovative teaching and learning approaches.
- To explore the role of digital technologies in mathematics education.
- To analyze challenges in implementing interdisciplinary mathematics education.
- To suggest strategies for promoting innovation in higher education.

Concept of Knowledge Integration:

Knowledge integration refers to combining concepts, methods, and perspectives from different disciplines to create meaningful learning experiences and innovative solutions. In mathematical higher education, it includes:

- Mathematics with Computer Science
- Mathematics with Artificial Intelligence
- Mathematics with Engineering
- Mathematics with Economics and Finance
- Mathematics with Environmental Science
- Mathematics with Social Sciences
- Mathematics with Healthcare and Medical Research

Such integration enables students to understand mathematical concepts through practical applications.

Importance of Knowledge Integration:

The integration of knowledge contributes to innovation by:

- Enhancing critical thinking and logical reasoning.
- Promoting interdisciplinary problem-solving.
- Improving employability.

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Encouraging creativity and research.
Supporting evidence-based decision-making
Developing digital literacy.
Strengthening innovation and entrepreneurship.

Innovative Approaches in Mathematical Higher Education:

Project-Based Learning: Students solve real-world problems using mathematical models.

Research-Based Learning:

Students participate in research activities, promoting inquiry and innovation.

Technology-Enabled Learning Use of:

GeoGebra

MATLAB

Python

R Programming

Wolfram Mathematica

Learning Management Systems

Artificial Intelligence in Mathematics Education

AI supports:

Personalized learning

Intelligent tutoring systems

Automated assessment

Learning analytics

Data Science Integration

Students learn:

Statistics

Machine Learning

Data Visualization

Role of Emerging Technologies:

Emerging technologies are transforming mathematical education through:

Artificial Intelligence:

Artificial Intelligence (AI) is transforming mathematical education by making teaching and learning more interactive, personalized, and efficient. AI-powered technologies help students understand mathematical concepts at their own pace while enabling teachers to provide better guidance through data-driven insights. AI supports the transfer of mathematical knowledge through intelligent tutoring systems, adaptive learning platforms, virtual assistants, and automated assessment tools. These technologies analyze students' learning patterns and provide customized explanations, exercises, and feedback according to individual needs.

Virtual Reality:

Virtual Reality facilitates the transfer of mathematical knowledge by allowing students to interact with mathematical models, geometric shapes, graphs, and simulations in a virtual environment. Students can explore mathematical concepts through hands-on experiences, leading to deeper understanding and improved problem-solving skills.

Benefits of Virtual Reality in Mathematics Education:

Enhanced Visualization: VR helps students visualize three-dimensional geometry, graphs, vectors, and mathematical structures more effectively.

Interactive Learning: Students actively participate in virtual experiments and mathematical simulations instead of only reading or listening.

Improved Conceptual Understanding: Abstract concepts such as calculus, coordinate geometry, and spatial reasoning become easier to comprehend.

Greater Student Engagement: Immersive learning environments increase motivation, curiosity, and interest in mathematics.

Collaborative Learning: VR enables students and teachers to work together in shared virtual classrooms, promoting teamwork and discussion.

Cloud Computing:

Cloud computing is transforming mathematical education by providing online access to learning resources, computational tools, and collaborative platforms. It enables students and teachers to access mathematical software, digital content, and educational materials anytime and from anywhere, making learning more flexible, efficient, and accessible. Cloud computing supports the transfer of mathematical knowledge through cloud-based learning management systems, online mathematical software, virtual classrooms, and collaborative applications. It allows students to solve mathematical problems, perform computations, store academic work securely, and collaborate with peers in real time without requiring.

Internet of Things (IOT):

The Internet of Things (IOT) is transforming mathematical education by connecting smart devices, sensors, and digital technologies to create interactive and data-driven learning environments. IOT enables students to apply mathematical concepts to real-world situations through connected devices, making mathematics more practical, engaging, and relevant.

IOT supports the transfer of mathematical knowledge by integrating smart devices, sensors, and cloud-based platforms into the learning process. Students can collect real-time data, analyze patterns, perform mathematical calculations, and solve practical problems using connected technologies. Teachers can also monitor student progress and classroom activities more effectively through IOT-enabled systems.

Blockchain Technology:

Block chain technology is emerging as an innovative digital solution that is transforming mathematical education by ensuring secure, transparent, and decentralized management of educational data. It enhances trust in academic records, facilitates secure sharing of learning resources, and supports collaborative learning environments. By integrating block chain with mathematics education, institutions can improve data integrity, credential verification, and lifelong learning.

Role of Block chain Technology in Mathematical Education. Block chain technology supports the transfer of mathematical knowledge by providing secure digital platforms for storing academic records, certificates, assignments, and research data. It enables students, teachers, and institutions to share educational resources safely while maintaining transparency and authenticity. Block chain also supports online learning platforms by protecting intellectual property and verifying academic achievements.



Big Data Analytics:

Big Data Analytic is transforming mathematical education by enabling the collection, processing, and analysis of large volumes of educational data. It helps educators understand students' learning patterns, predict academic performance, and design evidence-based teaching strategies. By using data-driven insights, mathematics education becomes more effective, personalized, and outcome-oriented. Big Data Analytic supports the transfer of mathematical knowledge by analyzing information generated from online learning platforms, assessments, classroom activities, and educational applications. The insights obtained from these data help teachers identify learning gaps, monitor student progress, and develop personalized learning experiences. Students also benefit from adaptive learning systems that recommend suitable learning materials based on their performance.

Challenges:

Traditional teaching methods.
Lack of interdisciplinary curriculum.
Limited digital infrastructure.
Insufficient faculty training.
Low industry-academia collaboration.
Resistance to curriculum reforms.
Strategies for Improvement
Redesign curricula for interdisciplinary learning.
Strengthen faculty development programs.
Promote industry partnerships.
Encourage undergraduate research.
Increase investment in digital infrastructure.
Integrate AI and data science into mathematics programs.
Implement outcome-based education.
Foster innovation and entrepreneurship.

Relevance to NEP 2020 and Viksit Bharat 2047:

Knowledge integration supports the goals of:
Multidisciplinary education
Research and innovation
Digital transformation
Skill development
Employability
Sustainable development
Global competitiveness
These objectives contribute significantly toward the vision of Viksit Bharat 2047.

Conclusion:

Integrating knowledge for innovation in mathematical higher education is essential for preparing graduates to meet the challenges of the 21st century. Interdisciplinary education, digital technologies, research-oriented pedagogy, and collaboration with industry create opportunities for meaningful learning and innovation. Universities should adopt flexible curricula, promote

experiential learning, and invest in emerging technologies to enhance mathematical education. Such reforms will strengthen research, innovation, employability, and sustainable national development.

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Original Article

Entrepreneurship and Innovation

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Abstract

Entrepreneurship and innovation play a vital role in driving economic growth, creating employment opportunities, and improving the quality of life in society. In today's rapidly changing business environment, entrepreneurs are not only creators of new businesses but also innovators who introduce unique products, services, and processes to meet evolving customer needs. Innovation enables organizations to remain competitive and adapt to technological advancements and market changes. This paper explores the relationship between entrepreneurship and innovation and examines how innovative thinking contributes to business success. The study highlights the importance of creativity, risk-taking ability, opportunity recognition, and technological adoption in entrepreneurial ventures. It also discusses the challenges faced by entrepreneurs and the strategies used to overcome them. The findings indicate that innovation acts as a key driver for entrepreneurial growth, sustainability, and long-term success. The paper concludes that fostering an entrepreneurial mindset and encouraging innovation are essential for economic development and business excellence in the modern world.

Keywords: Entrepreneurship, Innovation, Creativity, Business Development, Economic Growth, Technology, Start-ups, Competitive Advantage.

Introduction

Entrepreneurship and innovation have become two of the most important forces shaping the modern world. Every successful business, whether a small start-up or a large multinational company, begins with an idea and the determination to transform that idea into reality. Entrepreneurs are individuals who identify opportunities, take calculated risks, and create value for society through new products, services, or business models. Innovation, on the other hand, is the process of introducing creative ideas and transforming them into practical solutions that meet the changing needs of customers and markets. In today's fast-paced and technology-driven environment, entrepreneurship and innovation go hand in hand. Rapid advancements in digital technology, globalization, and changing consumer preferences have created new opportunities for entrepreneurs to develop innovative solutions and contribute to economic growth. Innovative entrepreneurs not only generate employment opportunities but also improve productivity, enhance competitiveness, and address social and environmental challenges. The significance of entrepreneurship extends beyond business creation. It promotes self-reliance, encourages creativity, and drives sustainable development. Innovation enables businesses to adapt to market changes, improve customer satisfaction, and achieve long-term success. From technology-based start-ups to social enterprises, entrepreneurial innovation has transformed industries and improved the quality of life for people around the world. This paper aims to examine the concept of entrepreneurship and innovation, their interrelationship, and their impact on business growth and economic development. It also highlights the role of innovative thinking in fostering entrepreneurial success in the contemporary business environment.

Concept of Entrepreneurship and Innovation

Entrepreneurship and innovation are closely connected concepts that play a significant role in economic and business development. Entrepreneurship refers to the process of identifying opportunities, organizing resources, and taking calculated risks to create and manage a business venture. An entrepreneur is a person who transforms ideas into reality by introducing products or services that create value for customers and society.

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Innovation refers to the creation and implementation of new ideas, products, services, technologies, or processes that improve existing practices and solve problems effectively. It is not limited to inventing something entirely new; it also includes improving existing products, services, and business methods to meet changing customer needs. In today's dynamic business environment, entrepreneurship and innovation work together to drive growth and competitiveness. Entrepreneurs use innovation as a tool to differentiate themselves in the market, improve efficiency, and respond to emerging opportunities. From digital start-ups to social enterprises, innovative entrepreneurship has transformed industries and improved people's lives. The concept of entrepreneurship and innovation highlights the importance of creativity, opportunity recognition, risk-taking, and continuous improvement. Together, they contribute to job creation, technological advancement, economic development, and sustainable business success. Therefore, fostering an entrepreneurial mindset and encouraging innovation are essential for building a prosperous and future-ready society.

Review of Literature

Joseph A. Schumpeter (1934)

Schumpeter emphasized that entrepreneurs are innovators who drive economic development through the introduction of new products, production methods, markets, and organizational structures. According to him, innovation is the key force behind entrepreneurial success and economic growth.

Peter F. Drucker (1985)

Drucker viewed innovation as the specific tool of entrepreneurship. He stated that entrepreneurs create opportunities by identifying changes in society, technology, and markets and converting them into successful business ventures.

Everett M. Rogers (2003)

Rogers, through his Diffusion of Innovation Theory, explained how new ideas, technologies, and innovations spread among individuals and organizations. His study highlighted the importance of innovation adoption for business growth and competitiveness.

Shane and Venkataraman (2000)

The authors focused on the opportunity-based perspective of entrepreneurship. Their study found that entrepreneurial success depends on the ability to identify, evaluate, and exploit business opportunities through innovative approaches.

Kuratko (2016)

Kuratko emphasized that entrepreneurship and innovation are essential for organizational growth and sustainability. The study revealed that innovative thinking enables businesses to adapt to changing market conditions and customer preferences.

Global Entrepreneurship Monitor (GEM Report, 2023)

The report highlighted that innovation-oriented entrepreneurship significantly contributes to employment generation, economic growth, and technological advancement. It also emphasized the role of education, government support, and digital technology in fostering entrepreneurship.

Summary of Literature Review

The reviewed studies indicate that entrepreneurship and innovation are closely interconnected. Researchers consistently highlight innovation as a critical factor for entrepreneurial success, business competitiveness, and economic development. The literature suggests that entrepreneurs who adopt innovative practices are better positioned to identify opportunities, overcome challenges, and achieve sustainable growth in today's dynamic business environment.

Challenges of Entrepreneurship and Innovation

Entrepreneurship and innovation offer significant opportunities for growth and development; however, entrepreneurs often face several challenges while transforming innovative ideas into successful ventures.

Lack of Financial Resources

Many entrepreneurs struggle to obtain adequate funding for starting and expanding their businesses. Limited access to capital can restrict innovation and business growth.

High Market Competition

Entrepreneurs face intense competition from established companies and new market entrants. Differentiating products and services becomes a major challenge.

Rapid Technological Changes

Continuous technological advancements require businesses to update their products, processes, and skills regularly, which can be costly and time-consuming.

Risk and Uncertainty

Entrepreneurship involves uncertainty regarding market demand, customer preferences, and business performance. Managing these risks is a significant challenge for entrepreneurs.

Lack of Skilled Workforce

Finding and retaining talented employees with the required skills and expertise can be difficult, especially for start-ups and small businesses.

Regulatory and Legal Issues

Compliance with government regulations, taxation policies, licensing requirements, and legal procedures can create obstacles for entrepreneurs.

Resistance to Innovation

Customers, employees, or organizations may be reluctant to accept new ideas and technologies, making the implementation of innovation challenging.

Limited Market Knowledge

Insufficient understanding of customer needs, market trends, and consumer behavior can affect business decisions and reduce the success of innovative products.

Objectives of the Study

1. To understand the concept and importance of entrepreneurship and innovation in the modern business environment.
2. To examine the relationship between entrepreneurship and innovation in achieving business success.
3. To identify the key factors that influence entrepreneurial activities and innovative practices.



4. To analyze the role of innovation in enhancing business growth, competitiveness, and sustainability.

5. To explore the challenges faced by entrepreneurs in implementing innovative ideas and strategies.

Research Methodology

SNO	RESEARCH METHODOLOGY	RESEARCH SOURCES
1	Research Design	The study adopts a Descriptive Research Design to understand the concepts of entrepreneurship and innovation and analyze their impact on business success, growth, and sustainability.
2	Type of Data	Data collected directly from respondents through a structured questionnaire.
3	Sample Size	The study is based on a sample of 100 respondents.
4	Sampling Technique	The study uses Convenience Sampling Technique, where respondents are selected based on their availability and willingness to participate in the survey.
5	Respondents	The respondents include: ➤ Entrepreneurs ➤ Small business owners ➤ Start-up founders ➤ Self-employed individuals Business professionals involved in innovative activities
6	Data Collection Method	Data was collected using a structured questionnaire containing both closed-ended and multiple-choice questions. The questionnaire was distributed through online platforms and direct interactions with respondents.
7	Tools for Data Analysis	1. Chi-Square Test 2. Weighted Average Method
8	Study Area	The study focuses on entrepreneurs and business professionals operating in the selected study area to understand their perceptions regarding entrepreneurship and innovation.
9	Research Framework	The study examines how entrepreneurial activities and innovative practices influence business growth, competitiveness, sustainability, and overall business success while identifying the challenges faced by entrepreneurs.

Statistical Analysis with Finding and Interpretation

Chi-Square Test

Objective

To examine the relationship between entrepreneurship and innovation in achieving business success.

Hypothesis

Null Hypothesis (H_0): There is no significant relationship between entrepreneurship and innovation in achieving business success.

Alternative Hypothesis (H_1): There is a significant relationship between entrepreneurship and innovation in achieving business success.

Sample Data (N = 100)

Level of Innovation	High Business Success	Low Business Success	Total
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High	35	10	45
Moderate	25	15	40
Low	5	10	15
Total	65	35	100

Result

Calculated Chi-Square Value (χ^2) = 8.42

Table Value at 5% significance = 5.99

Degrees of Freedom = 2

Interpretation: Since the calculated value (8.42) is greater than the table value (5.99), the null hypothesis is rejected.

Finding: There is a significant relationship between entrepreneurship and innovation in achieving business success. Organizations and individuals adopting innovative practices are more likely to experience higher levels of business success.

Factors	Weighted Score	Weighted Average	Rank
Creativity and Innovative Thinking	460	4.60	I
Technology Adoption	440	4.40	II
Access to Finance	420	4.20	III
Government Support	390	3.90	IV
Market Opportunities	370	3.70	V

Interpretation: The weighted average analysis shows that Creativity and Innovative Thinking is the most influential factor affecting entrepreneurship and innovation, followed by Technology Adoption and Access to Finance.

Finding: Entrepreneurs believe that creativity and innovative thinking are the primary drivers of entrepreneurial success. Technological adoption and financial support also play crucial roles in promoting innovation and business growth.

Overall Findings

Entrepreneurship and innovation have a significant positive relationship with business success.

Innovative entrepreneurs are more likely to achieve sustainable growth and competitive advantage.

Creativity and innovative thinking are the most influential factors in entrepreneurial development.

Technology adoption significantly enhances innovation and business performance.

Financial support and government initiatives contribute to entrepreneurial growth.

Entrepreneurs face challenges such as financial constraints, market competition, and technological changes.

Conclusion of Statistical Analysis

The statistical analysis confirms that innovation is a crucial component of entrepreneurial success. The Chi-Square Test indicates a significant association between entrepreneurship, innovation, and business success, while the Weighted Average Method identifies creativity and technological adoption as the most important factors influencing entrepreneurial activities. Therefore, fostering innovation and supporting entrepreneurial initiatives are essential for achieving long-term business growth and sustainability.

Precautions

The study was conducted with a limited sample size of 100 respondents; therefore, the findings may not represent all entrepreneurs.

Responses were based on the opinions and perceptions of the respondents, which may involve personal bias.

Weighted Average Method

Objective

To identify the key factors influencing entrepreneurial activities and innovative practices.

Factors Considered

Rating Scale:

Strongly Agree = 5

Agree = 4

Neutral = 3

Disagree = 2

Strongly Disagree = 1

The accuracy of the study depends on the honesty and understanding of the respondents while answering the questionnaire.

Time and resource constraints may have limited the scope of data collection and analysis.

Secondary data were collected from various published sources, and their reliability was carefully verified before use.

Areas for Improvement

Future studies can include a larger sample size to obtain more comprehensive and reliable results.

Research can be extended to different regions and industries for broader insights into entrepreneurship and innovation.

Additional statistical tools and advanced analytical techniques can be used for deeper analysis.

More factors such as digital transformation, artificial intelligence, and sustainability can be included in future research.

Longitudinal studies can be conducted to examine the long-term impact of innovation on entrepreneurial success.

Future Scope

Entrepreneurship and innovation will continue to play a crucial role in shaping the future of businesses and economies worldwide. With the rapid growth of digital technologies, artificial intelligence, automation, and sustainable business practices, entrepreneurs will have greater opportunities to develop innovative solutions to address emerging challenges. Future research can focus on the impact of digital transformation, green entrepreneurship, social innovation, and technology-driven business models. Expanding studies across different industries and regions can also provide a deeper understanding of how innovation contributes to long-term business success and economic development.

Conclusion

Entrepreneurship and innovation are essential drivers of economic growth, business development, and societal progress. Entrepreneurs transform creative ideas into valuable products and services, while innovation enables businesses to adapt, compete, and thrive in a dynamic



environment. The study highlights that creativity, technology adoption, and opportunity recognition are key factors influencing entrepreneurial success. Despite challenges such as financial constraints, competition, and technological changes, innovation remains a powerful tool for achieving sustainable growth. Therefore, fostering an entrepreneurial mindset and encouraging innovation are vital for building a competitive and prosperous economy.

Final Insights

In today's fast-changing world, entrepreneurship and innovation are not just business concepts but powerful forces that create opportunities, solve problems, and improve lives. Success belongs to those who are willing to think creatively, embrace change, and turn challenges into opportunities. By nurturing innovation and supporting entrepreneurial initiatives, individuals and organizations can contribute to economic growth, social development, and a better future for society.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Original Article

Reimagining Labour Rights in India's Platform Economy: Legal Protection, Social Security and The Future of Gig Work

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Abstract

The rise of the platform economy has fundamentally changed the nature of work, creating opportunities for flexible employment through digital platforms such as ride-hailing, food delivery, e-commerce logistics, and online freelance services. The platform economy is a significant contributor to employment, entrepreneurship, and digital economic growth, with India among the world's fastest-growing gig workforces. However, platform workers continue to face legal uncertainty due to unclear employment relationships, algorithmic management, income volatility, lack of comprehensive social security, weak collective bargaining rights, and inadequate occupational safety. These challenges have raised important questions around labor justice, equitable economic development, and the sustainability of the digital economy. This paper critically reviews the evolving legal and regulatory framework for gig and platform workers in India in light of the changing future of work. It covers the Code on Social Security, 2020, recent State-level legislative initiatives on platform worker welfare, and emerging judicial responses on employment classification and workers' rights. The study also offers a comparative analysis of international developments, including the European Union Platform Work Directive, the International Labor Organization (ILO)'s evolving standards on digital labor, and selected regulatory approaches in the United Kingdom and the United States. These comparative perspectives offer useful insights for strengthening India's regulatory architecture. The paper seeks to assess whether the existing legal framework is adequate for balancing technological innovation with the constitutional guarantees of equality, dignity, social justice, and the right to livelihood, using a doctrinal and comparative research methodology. It argues that for the platform economy to grow sustainably, it needs a rights-based governance framework that guarantees fair pay, transparency, and accountability in algorithmic decision-making; portability of social security benefits; efficient mechanisms for addressing grievances; occupational safety; data transparency; and substantial worker involvement in policy design. The paper argues that India's move to a digital economy requires comprehensive labor law reform that recognizes platform workers as part of the contemporary workforce while protecting their economic and social rights. Such reforms would help to foster resilient labor markets, responsible digital innovation, and the achievement of the United Nations Sustainable Development Goals, in particular SDG 8 (Decent Work and Economic Growth), SDG 10 (Reduced Inequalities), and SDG 16 (Peace, Justice and Strong Institutions).

Keywords: Platform Economy, Gig Workers, Labor Rights, Social Security, Algorithmic Management, Future of Work, Sustainable Development.

Introduction

Technology-enabled work options beyond the employer-employee relationship have transformed global labor markets. Uber, Ola, Swiggy, Zomato, Amazon Flex, Urban Company, and Freelancer have helped develop the platform economy, where consumers work with independent workers via web apps in real time. The new model of the economy has created more jobs, fostered entrepreneurship, and driven economic growth by introducing flexible work arrangements and reducing barriers to labor-market entry (International Labor Organization [ILO], 2021). With the expanding internet penetration, smartphone usage, digital payment systems, and government support under Digital India, India is one of the fastest-growing marketplaces for platform-based jobs. According to NITI Aayog (2022), gig employment in India was 7.7 million in 2020–21, accounting for close to 1.5% of the overall workforce. It also projects 23.5 million gig workers by 2029–30, representing 4.1% of the workforce. This extraordinary rise highlights the growing significance of platform-based jobs in India's digital economy and the need for a legal and regulatory framework.

Source: Based on NITI Aayog (2022) estimates.

Platform economies are economically important yet raise significant legal and socio-economic challenges. Platform workers are generally classified as independent contractors, rather than employees.

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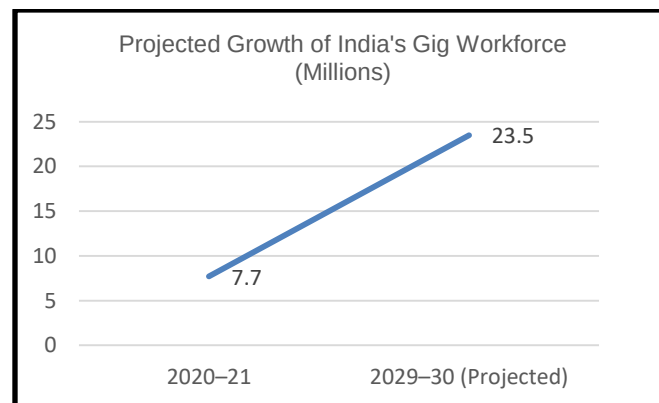


Chart 1.1 Projected Growth of India's Gig Workforce

Hence, they are deprived of minimum wages, paid leave, health insurance, social security, the right to collective bargaining, and protection against arbitrary dismissal (De Stefano, 2016). Algorithmic management is widely used on digital platforms to assign labor, rate performance, calculate wages, and assess people's job status. The opacity of these computational methods raises problems regarding fairness, accountability, discrimination, and procedural justice (Wood et al., 2019). To address these challenges, India enacted the Code on Social Security, 2020, the first Indian legislation to identify "gig workers" and "platform workers". The Code, however, largely endorses social plans without reference to labor rights or the employment relationship. Meanwhile, the European Union Platform Work Directive (2024) and the ILO's emerging rules demonstrate a global trend towards better protection for workers in the platform economy. The study critically examines the adequacy of India's regulatory structure in protecting the rights and welfare of gig and platform workers and fostering innovation in the digital economy. The article uses a doctrinal and comparative research methodology to explore the legal position of platform workers, relevant labor and social security legislation, international regulatory approaches, and policy proposals for sustainable and inclusive governance. Technological innovation and worker rights must be balanced for decent work, social fairness, and sustainable economic development in the 21st century, the research says.

Conceptual Framework of the Platform Economy Meaning of the Gig Economy

In the gig economy, workers do services on an on-demand basis, rather than as formal employees. Such services are provided by digital platforms that link consumers and service providers through mobile apps and algorithmic systems. Gig workers may not have long-term

Skills Composition of the Indian Gig Workforce

contracts and are paid per job or service. Digital labor platforms have transformed the nature of work, placing a premium on flexibility, technical innovation, and client convenience (ILO, 2021).

Gig or Platform Workers

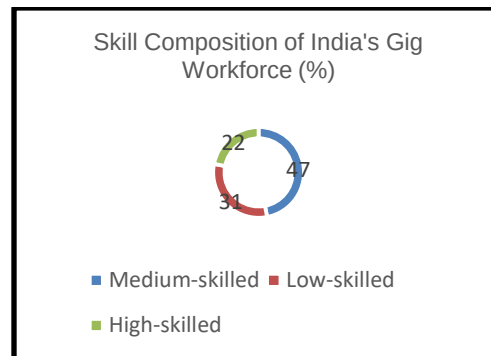
The Code on Social Security, 2020, distinguishes between gig workers and platform workers, but the terms are sometimes used interchangeably. Platform workers are workers who work through internet platforms that connect service providers and customers. Gig workers are independent workers. Examples include Uber and Ola drivers, delivery partners for Swiggy and Zomato, home service workers for Urban Company, and freelancers on online marketplaces. Such workers enjoy more flexibility in scheduling and tasks, but have lower job security, social security, and statutory labor benefits (De Stefano, 2016).

Characteristics of Platform Employment

There are a number of ways in which platform labor varies from traditional employment:

- Flexible and demand-driven work arrangements.
- Digital matching of workers and consumers through online platforms.
- Task-based remuneration instead of fixed monthly wages.
- Algorithmic allocation and monitoring of work.
- Performance evaluation through customer ratings.
- Limited bargaining power and absence of traditional employment benefits.
- Greater entrepreneurial autonomy accompanied by increased economic risk (Wood et al., 2019).

This demonstrates how the platform economy combines technological innovation and flexible labor markets, while raising regulatory questions about employment status and workers' rights.



The expansion of the Indian platform economy has expanded the gig work space beyond transportation and food delivery. 47% of gig workers work in medium-skilled employment, 31% in low-skilled professions, and 22% in high-skilled jobs (NITI Aayog, 2022). This distribution demonstrates how activity on the platform is increasingly extending across IT, consulting, education, healthcare, and financial services, as well as delivery and mobility.

Chart 2.1 Skill Composition of India's Gig Workforce

Source: Distribution of gig workers by skill level based on NITI Aayog (2022).

The composition of the gig labor is shifting, suggesting that the platform economy is now a substantial source of employment in many areas. Thus, a successful legal and regulatory framework must address the needs of workers with varying skill levels while promoting equitable and sustainable economic growth.

Legal Status and Regulatory Framework of Platform Workers in India

The platform economy has rapidly transformed employment relations. Traditional labor rules were intended for employer-employee relationships with control, supervision, fixed hours, and contractual duties. Platform firms typically classify gig workers as independent contractors or self-employed, which limits their right to minimum pay, provident fund, paid leave, gratuity, maternity benefits, and protection against unfair dismissal (De Stefano, 2016). One of the most important issues in contemporary labor law is the legal status of platform workers. The Indian Constitution provides Fundamental Rights to protect the rights of workers and the Directive Principles of State Policy. Article 21 has been interpreted by courts to include the right to livelihood and to dignified working conditions. Article 14 guarantees equality before the law. Articles 38, 39, 41, 42, and 43 compel the state to ensure social fairness, humane working conditions, and a suitable livelihood. These constitutional provisions do not deal with platform work, but they do establish the guiding

principles for inclusive labor governance (Constitution of India, 1950). For the first time, the Code on Social Security, 2020, recognized gig and platform workers as separate categories of workers under Indian labor law. Gig and platform workers are defined in sections 2(35) and 2(61). According to the Code, the Central and State Governments shall have the power to make provisions for life and disability insurance, health, maternity, old-age, education, and other social security measures. However, the legislation does not create an employer-employee relationship between digital platforms and workers, nor does it mandate minimum wages, paid leave, or job security (Ministry of Labor and Employment, 2020). The government is creating a national database of gig and platform workers through the e-Shram Portal. The Ministry of Labor and Employment states that millions of workers have registered on the site, allowing them to be included in future benefit schemes and to support better policy planning (Ministry, 2023). Registration does not guarantee social security or labor rights. Several state administrations have strengthened social protection for platform workers. Rajasthan was the first Indian state to introduce the Rajasthan Platform-Based Gig Workers (Registration and Welfare) Act, 2023, which provided for the registration of gig workers and aggregators, the establishment of welfare boards, the creation of a social security fund, and institutional grievance redressal. This is a big step forward in defending the rights and flexibility of platform workers. But despite these legislative efforts, many regulatory gaps remain. Platform firms deploy algorithmic management, dynamic pricing, customer rating systems, and automated account deactivation to control workers while denying them a sense of employment. The problem is employer-like control without labor protections (Wood et al., 2019). The current legislative framework thus prioritizes welfare over rights-based employment.

Table 3.1 A comparative assessment of India's current framework is presented below.

Aspect	Present Position in India
Legal Status	Independent category (Gig/Platform Worker)
Governing Law	Code on Social Security, 2020
Employment Relationship	Not recognized
Minimum Wage Guarantee	Not specifically provided
Social Security	Welfare schemes may be notified
Collective Bargaining	No explicit statutory recognition



Aspect	Present Position in India
State Initiative	Rajasthan Platform-Based Gig Workers (Registration and Welfare) Act, 2023

The table illustrates that India's regulatory strategy has improved by bringing gig and platform workers under labor rules. The framework is nonetheless largely welfare-oriented and does not yet extend full employment rights as extended to regular employees. As the platform economy evolves, we need to strengthen legislative protections while preserving labor market innovation and flexibility.

Emerging Challenges and Comparative International Perspectives

The fast expansion of platform-based work has revealed weaknesses in labor governance. Digital platforms have increased employment and labor market flexibility, but have raised significant legal and regulatory challenges regarding workers' rights, social protection, algorithmic transparency, and collective bargaining. Other nations have adopted alternative legislative approaches to strike a balance between technological innovation and employment protection (ILO, 2021). One of the main issues is the insecure work situation of platform workers. Most digital platforms treat workers as independent contractors, robbing them of minimum wages, paid leave, social security benefits, and protection against unjust dismissal. Platform corporations exercise power through digital algorithms, user ratings, incentive schemes, and automatic account deactivation, generating a labor relationship that differs in form but not in substance (De Stefano, 2016; Wood et al., 2019). Also crucial is algorithmic management. Automation allocates work, fixes pricing, assesses workers' performance, and suspends accounts without transparency or recourse. This lack of transparency in the decision-making process raises concerns regarding procedural fairness, accountability, and due process, especially for workers who depend on platform-generated assignments (ILO, 2021). Workers are more

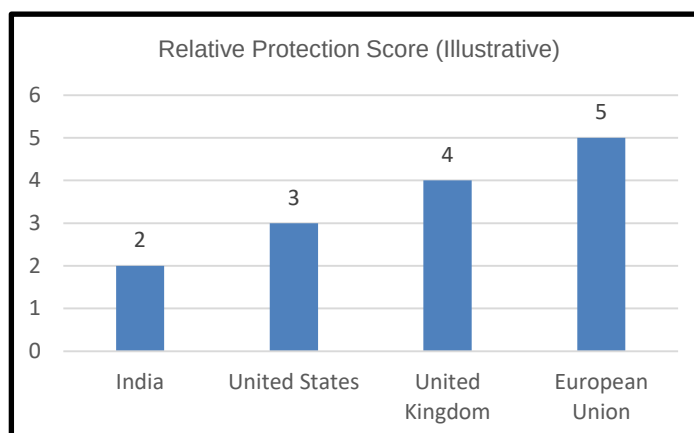
exposed because of the lack of comprehensive social security. India's Code on Social Security, 2020, recognizes gig and platform workers, but numerous assistance systems are still to be put in place. Consequently, many platform workers are without health insurance, old-age benefits, maternity protection, and accident compensation (Ministry of Labor and Employment, 2020). These challenges can be solved with international experience. The EU Platform Work Directive (2024) presumes employment when platforms control workers. It requires greater transparency in algorithmic decision-making and real oversight of automated decision-making. The aim is to shield employees in circumstances akin to conventional employment. The UK's middle "worker" status provides gig workers with basic pay, paid annual leave, and protection against unlawful deductions, while preserving flexibility. The Uber BV v. Aslam (2021) decision, which found that Uber drivers were 'workers' rather than independent contractors, was a major win for employment rights in the platform economy. State-level rules in the US vary widely. California's Assembly Bill 5 (AB5) first employed the stringent "ABC Test" to reclassify many platform workers as employees. Proposition 22 created a hybrid system in which app-based transportation and delivery workers would receive some benefits while remaining independent contractors. The debate over the proper balance between labor protection and corporate flexibility continues. Comparative strategies of these states reflect a gradual evolution from contract flexibility to legislative recognition, algorithmic responsibility, and broader social security coverage for labor protection.

Table 4.1 Comparative Regulatory Approaches

Jurisdiction	Employment Status	Social Security	Algorithmic Transparency	Notable Development
India	Gig/Platform worker recognized under Code on Social Security, 2020	Welfare schemes proposed	Limited	Rajasthan Platform-Based Gig Workers Act, 2023
European Union	Presumption of employment in specified situations	Strong	Mandatory transparency and human oversight	EU Platform Work Directive (2024)
United Kingdom	Intermediate 'Worker' status	Minimum wage and paid leave	Moderate	Uber BV v. Aslam (2021)
United States (California)	Hybrid model	Limited statutory benefits	Varies	AB5 and Proposition 22

Chart 4.1 Comparative Level of Legal Protection for Platform Workers

Illustrative comparison based on employment recognition, social security, and algorithmic regulation.





Comparative research reveals that India has made considerable strides in legalizing gig and platform work. The framework is welfare-oriented rather than rights-based, unlike those of the EU and the UK. Therefore, future improvements must reinforce work rights, increase transparency in algorithmic management, extend social security coverage, and put in place effective grievance redressal processes, while maintaining the flexibility of platform jobs.

Sustainable Development and the Future of Work

The platform economy fosters sustainable economic growth by creating jobs, fostering entrepreneurship, and promoting digital inclusivity. Digital labor platforms in India have enabled millions to earn a livelihood, lowering entrance barriers and increasing financial inclusion and workforce participation. Creating jobs is not sufficient to sustain the platform economy; it must also provide good work, social protection, and fair labor standards (United Nations, 2015). The labor regulations in the platform economy can be reviewed in the context of the SDGs 8 (Decent Work and Economic Growth), 10 (Reduced Inequalities), and 16 (Peace, Justice and Strong Institutions). Digital platforms contribute to

economic growth and innovation, but weak worker protection, income insecurity, algorithmic discrimination, and insufficient social security may undermine global development goals (ILO, 2021). AI, automation, digital platforms, and data-driven management systems will shape the future of work. Technology may increase productivity and create jobs, but it requires flexible legal frameworks to balance innovation and workers' rights. Therefore, labor governance must shift from regulating traditional employment relationships to protecting workers irrespective of contract (World Economic Forum, 2025). India has undertaken considerable reforms through the Code on Social Security, 2020, and digital governance projects. But further legislation is needed to strengthen universal social security, ensure openness in algorithmic decision-making, increase digital skills development, and improve grievance redress. Collaborative governance by governments, platform firms, trade unions, and civil society organizations (NITI Aayog, 2022) is necessary for the equitable and sustainable platform economy.

The relationship between sustainable development and platform work may be summarized as follows.

Sustainable Development Goal	Relevance to Platform Economy
SDG 8: Decent Work and Economic Growth	Promotes productive employment, fair wages, and social protection for gig workers.
SDG 10: Reduced Inequalities	Expands digital employment opportunities while reducing income and social disparities.
SDG 16: Peace, Justice and Strong Institutions	Encourages transparent regulation, accountability, and effective dispute resolution mechanisms.

In the future, platform work needs to be driven by economic efficiency, fairness, inclusiveness, and sustainability. Sustainable development and inclusive economic growth can be achieved through a balanced regulatory framework that protects workers and fosters technological innovation.

Findings

The analysis finds that India's platform economy has generated millions of jobs and driven digital economic growth, providing millions with flexible income. Digital platforms are growing rapidly and serve as an example of how technology can transform labor markets and contribute to sustainable economic growth (NITI Aayog, 2022). The data also demonstrates that the legal environment has improved with the Code on Social Security, 2020, recognizing gig and platform workers. This recognition is predominantly welfare-based and does not constitute an employer-employee relationship or provide for minimum salaries, paid leave, job stability, collective bargaining, or protection from unfair dismissal (Ministry of Labor and Employment, 2020). Algorithmic management has changed the way we regulate labor. Wood et al. (2019) argue that while platform firms identify their workers as independent contractors, they still exert a degree of administrative control akin to traditional employers through digital algorithms that regulate task allocation, pricing, performance assessment, and account suspension. Lack of openness and ineffective grievance remedies render workers vulnerable. The comparative research finds that the European Union and the UK have enhanced legislative safeguards through respecting job rights, improving algorithmic transparency and giving social security benefits

for platform workers. The regulatory environment in India needs legislative and policy adjustments to align with the best international standards (ILO, 2021). Finally, the research demonstrates that Sustainable Development Goal 8 (Decent Work and Economic Growth) needs to be balanced with technology innovation and labor protection. Creating jobs alone won't be enough; a sustainable platform economy needs fair working conditions, universal social protection, digital equality, and inclusive government. Legal protections must be improved in India's digital labor market, while preserving the flexibility and innovation of platform-based work.

Suggestions and Recommendations

The research provides recommendations to increase worker protection in India's platform economy, while maintaining innovation and flexibility.

First, the government should enshrine platform workers' job status in law. The Code on Social Security, 2020, should have objective criteria to distinguish true independent contractors from digital platform workers (De Stefano, 2016). Second, full-blown welfare schemes such as health insurance, accident compensation, maternity benefits, old-age pensions, and disability protection must speed up the implementation of the Code on Social Security, 2020. Social security must be universal and portable to ensure benefits, regardless of the platform workers use (ILO, 2021). Third, legal protection is needed for algorithmic management. Digital platforms must justify the suspension or deactivation of accounts, be transparent in automated decision-making, and provide accessible grievance redressal mechanisms with

meaningful human review. Fourth, the government should recognize workers' associations and foster talks between platform enterprises, workers' groups, and regulatory bodies to facilitate collective representation and social dialogue. Collaborative governance may reconcile labor reform with business innovation. Finally, India might look to international best practices, such as the European Union Platform Work Directive and the UK's model of worker status, and tailor them to India's socioeconomic circumstances. A legislative framework that balances worker rights, digital innovation, and sustainable development would propel the platform economy and help achieve SDG 8 on decent employment and inclusive economic growth (United Nations, 2015).

Conclusion

India's platform economy has reshaped the workforce with flexible jobs and spurred digital economic growth. The move has also opened up legal and regulatory challenges around employment classification, social security, algorithmic governance, and workers' rights. The Code on Social Security, 2020, acknowledges gig and platform workers but is largely welfare-oriented and does not yet offer a comprehensive set of labor rights comparable to those available in a typical employment relationship. In comparison, the EU and the UK have taken more progressive steps, such as strengthening employment rights, enhancing transparency in algorithmic decision-making, and broadening social security coverage. India can learn from these experiences to evolve a regulatory structure suited to its socio-economic requirements. Artificial intelligence, digital platforms, and technological innovation are transforming the future of work, and labor law must adapt to foster economic success and social justice. A balanced regulatory framework is needed to build an inclusive and resilient platform economy that safeguards workers' dignity, promotes fair working conditions, ensures universal social security, and fosters responsible technological innovation. What matters is not the number of jobs created but the quality, security, and dignity of labor in India's digital economy. This approach will promote worker rights, contribute to the constitutional vision of social justice, and help to deliver on the Sustainable Development Goals, particularly SDG 8—Decent Work and Economic Growth (United Nations, 2015).

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Original Article

Consumer Behaviour: A Comprehensive Study Of Consumer Buying Behaviour in The Modern Market

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Abstract

Consumer behaviour has become increasingly dynamic due to rapid technological advancements, digital marketing, globalization, and changing consumer preferences. The emergence of e-commerce platforms, social media marketing, artificial intelligence, and personalized advertising has significantly transformed purchasing decisions. This study examines the major factors influencing consumer buying behaviour in the modern marketplace. The paper adopts a descriptive research methodology based on secondary data collected from books, research articles, government reports, and reputed business publications. The study identifies psychological, social, cultural, economic, and technological factors as the major determinants of consumer behaviour. Furthermore, it explores the impact of digital marketing and online reviews on consumer decision-making. The findings suggest that organizations must continuously adapt their marketing strategies to meet evolving consumer expectations. Businesses that effectively utilize data analytics, customer engagement, and personalized marketing are more likely to gain competitive advantage.

Keywords: Consumer Behaviour, Buying Behaviour, Digital Marketing, Consumer Decision Making, E-commerce, Marketing Strategy

Introduction

Consumer behaviour refers to the study of how individuals, groups, and organizations select, purchase, use, and dispose of goods and services to satisfy their needs and wants. Understanding consumer behaviour has become one of the most significant aspects of marketing because it enables businesses to develop products and services that match customer expectations.

The modern business environment has experienced remarkable changes due to digital transformation. Consumers now possess greater access to information than ever before, allowing them to compare products, evaluate alternatives, read customer reviews, and make informed purchasing decisions. Consequently, organizations have shifted from product-oriented marketing to customer-centric marketing strategies. With the expansion of e-commerce platforms, mobile applications, artificial intelligence, and social media, consumer behaviour has become more complex. Businesses must therefore continuously monitor consumer preferences and modify their marketing approaches to maintain customer satisfaction and loyalty.

Objectives of the Study

The study aims to:

- Examine the concept of consumer buying behaviour.
- Identify the major factors influencing purchasing decisions.
- Analyze the impact of digital marketing on consumer behaviour.
- Understand the consumer decision-making process.
- Suggest strategies for improving customer satisfaction and business performance.

Research Methodology

The study is descriptive in nature and is based entirely on secondary data.

Sources of Data

1. Research journals
2. Books on marketing management
3. Government publications
4. Company reports
5. Business magazines
6. Online academic databases

Research Design

A descriptive research design has been adopted to analyze various dimensions of consumer buying behaviour in the contemporary market.

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Literature Review

Previous studies have highlighted the multidimensional nature of consumer behaviour. Kotler and Keller (2019) stated that consumer buying behaviour is influenced by cultural, social, personal, and psychological factors. Solomon (2020) emphasized that consumer behaviour has become increasingly experience-oriented, where emotions significantly influence purchasing decisions. Schiffman and Wisenblit (2019) observed that technological innovation and online shopping have transformed traditional buying patterns. Consumers increasingly rely on digital information before making purchase decisions. Recent studies further indicate that online reviews, influencer marketing, social media engagement, and personalized recommendations strongly affect consumer trust and purchase intention.

Factors Influencing Consumer Buying Behaviour**Cultural Factors**

Culture significantly shapes consumer preferences, beliefs, and purchasing habits. Values, traditions, and customs influence buying decisions across different societies.

1. Examples include:
2. Food preferences
3. Clothing choices
4. Festival shopping
5. Brand perception

Social Factors

Consumers are influenced by family, friends, colleagues, and social groups. Social media communities have become important reference groups influencing purchasing behaviour.

Major social influences include:

1. Family
2. Friends
3. Social status
4. Online communities

Personal Factors

Personal characteristics directly affect buying behaviour.

These include:

1. Age
2. Occupation
3. Income
4. Lifestyle
5. Personality
6. Education

Higher-income consumers generally prefer premium products, whereas middle-income consumers seek value for money.

Psychological Factors

Psychological variables influence consumer perception and motivation.

1. These include:
2. Motivation
3. Learning
4. Perception
5. Beliefs
6. Attitudes

Positive brand experiences encourage repeat purchases and customer loyalty.

Technological Factors

Technology has dramatically transformed buying behaviour through:

1. Online shopping
2. Mobile applications
3. Digital payments

4. Artificial Intelligence

5. Chatbots

Personalized recommendations

Consumers now expect convenience, speed, and personalized experiences.

Consumer Decision-Making Process

The buying decision process generally consists of five stages.

Problem Recognition

The consumer realizes a need or desire.

Information Search

Information is collected through:

1. Internet
2. Friends
3. Advertisements
4. Social media
5. Reviews

Evaluation of Alternatives

Consumers compare brands based on:

1. Price
2. Quality
3. Features
4. Brand reputation

Purchase Decision

The consumer selects the product offering maximum perceived value.

Post-Purchase Behaviour

Customer satisfaction determines future purchase behaviour and brand loyalty.

Impact of Digital Marketing on Consumer Behaviour

Digital marketing has fundamentally changed consumer interactions with businesses.

Important digital marketing tools include:

1. Search Engine Marketing
2. Social Media Marketing
3. Email Marketing
4. Influencer Marketing
5. Content Marketing
6. Video Marketing

Modern consumers spend considerable time on digital platforms before making purchasing decisions. Online customer reviews significantly influence purchase intentions. Positive reviews increase trust, whereas negative reviews discourage purchases. Artificial Intelligence enables companies to provide customized product recommendations, improving customer satisfaction.

Emerging Trends in Consumer Behaviour

Current trends include:

1. Sustainable purchasing
2. Eco-friendly products
3. Personalized shopping experiences
4. Mobile commerce
5. Voice search
6. Artificial Intelligence
7. Subscription-based services
8. Omni channel shopping

Consumers increasingly value convenience, transparency, ethical business practices, and environmentally responsible products.

Findings of the Study

1. The study reveals that:
2. Consumer buying behaviour is influenced by multiple interconnected factors.



3. Digital technology has significantly transformed purchasing decisions.
4. Social media strongly influences brand awareness and product selection.
5. Online reviews play an important role in consumer trust.
6. Personalized marketing enhances customer satisfaction.
7. Businesses focusing on customer experience achieve stronger competitive advantages.
8. Data analytics assists organizations in understanding changing consumer preferences.

Suggestions

Based on the findings, the following recommendations are proposed:

1. Develop customer-centric marketing strategies.
2. Improve digital customer engagement.
3. Utilize Artificial Intelligence for personalized recommendations.
4. Encourage customer feedback and online reviews.
5. Strengthen social media presence.
6. Ensure transparency in pricing and product information.
7. Promote environmentally sustainable products.
8. Enhance customer relationship management systems.

Conclusion

Consumer buying behaviour has undergone significant transformation due to globalization, digitalization, and technological advancements. Modern consumers possess greater access to information, making them more informed and selective than previous generations. Businesses must continuously analyze consumer preferences and develop innovative marketing strategies to meet changing expectations. The integration of digital marketing, artificial intelligence, and customer analytics has revolutionized the relationship between businesses and consumers. Organizations that prioritize customer satisfaction, ethical practices, and personalized experiences are more likely to achieve sustainable growth and long-term success in today's competitive marketplace. Understanding consumer behaviour remains essential for designing effective marketing strategies and maintaining customer loyalty in the rapidly evolving business environment.

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Original Article

An Empirical Study on The Profitability of Selected Automobile Companies During Pre and Post GST Period

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Abstract

This study titled "A Comparative Study of Profitability of Automobile Companies Before and After GST Implementation in India" examines the financial performance of selected automobile companies and evaluates the influence of the Goods and Services Tax on their profitability. The main purpose of the study is to analyse whether GST implementation has created significant changes in the profitability, operational efficiency, and financial stability of automobile companies in India. The study is important because the automobile sector is one of the major contributors to the Indian economy, and GST has transformed the taxation structure by replacing multiple indirect taxes with a unified system. The research is based on secondary data collected from company annual reports, financial statements, journals, and authentic online sources. A descriptive research design has been adopted, and convenience sampling has been used for selecting the companies included in the study. Statistical tools such as ANOVA and T-test were applied through JAMOVI software for data analysis and interpretation. The findings of this study will contribute to academic research, policymakers, financial analysts, investors, and automobile companies by providing insights into the impact of GST on corporate profitability and financial performance. The study also highlights challenges and opportunities faced by companies during the post-GST business environment.

Introduction

The automobile industry contributes approximately 7.1% to India's GDP and around 49% of the manufacturing GDP, making it one of the country's most important industrial sectors. Before the implementation of GST (2013–2017), automobile companies faced multiple indirect taxes ranging from 26% to 44%, which increased production and distribution costs. After GST was introduced in July 2017, most passenger vehicles were taxed at 28% GST (plus cess on certain categories), leading to a simplified tax structure and improved input tax credit benefits. During the post-GST period (2018–2025), many automobile companies experienced improvements in profitability, with average Operating Profit Ratios increasing from around 8–10% to 10–13% and Net Profit Ratios improving from about 4–6% to 6–9%, depending on the company. India's GDP growth also remained strong, rising from approximately ₹131 lakh crore in 2016–17 to over ₹330 lakh crore by 2024–25 (current prices). The reduction in logistics costs by nearly 20–30%, along with better supply chain efficiency and tax compliance, contributed to higher profitability levels. Therefore, the growth in GDP and the implementation of GST have collectively supported improved financial performance and operational efficiency in the Indian automobile industry.

conceptual background

The conceptual background of this study lies in the structural transition of India's fiscal landscape following the introduction of the Goods and Services Tax (GST) in July 2017, which sought to replace a fragmented, cascading indirect tax regime with a unified tax system. Operating within this common regulatory environment, the Indian automobile industry serves as a vital economic pillar, meaning that changes in tax policies deeply influence its operational cost structures and bottom-line efficiency. To empirically evaluate the business impact of this policy shift, this study adopts a quantitative, comparative research approach to analyze whether the legislative intent of GST has successfully translated into enhanced corporate financial health. By deploying a purposive sampling framework, the research examines a sample size of ten prominent firms evenly split between two distinct automotive paradigms: traditional Three-Wheeler Manufacturers (operating on mature internal combustion engines) and emerging Electric Vehicle (EV) Manufacturers (subject to targeted, eco-friendly fiscal slabs). Ultimately, by utilizing financial ratio analysis (such as Net Profit, Operating Profit, ROA, and ROE) and statistical testing across pre-GST and post-GST timelines, the conceptual model isolates the direct effect of tax reform on the industry's profitability, long-term financial stability, and overall operational growth.

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Review of literature

Megha Patnaik (2026)¹⁵ found that GST improves tax compliance and supply chain transparency by encouraging firms to register formally. The study also suggests analysing the long-term impact of GST on small businesses and informal sectors. Rajesh Kumar and Neha Verma (2025)²⁷ examined the impact of corporate taxation on company profitability and financial growth. The findings show that tax policy changes directly affect investment decisions and financial performance. Dr. Upasana Dasgupta (2022)⁶ analysed legal and policy challenges in India's space sector and highlighted the need for updated regulations. The study emphasized supporting private participation and improving future legislative frameworks. John Smith and Emily Carter (2021)⁹ studied the role of artificial intelligence in the automobile industry and found that AI improves production efficiency, safety, and customer experience. The research also discusses challenges related to regulation, ethics, and employment. James Mwangi and Esther Njeri (2020)⁸ explored how financial characteristics influence leverage in automobile companies. The study concluded that profitability and liquidity reduce leverage, while firm size and asset base increase it. Matt Hopkins and William Lazonick (2020)¹⁴ examined Tesla's global EV strategy and found that innovation and supply chain control strengthen competitiveness. The study also highlighted Tesla's ability to adapt quickly to technological and market changes. Bhanu Karnwal (2026)¹⁰ studied the impact of demonetization and GST on Indian stock market volatility and found that both reforms caused short-term fluctuations but improved long-term market stability. The study also suggests future analysis of SEBI regulations and retail investor behaviour. Syed Nagul Meerabi (2025)²⁹ examined the effect of the PLI scheme on investment and capital structure in India's manufacturing sector. The findings show that government incentives improve investment, competitiveness, and financial growth of firms. Dr. Suvarna Nimbagal et al. (2022)⁵ analysed the impact of GST slab cuts on large petrol cars and SUVs in India. The study found that reduced GST rates improve affordability and increase consumer demand in the automobile sector. Daksh Dhariwal, Rohan Sharma, and Siddhanth Singhi (2021)⁴ studied taxation challenges in software transactions under GST and earlier tax systems. The findings reveal that digital products create classification and tax ambiguity issues requiring clearer policies. Ramesh Kumar and Anjali Sharma (2020)²⁸ analysed automobile stock price movements using technical analysis tools like RSI and moving averages. The study found that technical indicators help investors predict short-term stock trends effectively. Priya Sharma and Anil Kumar (2020)¹⁷ examined board structures in Indian automobile and IT companies. The findings show that smaller, independent, and diverse boards improve corporate governance and decision-making. Khandelwal (2020)¹¹ studied GST's impact on supply chain formalization and found that input tax credits and invoice requirements encouraged firms to adopt formal business practices. The research highlights GST's role in improving compliance and transparency. R. Srinivasan and Anjali Mehta (2019)²⁶ explored opportunities and challenges in the Indian automobile industry. The study highlighted the importance of innovation, technology adoption, and strategic planning for future growth. R. K. Sharma and Priya Verma (2019)²⁵ analysed the slowdown in the Indian automobile sector and identified declining demand, credit issues, and economic slowdown as major causes. The study also emphasized the need for growth revival strategies and

policy support. R. K. Sharma and Priya Mehta (2019)²⁴ examined the financial performance of companies involved in cross-border mergers and acquisitions. The findings show mixed results, with some firms improving profitability while others faced integration challenges. Dr. Madhu Bala (2018)¹³ studied the implementation of GST and its impact on the Indian economy. The research concluded that GST simplified taxation, reduced cascading taxes, and supported economic growth through a unified market. Vidhu Shekhar (2025)³⁰ analysed inflation trends across different Indian Prime Ministers and found that inflation levels varied due to policy decisions and global economic factors. The study highlights the role of macroeconomic policies in price stability. Dr. Kishor P. Bholane (2024)³ evaluated the impact of GST on indirect tax collection and GDP growth in India. The findings show that GST increased tax efficiency and expanded the taxpayer base significantly. Jack Mintz, Alexandre Laurin, and Nicholas Dahir (2024)⁷ studied major tax reforms and economic growth in Canada. The research found that simplified tax systems and reduced tax dependence support investment and productivity growth. Abhishek Anand, Josh Felman, and Arvind Subramanian (2023)¹ examined the accuracy of India's GDP growth estimates. The study found differences between official GDP data and alternative economic indicators, suggesting improvements in measurement methods. R. K. Sharma and Pooja Gupta (2020)²² analysed GST's impact on the Indian automobile industry and found improvements in pricing efficiency, profitability, and supply chain management. The study also noted the positive role of GST in reducing cascading taxes. R. K. Sharma and Ananya Verma (2019)²¹ studied the relationship between dividend payout and share prices in automobile companies. The findings show that stable dividend policies positively influence market value and investor confidence. Anil Kumar and Neha Sharma (2019)² evaluated stock efficiency in Indian automobile companies using DEA analysis. The study found differences in stock performance efficiency among companies due to management and operational effectiveness. Kumar Saurav (2021)¹² examined GST compliance challenges faced by small and informal businesses in India. The findings reveal that digital filing systems and compliance costs created difficulties for small entrepreneurs. R. K. Sharma and Ananya Gupta (2020)²⁰ studied sustainable growth rates and financial determinants in Indian companies. The research concluded that profitability, leverage, and retention ratios strongly influence long-term growth. R. K. Sharma and Pooja Verma (2019)²³ analysed GST implementation challenges faced by Indian businesses. The findings show that although GST improved efficiency, companies initially faced compliance and transition difficulties. Pooja Sharma and R. K. Verma (2020)¹⁶ studied weak form market efficiency in selected automobile company stocks listed on the NSE. The findings suggest that past stock price movements can sometimes help predict future trends and investment decisions. R. K. Sharma and Ananya Gupta (2019)¹⁹ analysed GST implementation using SWOC analysis and identified both advantages and challenges of the tax reform. The study emphasized the importance of policy adaptation and strategic planning for effective implementation. R. K. Sharma and Pooja Verma (2019) examined the overall impact of GST on Indian businesses and found improvements in tax efficiency and transparency despite initial compliance difficulties. The study also highlighted the need for long-term policy support and simplification



Statement of the Problem

The Goods and Services Tax (GST) was introduced in India to simplify the indirect tax system and improve economic efficiency. The automobile industry is a significant contributor to the Indian economy through employment, production, and revenue generation. Although many studies discuss the concept and benefits of GST, limited research has focused on its impact on the financial performance of automobile companies. Therefore, it is important to compare the profitability of selected automobile companies before and after GST implementation to understand its actual effect on their growth and financial performance.

Objective of the Study

1. To examine the effect of GST implementation on the financial performance of selected automobile companies in India.
2. To evaluate the long-term impact of GST on financial stability of automobile companies in India.

Research Methodology

Research Method

This study adopts a quantitative and descriptive research design to examine the impact of GST on the profitability of selected automobile companies in India. The analysis is based on secondary data collected from annual reports and financial statements. Financial performance during the pre-GST and post-GST periods is compared to evaluate changes in profitability.

Sampling Method

The study uses purposive sampling to select automobile companies based on their industry relevance, availability of financial data, and significant market presence. This method ensures the selection of companies suitable for analysing the impact of GST on profitability.

Sample Size

The sample consists of ten automobile companies in India. These companies are analysed to compare their financial performance before and after GST implementation and to assess changes in profitability and financial stability.

Source of data

Secondary Sources of Data

The study is based on secondary data collected from the annual reports and financial statements of selected automobile companies. Additional information is obtained from company websites, government publications, journals, books, and research articles. These sources provide the necessary data to analyse the profitability of automobile companies before and after GST implementation.

Tools the study

Descriptive Statistics

Descriptive statistics are used to summarize and present financial data in a simple form. It includes measures such as mean, minimum, maximum, and standard deviation to understand the trend of profitability of selected automobile companies before and after GST.

Correlation

Correlation analysis is used to measure the relationship between GST implementation and the profitability of selected automobile companies. It helps identify the strength and direction of the association between GST and profitability indicators such as revenue and profit.

Hypotheses of the Study

H0: There is no known significant effect of GST implementation on the financial performance of selected automobile companies in India.

H0: There is no known significant long-term impact of GST on the financial stability of automobile companies in India

Data Analysis and Interpretation

Data analysis and interpretation are used to examine the profitability of selected automobile companies before and after GST implementation. Statistical tools are applied to analyze financial data and identify changes in revenue, profit, and overall financial performance.

H0: There is no known significant effect of GST implementation on the financial performance of selected automobile companies in India.

Descriptive

Statistics

	Mini	Max	Mean	SD	Skewness	Kurtosis
Company	1.00	10.00	4.3667	2.04237	1.104	1.406
PDVTVSCOM1	3.66	4.85	4.0770	.38675	1.149	.368
PDVTVSCOM2	430000.00	625000.00	548940.0000	61977.43675	-.579	.020
PDVTVSCOM3	457000.00	941115.00	639411.5000	189845.48685	.718	-1.433
PDVTVSCOM4	26039.00	52300.00	41713.9000	9662.90150	-.558	-1.328
PDVTVSCOM5	2014000.00	5183000.00	3376200.0000	1090637.10229	.381	-1.057
PDVSGCOM1	-.14	.17	.0041	.09236	.160	-.052
PDVSGCOM2	-.14	.27	-.0203	.12190	1.652	3.294
PDVSGCOM3	-.08	.36	.0881	.12055	1.188	2.593
PDVSGCOM4	-.34	.23	.0002	.18026	-1.073	.330
PDVSGCOM5	.05	.14	.1029	.03120	-.471	-1.331
PDVRGCOM1	-.09	.23	.0693	.10669	-.246	-.850
PDVRGCOM2	-.15	.27	.0260	.14509	.665	-.438
PDVRGCOM3	-.10	.69	.1893	.22528	1.135	1.658
PDVRGCOM4	-.53	.52	.0923	.30709	-.963	.995
PDVRGCOM5	.10	.29	1746	.05871	.592	-.024
Valid N (listwise)			10			

Source: Survey Data-SPP Output

The descriptive statistics show notable variations in turnover, sales growth, and revenue growth among the selected automobile companies during the post-GST period. Some companies recorded higher and more consistent performance, while others experienced lower or negative growth in certain years. Overall, the findings indicate unequal post-GST financial performance, reflecting differences in business scale, growth trends, and operational efficiency.



Descriptive Statistics

	Mini	Max	Mean	SD	Skewness	Kurtosis
Company	1.00	10.00	4.3667	2.04237	1.104	1.406
EVTVSCOM1	22477.00	1845000.00	797708.1000	825710.78386	.309	-2.083
EVTVSCOM2	22477.00	1845000.00	797708.1000	825710.78386	.309	-2.083
EVTVSCOM3	409000.00	4600000.00	1675300.0000	1682611.79586	1.019	-.698
EVTVSCOM4	900000.00	1320000.00	1144500.0000	131187.10133	-.346	-.164
EVTVSCOM5	0.00	590000.00	316000.0000	265547.65214	-.387	-2.150
EVSGCOM1	-.01	748.20	75.1741	236.47733	3.162	10.000
EVSGCOM2	-.18	1.53	.3325	.51869	1.465	2.278
EVSGCOM3	-.13	.19	.0265	.10535	.406	-1.049
EVSGCOM4	-.24	.43	.1011	.16672	-.084	2.854
EVSGCOM5	-.12	.71	.3250	.24896	-.236	-.436
EVRGCOM1	.01	3.88	.7618	1.12794	2.821	8.476
EVRGCOM2	.02	.96	.3023	.28324	1.423	2.723
EVRGCOM3	-.05	.26	.1115	.11106	.024	-1.460
EVRGCOM4	-.17	.28	.1160	.11955	-1.388	3.838
EVRGCOM5	.22	.62	.4260	.14136	-.165	-.775
Valid N (listwise)				10		

Source: Survey Data-SPP Output

The descriptive statistics reveal significant variation in turnover, sales growth, and revenue growth among the selected automobile companies. While some companies recorded higher turnover and strong growth, others showed lower performance and greater fluctuations across the study period. Overall, the findings indicate

differences in business scale, growth potential, and financial performance among the companies.

H0.: There is no known significant long-term impact of GST on the financial stability of automobile companies in India

Test of Homogeneity of Variances

	To evaluate the long-term impact of GST on financial stability of automobile companies in India.	To evaluate the long-term impact of GST on financial stability of automobile companies in India.	To evaluate the long-term impact of GST on financial stability of automobile companies in India.	To evaluate the long-term impact of GST on financial stability of automobile companies in India.
PRENPEV	6.707	4	20	.001
POSTNPEV	17.178	4	20	2.966
PREOPEV	6.923	4	20	.001
POSTOPEV	17.516	4	20	2.566
PREGPEV	9.020	4	20	.029
POSTGPEV	20.127	4	20	8.707
PRENOCEV	8.224	4	20	.091
POSTNOCEV	8.156	4	20	.099
PREOCEV	12.042	4	20	.081
POSTOCEV	9.942	4	20	.037
PRETCEV	7.005	4	20	.001
POSTTCEV	7.003	4	20	.001
PRETVSEV	25.342	4	20	1.387
POSTVSDEV	7.450	4	20	.001
PRESGEV	7.108	4	20	.001
POSTSGEV	1.354	4	20	.285
PRERGEV	5.719	4	20	.003
POSTRGEV	1.276	4	20	.312
PRENPPDV	15.934	4	20	5.201
POSTNPPDV	18.479	4	20	.080
PREOPPDV	10.003	4	20	.736
POSTOPPDV	8.107	4	20	.074
PREGPPDV	5.239	4	20	.254
POSTGPPDV	12.736	4	20	.410
PRENOCPDV	3.166	4	20	.170
POSTNOCPDV	12.154	4	20	.310
PREOCPDV	15.826	4	20	5.406
POSTOCPDV	11.461	4	20	.320
PRETCPDV	14.260	4	20	.610
POSTTCPDV	10.572	4	20	55.000
PRETVSPDV	12.855	4	20	988.000



Source: Survey Data-SPP Output

This Test showed that some financial and operational variables had unequal variances across the selected automobile companies ($p < 0.05$), while others had equal variances ($p > 0.05$). This indicates that variability differed for certain performance measures but remained consistent for others. Overall, the assumption of homogeneity of variance was only partially satisfied.

Results and Discussion

- The profitability analysis revealed significant variations among the selected automobile companies during both the pre-GST and post-GST periods.
- Several companies recorded higher operating profit and gross profit after GST implementation, indicating improved operational efficiency and better financial performance.
- Net profit showed greater fluctuations across companies, suggesting that factors other than GST also influenced overall profitability.
- The cost analysis indicated substantial differences in non-operating, operating, and total costs among the selected companies.
- Strong positive correlations were observed between pre-GST and post-GST operating costs, indicating consistency in expenditure patterns after GST implementation.
- Non-operating costs also maintained a positive relationship across the two periods, while total costs showed comparatively lower consistency.
- The correlation analysis of profitability measures showed significant positive relationships for operating profit and gross profit, suggesting stability in profitability performance before and after GST.
- Net profit exhibited a weak and statistically insignificant relationship between the two periods, indicating variations in earnings performance.
- Vehicle sales recorded an extremely strong positive correlation between the pre-GST and post-GST periods, reflecting stability in sales performance among the companies.
- Sales growth and revenue growth displayed weak or negligible correlations, indicating that growth patterns changed considerably after GST implementation.
- The findings suggest that GST contributed to a more streamlined business environment, which supported operational performance and cost management.
- Overall, the impact of GST varied across companies, with larger benefits observed in operating efficiency, gross profitability, and cost stability than in net profit and growth-related indicators.

Conclusion

The study concludes that GST has influenced the performance of selected automobile companies in India by improving operational efficiency and simplifying the tax structure. The findings indicate greater stability in operating profit, gross profit, and cost management during the post-GST period. Vehicle sales also remained relatively consistent after GST implementation. However, net profit, sales growth, and revenue growth showed mixed results, suggesting that other market and economic factors also affected company performance. Overall, GST had a positive impact on the automobile industry, although the extent of its benefits varied among companies. The study therefore finds that GST contributed to improved financial

performance and business efficiency in the selected automobile companies.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Original Article

Systematic Analysis on Cyber Security Preparedness and User Awareness in Digital Finance: A Users Perspective in Karnataka

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Abstract:

This study examines the growing cyber security challenges associated with the rapid adoption of digital financial platforms. With increasing dependence on online banking, mobile payments, and digital transactions, users are becoming more vulnerable to cyber threats such as phishing, identity theft, online fraud, and unauthorized access. The main purpose of this study is to analyse the extent of cyber security vulnerabilities faced by digital finance users in Karnataka and to evaluate the role of cyber security awareness in reducing such risks. The objectives of the study are to identify the impact of cyber threats, particularly phishing and online fraud, on users in Karnataka and to analyse the impact of cyber security awareness among users of digital financial platforms. The study adopts a descriptive research design and uses convenience sampling to collect primary data from 401 respondents across Karnataka. Data analysis was conducted using JAMOVI software, employing statistical tools such as ANOVA and T-test to examine variations and relationships among variables. The findings of this research are expected to contribute to academic research, policy formulation, financial institutions, and digital platform providers by enhancing awareness and strengthening cyber security practices among users of digital financial services.

Keywords: Cyber Security Awareness, Digital Finance, Cyber Threats, Phishing Attacks, Online Fraud, Digital Financial Platforms, User behaviour, Karnataka.

Introduction

The rapid growth of digital finance has transformed the way individuals conduct financial transactions, making online banking, mobile wallets, and digital payment systems an essential part of daily life. India's digital payment ecosystem has witnessed tremendous growth, with over 18,000 crore digital payment transactions recorded during 2024–25, while UPI alone processed more than 228 billion transactions in 2025. In today's technology-driven environment, the convenience and speed of digital financial platforms have significantly increased their usage across urban and rural areas in Karnataka. However, this expansion has also led to a rise in cyber security vulnerabilities, exposing users to threats such as phishing, online fraud, identity theft, and unauthorized access to financial information. Karnataka alone reported cyber fraud losses of ₹861 crore until July 2025, highlighting the seriousness of digital financial crimes in the state. In the present context, ensuring cyber security in digital finance has become a major concern for governments, financial institutions, and users alike. As cybercriminals continue to adopt advanced techniques, users with limited cyber security awareness are becoming more susceptible to financial losses and data breaches. This study focuses on understanding the impact of cyber threats on digital finance users in Karnataka and analysing the importance of cyber security awareness in minimizing such risks. The research is highly relevant in today's context as digital transactions continue to increase rapidly in both personal and commercial activities.

Conceptual Background

The conceptual background of the study highlights the growing importance of cyber security awareness in the digital financial environment. Digital finance platforms have transformed the financial sector by making transactions and investments faster, easier, and more accessible. At the same time, the increased use of these platforms has created cyber security risks such as phishing attacks, identity theft, data breaches, malware, and fake investment applications. Cyber security awareness helps users identify these threats and adopt safe online practices like using strong passwords, enabling two-factor authentication, avoiding suspicious links, and regularly monitoring accounts. Greater awareness improves users' confidence and reduces the fear of online fraud while using digital financial services. Cyber security awareness, cyber hygiene practices, and effective legal frameworks play an essential role in protecting investors from cyber risks.

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The study emphasizes that greater awareness and secure digital practices can positively influence investment behaviour by increasing trust, reducing perceived risk, and encouraging safe participation in digital financial activities. The study emphasizes that greater awareness and secure digital practices can positively influence investment behaviour by increasing trust, reducing perceived risk, and encouraging safe participation in digital financial activities. The Technology Acceptance Model further supports the understanding of how users adopt digital financial technologies based on perceived usefulness, ease of use, and security. In addition, cyber hygiene practices and legal frameworks such as the Information Technology Act, 2000, RBI guidelines, and the Digital Personal Data Protection Act, 2023 help protect users and ensure secure digital financial transactions.

Review of literature

Anayo Chukwu Ikegwu et.al (2026)⁵ studied cyber security in mHealth applications. The study found that Cyber Threat Intelligence improves threat detection and data security. Isabel Maldonado, et al (2026)¹⁴ examined cyber security challenges in SMEs. The findings showed that SMEs need stronger security frameworks and awareness programs. Duo Wang and Yanxi Li (2026)¹⁰ analysed cyber security legislation and debt default risk. The study found that strong cyber laws help reduce financial risks. Ramlan Amir Isa, et al (2026)²⁷ studied cyber security awareness in digital commerce. The findings showed that awareness improves secure online practices. Fathey Mohammed et.al (2026)¹² explored fraud vulnerability among older adults. The study found that low awareness increases digital investment fraud risks. Harting, Ralf-Christian et.al (2025)¹³ examined cyber risk management performance. The study showed that awareness and technology improve cyber security systems. Siyabulela Sandi and Carolien L. van den Berg (2025)³⁰ analysed cyber security education and resilience. The findings revealed that continuous learning improves security behaviour. Serpil Sevimli Deniz and Mehmet Ataş (2025)²⁹ studied phishing risks during employee onboarding. The study found that proper training reduces phishing attacks significantly. Mohammed Afzal et.al (2025)²¹ examined cyber awareness in rural digital finance. The findings showed that awareness reduces fraud and improves trust. Damodharan Kuttiyappan and Dr. Rajasekar V (2023)⁷ developed a deep learning cyber-attack detection model. The study achieved high accuracy in identifying banking cyber threats. Kevin F. McCrohan, Kathryn Engel, and James W. Harvey (2010)¹⁹ analysed awareness training and password behaviour. The study found that cyber training improved password security strength. Dave Brown, et.al (2026)⁸ studied privacy concerns among older digital users. The findings showed that low digital literacy reduces trust in online systems. Bo Nørregaard Jørgensen and Zheng Grace Ma (2026)⁶ reviewed cyber security threats in smart grids. The study found that cyber-attacks create major risks to energy systems. Kate-Riin Kont and Denis Horenzenko (2026)¹⁸ examined cyber risk management among tax officials. The findings revealed gaps in formal cyber security practices. Julija Saveljeva and Tatjana Volkova (2025)¹⁷ studied digital trust and banking risks. The study found that trust reduces perceived third-party cyber risks. Jones Márcio Nambundo, et.al (2025)¹⁵ analysed cyber threats in smart meter systems. The findings showed risks like data tampering and weak authentication. Rahime Belen-Saglam, et.al (2025)²⁶ explored cyber risks in MaaS systems. The study identified privacy issues and weak

security standards. Doney Abraham, et.al (2023)⁹ examined cyber-attacks on energy infrastructure. The study found increasing vulnerabilities in critical energy systems. Martin Eling, et.al (2021)²⁰ reviewed cyber risk management frameworks. The study emphasized the importance of cyber resilience strategies. Natile Nonhlanhla Cele and Sheila Kwenda (2024)²⁴ studied cyber threats affecting digital banking adoption. The findings showed that security concerns reduce user trust. Ahmed M. Abdelmagid, et.al (2025)⁴ analysed maritime cyber risks. The study found that outdated systems increase cyber vulnerabilities. Ntokozo F. Miya and Nazeer Joseph (2025)²⁵ examined cyber resilience trends in finance. The study highlighted limited focus on recovery and resilience strategies. Samir Bhowmik and Annesha Saha (2025)²⁸ studied digital finance adoption among MSMEs. The findings revealed challenges in cyber risk management practices. Joseph Opuni-Frimpong (2026)¹⁶ analysed cyber security disclosures and credit risk. The study found that better disclosures reduce financial risk exposure. Abu Barkat Ullah, et.al (2025)¹ reviewed cyber security in mining infrastructure. The study recommended stronger policies and threat detection systems. Adetunji Paul Adejumo and Chinonso Peter Ogburie (2025)² studied cyber security in digital finance systems. The findings showed that strong security measures reduce cyber risks. Adetunji Paul Adejumo and Chinonso Peter Ogburie (2025)³ analysed cyber security technologies in financial transactions. The study found that AI-based systems improve transaction safety. Mosope Williams, et.al (2021)²³ studied machine learning in fraud prevention. The findings showed improved cyber risk detection accuracy. Moshood F. Yussuf, et.al (2020)²² examined machine learning for cyber risk assessment. The study found that predictive models strengthen financial security. Eugenio Lilli (2020)¹¹ analysed Obama's cyber security policy and digital protection systems. The study concluded that government policies strengthened national cyber security efforts.

Problem Statement

The use of digital financial platforms has increased among investors in Karnataka because it is easy and convenient. However, this has also increased cyber risks like phishing, hacking, and online fraud. Due to lack of awareness, investors may face financial loss and lose trust in digital platforms. It is important to understand how cyber threats affect investors and how awareness influences their trust and decisions. Also, the effectiveness of cyber security awareness programs is not clearly known. Therefore, this study focuses on understanding investor awareness, the impact of cyber threats, and ways to improve safety in digital financial activities.

Objective of the Study

To examine the relationship between cyber security awareness and users' trust in digital financial services in Karnataka.

To evaluate the effectiveness of cyber security awareness programs and safety practices adopted by users in Karnataka.

Research Methodology

6.1 Research Method

The study adopts a **descriptive research methodology** to understand and explain the level of cyber security awareness among users using digital financial platforms. This method focuses on describing the current situation without influencing or controlling variables. Primary data is collected through structured questionnaires and surveys,



while secondary data is gathered from reliable sources such as websites, research articles, and financial reports.

Sampling Design

- **Sampling Method** -The study uses convenience sampling, a non-probability sampling method where respondents are selected based on availability and willingness. Users who are easily accessible and use digital financial platforms are chosen for the study. This method is simple, cost-effective, and suitable for collecting data within limited time and resources.
- **Sampling Size** – According statistics times website, As of 2026, Karnataka's estimated population is 6.91 crore, with around 86% of people using digital payments, resulting in a considerable population of 5,23,83,600. Using Cochran's sample size formula with a 95% confidence level, 0.5 proportion, and 5% margin of error, the calculated sample size is 385 respondents. To

Table 1 Scale Reliability Statistics

Objectives	Cronbach's α
Objective-1	0.815
Objective-2	0.823
Overall	0.898

Source: Survey Data-SPSS output

The Cronbach's alpha values for Objective 1 (0.815) and Objective 2 (0.823) indicate good reliability of the scale items. The overall Cronbach's alpha value of 0.898 shows a high level of internal consistency, confirming that the questionnaire is reliable and suitable for the study.

Secondary Data

Secondary data was collected from existing sources such as websites, research papers, journals, articles, and reports related to digital finance and cyber security. It helped in understanding background information, current trends, and supporting the findings of the study.

Tools of the Study

Descriptive Analysis-Descriptive analysis is used to summarize and present the collected data using percentages, mean, and standard deviation. It helps in understanding cyber threats, cyber security awareness, users' trust, and investment behaviour in Karnataka. This analysis identifies general patterns and supports the study hypotheses.

Correlation Analysis-Correlation analysis measures the strength and direction of the relationship between two variables. In this study, it is used to test H_{01} by examining

improve the validity of the study, the researcher considered 400 respondents for data collection.

Source of Data

Primary Data - This study relies on primary data collected from investors to examine cyber security awareness among users in digital finance.

Research Instrument

Structured Questionnaire

Data were collected through a structured questionnaire designed based on the objectives of the study to gather quantitative data for statistical analysis.

5-Point Likert Scale

A 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) was used to measure respondents' opinions, attitudes, and awareness levels, enabling easy comparison and analysis.

Reliability Statistics

the relationship between cyber security awareness and users' trust in digital financial services.

Regression Analysis-Regression analysis evaluates the impact of independent variables on a dependent variable. In this study, it is used to test H_{02} by assessing how cyber security awareness programs and safety practices influence users of digital financial services in Karnataka.

Hypotheses

H_{01} : There is no significant relationship between cyber security awareness and users' trust in digital financial services in Karnataka.

H_{02} : Cyber security awareness programs have no significance effect on the safety practices adopted by users.

Data Analysis and Interpretation

This section presents the analysis and interpretation of data collected through structured questionnaires. Statistical tools are used to examine cyber threats, cyber security awareness, users' trust, and investment behaviour in Karnataka. The findings support the objectives and hypotheses of the study.

H_{01} : There is no significant relationship between cyber security awareness and users' trust in digital financial services in Karnataka.

Table 2 CORRELATION MATRIX-OBJECTIVE-1

		obj1.1	obj1.2	obj1.3	obj1.4	obj1.5	obj1.6	obj1.7	obj1.8	obj1.9	obj1.10
Obj 1.1	Pearson's r	—									
	p-value	—									
obj 1.2	Pearson's r	0.206	—								
	p-value	<.001	—								
obj 1.3	Pearson's r	0.276	0.319	—							
	p-value	<.001	<.001	—							
obj 1.4	Pearson's r	0.299	0.355	0.235	—						
	p-value	<.001	<.001	<.001	—						
obj 1.5	Pearson's r	0.368	0.147	0.306	0.277	—					
	p-value	<.001	0.003	<.001	<.001	—					



obj 1.6	Pearson's r	0.219	0.312	0.226	0.294	0.377	—			
	p-value	<.001	<.001	<.001	<.001	<.001	—			
obj 1.7	Pearson's r	0.27	0.268	0.375	0.306	0.371	0.388	—		
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	—		
obj 1.8	Pearson's r	0.259	0.25	0.276	0.344	0.279	0.388	0.388	—	
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	—	
obj 1.9	Pearson's r	0.348	0.296	0.322	0.294	0.411	0.244	0.321	0.287	—
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	—
obj 1.10	Pearson's r	0.293	0.483	0.275	0.379	0.238	0.3	0.274	0.276	0.355
	df	399	399	399	399	399	399	399	399	399
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001

Source: Survey Data-SPSS output

The correlation matrix indicates positive relationships among all Objective-1 variables, with Pearson's correlation coefficients ranging from 0.147 to 0.483, reflecting weak to moderate associations. The strongest correlation was observed between obj1.2 and obj1.10 ($r = 0.483$, $p < .001$), followed by obj1.5 and obj1.9 ($r = 0.411$, $p < .001$), and obj1.6 with obj1.7/obj1.8 ($r =$

0.388, $p < .001$). All correlations were statistically significant ($p < .001$), indicating consistent relationships among cyber security awareness, trust, and online financial platform usage.

H₀: Cyber security awareness programs have no significance effect on the safety practices adopted by users.

Table 3 REGRESSION MODEL SUMMARY- OBJECTIVE-2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.745 ^a	.555	.544	.33855

a. Predictors: (Constant), Obj2.10, Obj2.5, Obj2.7, Obj2.3, Obj2.6, Obj2.4, Obj2.9, Obj2.8, Obj2.2, Obj2.1

Source: Survey Data-SPSS output

The regression model shows a strong relationship between the dependent and independent variables ($r = 0.745$). The r square value indicates that approximately 55% of the variation in the dependent variable is explained by the

predictors, while the adjusted r square confirms model consistency. The low standard error indicates good prediction accuracy, demonstrating an overall good model fit.

Table 4 ANOVA^a OBJECTIVE-2

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	55.78	10	5.58	48.66	.000 ^b
Residual	44.70	390	0.11		
Total	100.48	400			

a. Dependent Variable: Obj3 To analyse the influence of cyber security awareness on the safe usage behaviour of digital financial platform users.

b. Predictors: (Constant), Obj2.10, Obj2.5, Obj2.7, Obj2.3, Obj2.6, Obj2.4, Obj2.9, Obj2.8, Obj2.2, Obj2.1

Source: Survey Data-SPSS output

The ANOVA results indicate that the overall regression model is statistically significant ($F = 48.66$, $p = 0.000$). The independent variables collectively have a strong effect on the dependent variable (Obj3). The higher

regression sum of squares and mean square compared to the residual values indicate that the model explains a substantial portion of the total variation. Overall, the findings confirm the suitability and effectiveness of the regression model for prediction and analysis.

Table 5 COEFFICIENTS^a OBJECTIVE-4

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	.892	.151		5.91	.000
Obj2.1	.127	.028	.187	4.47	.000
Obj2.2	.085	.030	.117	2.83	.005
Obj2.3	.076	.024	.126	3.21	.001
Obj2.4	.079	.025	.125	3.18	.002
Obj2.5	.085	.023	.134	3.66	.000
Obj2.6	.069	.025	.109	2.77	.006

Obj2.7	.077	.024	.122	3.15	.002
Obj2.8	.045	.025	.073	1.75	.080
Obj2.9	.039	.026	.061	1.47	.141
Obj2.10	.096	.030	.138	3.22	.001

a. Dependent Variable: Obj3 To analyse the influence of cyber security awareness on the safe usage behaviour of digital financial platform users.

Source: Survey Data-SPSS output

The coefficients table shows the individual impact of each independent variable on the dependent variable (Obj3). Most variables have significance values below the accepted level, indicating a positive and significant influence. Among the predictors, Obj2.1 demonstrates the strongest effect, while Obj2.8 and Obj2.9 do not show significant influence. Overall, the results confirm that most variables contribute significantly to the regression model.

Results and Discussions

- Cyber security awareness recorded the highest mean score (Mean = 4.60, SD = 0.66), indicating strong awareness and preference for secure online financial platforms.
- Correlation analysis showed significant positive relationships among all variables ($r = 0.147-0.483$, $p < .001$), with the strongest between obj2.2 and obj2.10 ($r = 0.483$), leading to the rejection of H_{02} .
- Improved risk knowledge recorded the highest mean score (Mean = 4.52, SD = 0.74), indicating that awareness programs enhance user confidence and online safety practices.
- Regression results showed a strong model fit ($R = 0.745$, $R^2 = 0.555$; $F = 48.66$, $p = .000$), with Obj4.1 showing the strongest effect, leading to the rejection of H_{04} and confirming the significant impact of cyber security awareness programs on users in Karnataka.
- Financial institutions can implement Cyber Risk Score and Digital Trust Certification systems to help users identify secure platforms and make safer investment decisions.
- Banks and fintech companies can provide personalized cyber security dashboards, AI-based awareness programs, and customized alerts based on user behaviour and risk levels.
- AI-based fraud detection and adaptive authentication methods can strengthen transaction security through real-time alerts and risk-based protection.
- Interactive cyber security simulations and virtual training labs can improve users' ability to detect fraud, enhance awareness, and build trust in digital financial platforms.

Conclusion

This study concludes that cyber security threats such as phishing, online fraud, and unauthorized access have a significant impact on the behavior and trust of digital finance users in Karnataka. The findings reveal that demographic factors such as place, gender, age, occupation, and investment experience influence users' perceptions of cyber risks. Furthermore, cyber security awareness plays a crucial role in promoting safe digital financial practices, including the use of secure authentication methods and cautious platform usage. Overall, enhancing cyber security awareness and strengthening preventive measures can significantly reduce vulnerabilities and improve confidence in digital financial platforms among users.

Future research can expand the study by covering a larger sample across different states of India to improve the generalizability of the findings. Comparative studies between urban and rural digital finance users can provide deeper insights into cyber security awareness levels and risk exposure. Additionally, longitudinal studies can assess how cyber security awareness and user behavior evolve over time with changing digital threats.

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Original Article

Consumer Behaviour in The Modern Marketplace

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Abstract

Consumer behaviour refers to the study of how individuals make decisions to purchase, use, and dispose of products and services. In today's dynamic and technology-driven environment, understanding consumer behaviour has become essential for businesses to meet customer needs and preferences effectively. This paper explores the various factors that influence consumer buying decisions, including cultural, social, personal, and psychological aspects. The study highlights how digital media, online reviews, advertisements, and changing lifestyles shape consumer choices. By analyzing consumer purchasing patterns and preferences, the paper provides insights into the evolving expectations of customers in the modern marketplace. The findings emphasize that understanding consumer behaviour helps organizations develop better marketing strategies, improve customer satisfaction, and build long-term customer relationships. The study concludes that consumer behaviour is continuously changing, making it important for businesses to adapt and innovate to remain competitive.

Keywords : Consumer Behaviour, Buying Decision, Consumer Preferences, Marketing Strategy, Customer Satisfaction, Digital Influence.

Introduction

Consumer behaviour refers to the study of how individuals select, purchase, use, and dispose of goods and services to satisfy their needs and wants. It helps businesses understand the factors that influence consumer decisions, such as personal preferences, culture, social influences, income, and lifestyle. Understanding consumer behaviour is essential for developing effective marketing strategies and meeting customer expectations. In the modern marketplace, consumer behaviour has evolved significantly due to technological advancements, digital marketing, and the growth of e-commerce. Consumers now have easy access to information, online reviews, and multiple purchasing options, enabling them to make informed decisions. As consumer preferences continue to change, businesses must adapt to these trends to enhance customer satisfaction, build brand loyalty, and remain competitive in the market.

Concepts of Consumer Behaviour in the Modern Marketplace

Consumer behaviour is the study of how individuals, groups, and organizations select, purchase, use, and dispose of goods and services to satisfy their needs and wants. In the modern marketplace, understanding consumer behaviour is essential because consumers have access to a wide range of products, information, and purchasing channels. Businesses analyze consumer behaviour to understand customer preferences, predict buying patterns, and develop effective marketing strategies.

Consumer Decision-Making Process

The consumer decision-making process involves five stages: need recognition, information search, evaluation of alternatives, purchase decision, and post-purchase evaluation. Consumers first identify a need, gather information about available options, compare alternatives, make a purchase, and then evaluate their satisfaction with the product or service.

Buying Motives

Buying motives are the reasons that drive consumers to purchase a product or service. These motives can be rational, such as quality, price, and durability, or emotional, such as status, prestige, comfort, and personal satisfaction.

Perception

Perception refers to how consumers interpret and understand information about products and brands. Different consumers may perceive the same product differently based on their experiences, beliefs, and expectations. Marketers use advertising and branding to create positive perceptions among consumers.

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Attitude and Beliefs

Consumer attitudes and beliefs influence purchasing decisions. A positive attitude toward a product or brand increases the likelihood of purchase, while negative experiences may discourage future purchases. Companies focus on maintaining a positive brand image to influence consumer attitudes.

Consumer Preferences

Consumer preferences refer to the choices and tastes of consumers regarding products and services. Preferences vary based on age, income, education, lifestyle, and cultural background. Understanding consumer preferences helps businesses tailor their offerings to meet customer needs.

Brand Loyalty

Brand loyalty occurs when consumers repeatedly purchase products from a particular brand because of trust, satisfaction, and positive experiences. Loyal customers contribute to long-term business success and often recommend brands to others.

Customer Satisfaction

Customer satisfaction measures how well a product or service meets consumer expectations. Satisfied customers are more likely to make repeat purchases and remain loyal to a brand. Therefore, businesses focus on delivering quality products and excellent customer service.

Post-Purchase Behaviour

Post-purchase behaviour refers to consumer reactions after purchasing a product. If consumers are satisfied, they may become repeat customers. If dissatisfied, they may switch to competing brands or share negative feedback.

Impact of Digital Technology

Digital technology has significantly transformed consumer behaviour. Online shopping platforms, mobile applications, social media, and digital payment systems have made purchasing more convenient. Consumers can compare prices, read reviews, and access product information instantly.

Social Media Influence

Social media platforms such as Instagram, Facebook, YouTube, and X influence consumer decisions through advertisements, influencer marketing, and customer reviews. Consumers often rely on online recommendations before making purchases.

Review of Literature

Aljukhadar et al. (2023) examined the role of information technology in shaping consumer behaviour and found that technological innovations have transformed how consumers search for information, compare products, and make purchasing decisions. The study emphasized the increasing influence of digital tools on consumer engagement.

Kaur (2023) reviewed consumer behaviour in online marketplaces and concluded that product variety, pricing strategies, user-generated content, and platform design play a major role in influencing online purchase decisions. The study emphasized that consumers increasingly rely on online information before making purchases.

Drăghici and Constantinescu (2024) examined consumer behaviour in the digital era and found that technology, artificial intelligence, trust, and privacy concerns significantly influence consumer decision-making. The study highlighted the growing importance of personalized marketing and digital platforms in shaping consumer preferences.

Yogonugroho, Nur'adi, and Khasanah (2025) conducted a systematic literature review and identified digital marketing, social media engagement, online reviews, and consumer trust as key factors affecting purchasing decisions in digital environments. The research highlighted the importance of understanding digital consumer behaviour for effective marketing strategies.

Kumar and Sarkar (2025) explored consumer behaviour theories in the age of social media and found that influencer marketing, electronic word-of-mouth (eWOM), and user-generated content significantly impact consumer attitudes and buying intentions. The study suggested that traditional consumer behaviour models should be updated to reflect digital realities.

Li and Deng (2026) investigated impulse buying behaviour in the evolving marketplace and reported that social, emotional, technological, and economic factors strongly influence consumer purchasing behaviour. Their findings indicated that digital platforms encourage impulse buying through personalized recommendations and targeted promotions.

Summary Of Review of Literature

The reviewed studies reveal that consumer behaviour in the modern marketplace is increasingly influenced by digital technology, social media, online reviews, personalization, and consumer trust. These factors have transformed traditional purchasing patterns and created new opportunities for businesses to engage with consumers effectively.

Challenges of Consumer Behaviour in the Modern Marketplace

Rapidly Changing Consumer Preferences

Consumer tastes, needs, and expectations change frequently, making it difficult for businesses to predict buying behaviour accurately.

Information Overload

Consumers are exposed to vast amounts of information through websites, social media, advertisements, and reviews, which can create confusion during decision-making.

Influence of Social Media

Social media trends and influencer marketing can quickly alter consumer perceptions and purchasing decisions, making consumer behaviour unpredictable.

Growing Competition

The availability of numerous brands and products gives consumers more choices, increasing competition among businesses.

Privacy and Data Security Concerns

Consumers are becoming more concerned about the collection and misuse of their personal information in digital platforms.

Changing Technology

Continuous advancements in technology require businesses to adapt their marketing strategies to meet evolving consumer expectations.

Consumer Trust Issues

Fake reviews, misleading advertisements, and online fraud can reduce consumer trust in brands and online marketplaces.

Economic Uncertainty

Inflation, unemployment, and economic fluctuations influence consumer spending patterns and purchasing power.



Cultural Diversity

Businesses operating in global markets face challenges in understanding and satisfying consumers from different cultural backgrounds.

Customer Retention

Maintaining customer loyalty is challenging as consumers can easily switch to competitors offering better prices, quality, or services.

Objectives of the Study

Research Methodology

1. To understand the concept and importance of consumer behaviour in the modern marketplace.
2. To identify the factors influencing consumer purchasing decisions.
3. To examine the impact of digital technology and social media on consumer behaviour.
4. To analyze the consumer decision-making process in the modern marketplace.
5. To study the role of customer satisfaction and brand loyalty in shaping consumer behaviour.

SNO	RESEARCH METHODOLOGY	RESEARCH SOURCE
1	Research Design	The study adopts a descriptive research design to understand consumer behaviour in the modern marketplace and identify the factors influencing consumer purchasing decisions.
2	Data Type	The study is based on primary data collected directly from respondents through a structured questionnaire.
3	Sample Size	A total of 100 respondents were selected for the study.
4	Sampling Technique	The study uses convenience sampling, where respondents are selected based on their accessibility and willingness to participate.
5	Respondents	The respondents consist of consumers from different age groups, occupations, and income levels who actively purchase products and services in the modern marketplace.
6	Data Collection Tools	Data were collected using a structured questionnaire containing both multiple-choice and Likert scale questions to gather information on consumer preferences, buying behaviour, and factors influencing purchase decisions.

Statistical Analysis with Findings and Interpretation

Independent Sample t-Test

Objective: To examine whether there is a significant difference in consumer behaviour between male and female respondents.

Hypothesis

H₀: There is no significant difference in consumer behaviour between male and female consumers.

H₁: There is a significant difference in consumer behaviour between male and female consumers.

Table 1: t-Test Result

Gender	N	Mean Score	Std. Deviation	t-value	p-value
MALE	50	3.85	0.62	2.18	0.032
FEMALE	50	4.12	0.58		

Interpretation

Since the p-value (0.032) is less than 0.05, the null hypothesis is rejected. Therefore, there is a significant difference in consumer behaviour between male and female respondents.

Finding

Female consumers exhibit slightly higher consumer behaviour scores than male consumers.

Table 2: Chi-Square Result

Particular	Value
Chi-Square value	12.56
Degrees of Freedom	6
p-value	0.048

Interpretation

Since the p-value (0.048) is less than 0.05, the null hypothesis is rejected. Hence, there is a significant association between age group and factors influencing purchasing decisions.

Finding

Chi-Square Test

Objective: To identify the relationship between age group and factors influencing purchasing decisions.

Hypothesis

H₀: There is no association between age group and purchasing factors.

H₁: There is an association between age group and purchasing factors.

Different age groups consider different factors such as price, quality, convenience, and brand reputation while making purchases.

Findings from t-Test

There is a significant difference in consumer behaviour between male and female respondents.



Female consumers show a higher level of consumer behaviour compared to male consumers.

Gender influences purchasing decisions in the modern marketplace.

Findings from Chi-Square Test

1. There is a significant association between age group and purchasing decision factors.
2. Different age groups are influenced by different factors while making purchases.
3. Price, quality, brand image, convenience, and online reviews significantly affect consumer decisions.
4. Consumer preferences vary according to age.

Precautions

1. Ensure that the questionnaire is clear and easy for respondents to understand.
2. Collect responses from diverse consumers to avoid bias.
3. Maintain the confidentiality and privacy of respondents.
4. Avoid leading questions that may influence respondents' answers.
5. Verify the accuracy and completeness of the collected data.

Key Findings

1. Consumer behaviour is significantly influenced by demographic factors such as age and gender.
2. Digital technology and social media play a major role in shaping consumer purchasing decisions.
3. Online reviews and recommendations influence consumer preferences.
4. Customer satisfaction contributes to repeat purchases and brand loyalty.
5. Consumers prefer convenience, quality, and value for money while making purchasing decisions.

Areas for Improvement

1. Enhance customer engagement through personalized marketing strategies.
2. Improve online customer support and service quality.
3. Strengthen data privacy and security measures.
4. Increase transparency in advertising and product information.
5. Develop innovative products based on changing consumer preferences.

Future Scope

- Future studies can include a larger sample size for better generalization.
- Research can be conducted across different regions and demographic groups.
- The impact of artificial intelligence on consumer behaviour can be explored.
- Future studies can examine the influence of emerging digital platforms on purchasing decisions.
- Comparative studies can be conducted between online and offline consumer behaviour.

Conclusion

Consumer behaviour in the modern marketplace is continuously evolving due to technological advancements, social media influence, and changing consumer preferences. Understanding consumer behaviour helps businesses identify customer needs, improve satisfaction, and develop effective marketing strategies. Organizations that adapt to changing consumer trends can achieve sustainable growth and maintain a competitive advantage.

Final Insights

The study highlights that consumer behaviour in the modern marketplace is greatly influenced by digital technology, social media, customer satisfaction, and brand loyalty. Consumers are becoming more informed and selective in their purchasing decisions. Therefore,

businesses must continuously adapt to changing consumer preferences, provide quality products and services, and adopt customer-centric strategies to achieve long-term success and competitiveness.

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User Perception Towards UPI-Based Digital Payments in Karnataka

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Abstract:

The rapid growth of digital payment systems has transformed the financial landscape in India, with the Unified Payments Interface (UPI) emerging as one of the most widely adopted payment platforms due to its speed, convenience, and accessibility. This study titled "Users Perception towards Digital Payment Systems: A Study with Special Reference to UPI in Karnataka" aims to examine the behavioural factors influencing the adoption of UPI payments and to analyze customer awareness in improving the effective use of digital payment systems by considering demographic factors. The main purpose of the study is to understand user perception, awareness, and adoption patterns of UPI services among consumers in Karnataka. The study follows a descriptive research design and is based on primary data collected from 402 respondents through the convenience sampling technique. Data analysis was carried out using JAMOVI software with the application of statistical tools such as ANOVA and Correlation to identify relationships and differences among variables. The findings of the study are expected to contribute to financial institutions, digital payment service providers, policymakers, and researchers by providing insights into consumer behaviour, awareness levels, and factors influencing the effective adoption and usage of UPI-based digital payment systems in Karnataka.

Index Terms - Unified Payments Interface (UPI), Digital Payment Systems, User Perception, Customer Awareness, Financial Inclusion

Introduction

The advancement of digital technology has significantly transformed the way financial transactions are carried out across the world. In India, digital payment systems have gained remarkable importance after the introduction of initiatives promoting a cashless economy and financial inclusion. Among the various digital payment methods, the Unified Payments Interface (UPI) has emerged as one of the most popular and convenient platforms due to its speed, accessibility, security, and ease of use. The increasing penetration of smartphones, internet connectivity, and banking applications has further accelerated the adoption of UPI payments among people of different age groups and occupations. In today's context, digital payments play a crucial role in reducing dependency on cash and supporting transparent financial transactions. Karnataka, being one of the technologically advanced states in India, has witnessed rapid growth in the usage of UPI for everyday transactions such as shopping, bill payments, ticket booking, and fund transfers. However, user perception, behavioural factors, and awareness levels differ based on demographic characteristics and technological understanding. Therefore, studying users' perception towards digital payment systems has become highly relevant in understanding the effectiveness and acceptance of UPI services in the present digital era. This study mainly focuses on identifying the behavioural factors influencing the adoption of UPI payments and analyzing customer awareness regarding the effective use of digital payment systems in Karnataka. The research helps in understanding how demographic factors such as age, gender, education, occupation, and income influence users' perception and usage of UPI. The study also examines the convenience, security, reliability, and problem-solving aspects associated with digital payments. By analyzing these factors, the research provides valuable insights for banks, policymakers, digital payment providers, and researchers to improve digital payment services and encourage wider adoption among consumers.

Conceptual Background

Digital payment systems have transformed financial transactions in India, with the Unified Payments Interface (UPI) emerging as one of the most widely used platforms for instant and secure money transfers. Developed by the National Payments Corporation of India, UPI enables users to transfer money through mobile devices using UPI IDs, QR codes, and banking applications without sharing bank details. Features such as 24/7 availability, low transaction cost, speed, security, and convenience have increased its adoption among consumers and merchants. Karnataka, especially Bengaluru, has witnessed rapid growth in UPI usage due to higher digital awareness, smartphone penetration, and merchant acceptance.

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UPI plays an important role in promoting financial inclusion, reducing cash dependency, and supporting a cashless economy. However, challenges such as internet dependency, fraud risks, technical issues, and lack of digital awareness continue to affect its usage. Therefore, this study focuses on identifying the behavioural factors influencing the adoption of UPI payments and analyzing customer awareness regarding the effective use of digital payment systems in Karnataka. The findings of the study provide useful insights for banks, policymakers, digital payment providers, and researchers to improve digital payment services and encourage wider adoption among consumers.

Review of Literature

Aung Soe Lin and Dr. Bruce Edward Weeks (2025)³ found that security, ease of use, and convenience significantly increased digital payment adoption and financial inclusion in Myanmar. Niranjana Behara (2026)¹⁶ revealed that digital payments improved financial inclusion in rural India, though digital literacy and infrastructure issues affected adoption. P. Vanaja and S. Madhavi (2025)¹⁷ observed that UPI was preferred over cash due to convenience and speed, while trust and habit supported cash usage. Himanshu Trigune and et.al (2025)¹² developed a system that effectively detected fraudulent QR codes and improved the security of UPI transactions. Dr. Suresha K. P (2025)⁷ highlighted that the Digital India initiative improved digital accessibility and governance despite literacy challenges. Shruti Bhutani and Dr. Suman Pahal (2025)²⁴ found that retailer adoption of UPI increased because of convenience and low transaction cost. S.S. Soodi (2025)²⁰ identified that awareness and trust are important factors influencing the future growth of digital payments. Elamurugan Balasundaram and et.al (2025)⁸ concluded that speed, convenience, and reliability increased the acceptance of digital payment systems. Shreya Jakati, Yeshwanth T. N, and Dr. Parul Tandan (2025)²³ found that digital payments increased spending frequency and encouraged cashless transactions. Basavesh S and Sathvik V.H (2025)⁴ revealed that UPI improved transaction efficiency and customer service among small businesses in Bangalore. Vaibhav Dange, Samarth Kore, and Ritesh Kabra (2025)²⁹ showed that integrating UPI with EV charging stations improved cashless payment convenience. Dr. Chintamani Avinash Ramesh (2025)⁶ stated that digital payment systems reduced cash dependency and promoted economic digitalization in India. Shalini Kumari and Dr. Balagouda S Patil (2025)²² found that digital payments influenced consumer spending behaviour through transaction convenience. Vaishnavi Shrikant Takane and Kedar Sarika Suresh (2025)³⁰ concluded that digital payments enhanced accessibility and financial inclusion among users. Fathima J and et.al (2025)⁹ observed positive satisfaction among small business owners toward digital payment adoption in Coimbatore. Srishti Tamrakar and Ankita Lakra (2025)²⁷ found that UPI adoption improved financial management and reduced reliance on cash transactions. Pritish Kumar Sahu, Anwesha Chakraborty, and Pratyush Banerjee (2025)¹⁸ revealed that UPI supported financial inclusion and improved business efficiency in rural India. Komal Vishwakarma and et.al (2025)¹³ concluded that convenience and accessibility increased the preference for digital payment systems. Harsh Kumar (2025)¹⁰ found that digital payments enhanced financial participation and reduced cash dependency in rural India. Seena Mary Mathew and et.al (2024)²¹ highlighted the rapid growth of UPI as a dominant digital payment system in India. Mayank Kumar, Jang Bahadur Singh, and

Sujeet Kumar Sharma (2024)¹⁵ found that UPI improved business efficiency among micro-enterprises despite technical challenges. Sreeshavittala D and Dr. Ravi B (2024)²⁶ observed that merchants adopted UPI due to convenience and increasing customer demand. Arbole Supriya Suresh and Dr. Sanjay Kumar Sriwastaw (2024)² revealed that digital payments improved financial inclusion in rural Karnataka. Hima Devadas and Dr. P. Ayyappan (2024)¹¹ found that poor connectivity and lack of awareness limited effective UPI adoption in rural India. Aniket Swaraj and Ayush Bohara (2024)¹ concluded that limited awareness about security measures increased fraud risks in UPI usage. Somendra Kumar and Dr. Vinay Pal Singh (2024)²⁵ found differences in trust and satisfaction levels between Gen Z and Gen Y digital payment users. Bimal Jaiswal and Agnivesh Singh (2023)⁵ revealed that states with better infrastructure showed higher adoption of UPI payments. Tirthankar Mandal (2023)²⁸ found that government initiatives and ease of use significantly influenced UPI adoption in India. Mahesh A & Ganesh Bhat S (2022)¹⁴ concluded that UPI improved transaction speed, convenience, and financial inclusion. S. Sekar (2021)¹⁹ found that awareness of digital payment systems increased gradually among banking customers despite infrastructure challenges.

Problem Statement

Although UPI and digital payment systems are widely adopted, users still face issues such as transaction failures, delays, security concerns, and lack of digital awareness. Limited studies focus on real-time user problems, financial planning aspects, and the influence of demographic and behavioural factors like trust and fear of fraud. Therefore, this study aims to analyze user problems, awareness levels, and factors influencing the effective use of UPI payments.

Objective of the Study

- To examine the impact of digital payment systems on long-term financial planning and savings habits of users.
- To evaluate the strategies to overcome from real-time challenges faced by users during UPI transactions.

Research Methodology

Research Method

The study adopts a descriptive research methodology to understand and explain users' perception towards UPI payments in Karnataka. This method focuses on describing the current situation of UPI users without influencing or controlling variables. Primary data is collected through structured questionnaires and surveys, while secondary data is gathered from reliable sources such as websites, journals, research articles, and reports related to digital payment systems.

Sampling Design

Sampling Method - The study uses a **convenience sampling method** under non-probability sampling, which means selecting respondents who are easily available and willing to participate in the survey. In simple terms, the researcher collects data from people who are nearby, easy to contact, or ready to respond, such as students, working individuals, or small business owners who use UPI.

Sampling Size - According to the Money control report, Karnataka is one of the leading states in digital payments, contributing around 7.7% of India's total UPI transaction volume, with nearly 47% of the population actively using UPI payments. Based on this, the study considered a



considerable population of 34,31,000 users. Using Cochran's sample size formula with a 95% confidence level, 0.5 proportion, and 5% margin of error, the calculated sample size was 385 respondents. To improve the validity of the study, the researcher considered 400 respondents for data collection.

Source of Data

Primary Data

This study relies entirely on primary data collected from investors to examine investors perception in digital payment system with reference to UPI.

Research Instruments

Structured Questionnaires

Table 1 Scale Reliability Statistics

Objectives	Cronbach's α
Objective	0.819
Objective	0.83
Overall	0.89

Source: Survey Data-SPSS output

The Cronbach's alpha values of 0.819 and 0.83 indicate good reliability and consistency in the variables used for the study. The overall Cronbach's alpha value of 0.89 shows that the collected data is highly reliable and suitable for further statistical analysis.

Secondary Data

Secondary data was collected from various sources such as research articles, journals, books, government reports, websites, and publications related to digital payment systems and UPI. This data helped in understanding the concept of digital payments, user perception, adoption trends, challenges, and provided support for the analysis and findings of the study.

Tools of the study

T-Test - The t-test is used to compare the mean values between two groups to identify significant differences. In this study, it is applied to test H_{02} by comparing users based on digital payment usage and analysing its impact on long-term financial planning and savings habits. This helps in understanding whether digital payment systems significantly influence the financial planning behaviour of users in Karnataka.

Data were collected through structured questionnaires designed according to the objectives of the study to gather quantitative data for statistical analysis.

Point Likert Scale

A 5-point Likert Scale was used in the questionnaire to measure respondents' opinions, attitudes, and awareness levels, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). It helps in converting individual opinions into numerical values for easy comparison and statistical analysis.

➤ Reliability statistics

Regression - Regression analysis is used to identify the effect of one variable on another variable. In this study, it is applied to test H_{04} by analysing the effect of strategies used to reduce real-time challenges faced by users during UPI transactions. This helps in understanding how different strategies contribute to minimizing transaction issues and improving the overall UPI user experience in Karnataka.

Hypotheses

H_{01} : Digital payment systems have no significant impact on the long-term financial planning and savings habits of users.

H_{02} : There is no significant effect of strategies used and the reduction of real-time challenges faced by users during UPI transactions.

Data Analysis and Interpretation

The data collected through primary sources, structured questionnaires, has been classified, tabulated, and analysed using appropriate statistical tools. Techniques such as percentage analysis, charts, tables, and graphical representations are used to simplify complex data and make it more understandable.

H_{03} : Digital payment systems have no significant impact on the long-term financial planning and savings habits of users.

Table 4.14

ONE SAMPLE T-TEST

Variables	Statistic	df	p
Expense Tracking Support	38.00	401	<.001
Encourages Money Saving	23.40	401	<.001
Financial Goal Setting	23.70	401	<.001
Easy Budget Planning	21.10	401	<.001
Spending Record Tracking	28.90	401	<.001
Reduces Unnecessary Spending	22.20	401	<.001
Easier Investment Management	28.00	401	<.001
Financial Planning Support	24.50	401	<.001
Improves Money Management	26.00	401	<.001
Long-Term Financial Planning	25.20	401	<.001

Note. $H_a \mu \neq 3$

Source: Survey Data-SPSS output

The One Sample t-Test results show that all variables have significant p-values ($p < 0.001$), indicating that respondents' opinions differ significantly from the neutral value. This suggests that UPI positively supports expense tracking, saving habits, budget planning, investment management, and long-term financial planning. Therefore, UPI has a

Table 4.18

MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
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significant positive impact on users' financial management behaviour.

H_{05} : There is no significant effect of strategies used and the reduction of real-time challenges faced by users during UPI transactions

1	.632 ^a	.400	.384	.40122
a. Predictors: (Constant), Obj4.10, Obj4.3, Obj4.2, Obj4.1, Obj4.9, Obj4.4, Obj4.6, Obj4.7, Obj4.8, Obj4.5				

Source: Survey Data-SPSS output

The **R value of 0.632** indicates a moderate positive relationship between the predictors and the dependent variable. The **R Square value of 0.400** shows that the model explains **40.0% of the variation** in the dependent

variable, while the **Adjusted R Square of 0.384** indicates an explanatory power of **38.4%** after adjustment. Overall, the model has a moderate ability to explain the dependent variable.

Table 4.19

ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.905	10	4.190	26.031	.000 ^b
	Residual	62.942	391	.161		
	Total	104.847	401			

a. Dependent Variable: Obj3

b. Predictors: (Constant), Obj4.10, Obj4.3, Obj4.2, Obj4.1, Obj4.9, Obj4.4, Obj4.6, Obj4.7, Obj4.8, Obj4.5

Source: Survey Data-SPSS output

The ANOVA results indicate that the regression model is significant (**F = 26.031, p < 0.001**). This shows that the predictor variables collectively have a significant effect on

the dependent variable (Obj3), making the model statistically reliable.

Table 4.20

COEFFICIENTS

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.653	.156		10.583	.000
Obj4.1	.081	.027	.135	2.971	.003
Obj4.2	.051	.031	.075	1.657	.098
Obj4.3	.092	.028	.154	3.251	.001
Obj4.4	.121	.028	.203	4.342	.000
Obj4.5	.047	.030	.077	1.554	.121
Obj4.6	.029	.026	.053	1.117	.265
Obj4.7	.063	.027	.114	2.317	.021
Obj4.8	.059	.029	.098	2.054	.041
Obj4.9	.053	.028	.090	1.894	.059
Obj4.10	.012	.028	.022	.434	.664

a. Dependent Variable: Obj3

Source: Survey Data-SPSS output

The coefficients analysis shows that Obj4.1 ($p = 0.003$), Obj4.3 ($p = 0.001$), Obj4.4 ($p < 0.001$), Obj4.7 ($p = 0.021$), and Obj4.8 ($p = 0.041$) significantly influence the dependent

variable. Among them, Obj4.4 ($\beta = 0.203$) has the strongest impact. The remaining variables are not significant ($p > 0.05$).

Results and Discussions

- The percentage analysis indicates that respondents have a positive opinion towards the role of digital payments in financial planning. A majority **strongly agreed that digital payments help track expenses (53.23%)**, while **56.22% agreed that they encourage saving and 50.00% agreed that they support long-term financial planning**. Overall, respondents believed that digital payments improve budgeting, investment management, and money management.
- The One Sample t-test results show that **all variables are statistically significant ($p < 0.001$)**. Among them, **Expense Tracking Support recorded the highest t-value (38.00)**, indicating that digital payments have a significant positive impact on budgeting, saving, and financial planning.
- The hypothesis **H₀₂ is rejected**, as the results show that **digital payment systems significantly influence users' long-term financial planning and savings habits ($p < 0.05$)**. The findings confirm that digital payments positively support expense tracking, budgeting, saving behaviour, and investment management.

- The percentage analysis indicates that respondents have a positive opinion towards strategies for addressing UPI transaction challenges. A majority **strongly agreed that failed or pending UPI payments can be resolved (49.00%)**, while **56.22% agreed that UPI has safety measures to prevent fraud and 47.51% agreed that UPI problems can be handled easily**. Overall, respondents viewed customer support, app updates, and backup payment methods positively.
- The regression analysis showed a **moderate positive relationship ($R = 0.632$)**, with the model explaining **40.0% of the variation ($R^2 = 0.400$)**. The ANOVA results confirmed that the model was statistically significant (**F = 26.031, $p < 0.001$**), and **Obj4.1, Obj4.3, Obj4.4, Obj4.7, and Obj4.8 ($p < 0.05$)** significantly influenced effective UPI usage.
- The hypothesis **H₀₄ is rejected**, as the results indicate that **strategies for addressing real-time UPI transaction challenges significantly influence effective UPI usage ($p < 0.05$)**. The findings confirm that fraud prevention measures, customer support, app updates, and backup payment methods positively improve the effective use of UPI systems.



- Strengthen financial management features in UPI apps by introducing advanced budgeting, expense tracking, savings reminders, and investment planning tools to help users manage their finances more effectively.
- Improve security and customer support services by enhancing fraud detection systems, providing faster resolution of failed transactions, and offering 24/7 customer support to increase user trust and confidence in UPI payments.
- Increase user awareness and encourage regular UPI usage through educational campaigns, app tutorials, and reward programs that promote safe digital payment practices and highlight the benefits of using UPI for everyday transactions and financial planning.

Conclusion

The study concludes that users in Karnataka have a positive perception of UPI-based digital payment systems. Behavioural factors such as ease of use, convenience, security, rewards, and time-saving features significantly influence UPI adoption. Digital payments also support financial planning through better budgeting, expense tracking, and savings management. User awareness regarding UPI features, security measures, and transaction rules enhances the effective use of digital payment systems. In addition, fraud prevention measures, customer support, app updates, and backup payment options help users overcome transaction-related challenges. Overall, UPI has emerged as a reliable, convenient, and widely accepted payment system, contributing to the growth of a cashless economy in Karnataka.

The study can be extended to other regions to compare users' perceptions of UPI and digital payment systems. Future research may examine the role of emerging technologies and security features in digital payments. It can also focus on specific user groups such as rural users, senior citizens, and small business owners. Additionally, studies can be conducted over a longer period to analyze changes in digital payment behaviour and adoption trend.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Original Article

A Critical Analysis of Sex Ratio in India: A Geographical Review

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Abstract

Historically, India has exhibited a persistent male dominance in its sex composition, with sex ratio trends frequently reflecting a deficit of females. While rural ratios remained relatively stable above 900 since 1901, urban areas experienced a protracted decline before a recovery began in 2001. This paper examines the recent significant increase in India's sex ratio and analyzes the diverse spatial distribution between rural and urban sectors and across various states. The study employs a descriptive analysis of secondary data, primarily drawn from the National Family Health Survey-5 (2020-21) and the 2011 Census, to track longitudinal trends and regional disparities. Results indicate a landmark demographic shift, with the national sex ratio rising from 943 in 2011 to 1020 in 2021, marking the first time the survey recorded more females than males. However, a notable geographical divide persists, rural India reports a ratio of 1037, significantly higher than the 985 found in urban centers. Regional performance varies drastically, ranging from Kerala's peak of 1145 to Haryana's low of 926. While the overall improvement signals progress in demographic balance, the significant state-wise and urban-rural imbalances underscore the ongoing necessity for targeted policy interventions to address regional gender disparities and ensure an equitable demographic future.

Keywords: Sex Ratio, NFHS-5, Rural-Urban Divide, North-South Divide, Demographic, Gender Imbalance, Kinship, Conception.

Introduction

The sex ratio is a critical demographic metric used to indicate the gender composition of a population in a specific region. In biological and demographic studies, this ratio is typically classified into three levels. Primary Sex ratio is a ratio at the time of conception, calculated using data from live births alongside rates of abortion, miscarriage, and stillbirth. The ratio of males to females specifically at the time of birth, which remains relatively constant across global populations is known as Secondary Sex Ratio. Tertiary Sex Ratio is a proportion of males to females in the total population. In the Indian Census, the tertiary ratio is expressed as the number of females per 1000 males. It serves as a vital sociological indicator, reflecting the level of gender equality, and is essential for analyzing migration, mortality, marital status, and economic trends. A balanced sex ratio is paramount for maintaining economic growth, demographic stability, and a sustainable society. Historically, a deep-seated preference for male children driven by cultural beliefs regarding lineage, inheritance, and old-age support has led to a significant deficit of females. This preference is often reinforced by the perception of daughters as financial liabilities due to the practice of dowry. Such imbalances disrupt marriage systems and lead to severe social consequences. For instance, in states like Haryana and Punjab, the scarcity of women has forced men to "import" brides from other regions, a trend often linked to the exploitation of women and increased risks of human trafficking. According to the **National Family Health Survey (NFHS-5, 2020-21)**, India is seeing a positive shift. Families are increasingly moving away from sex-selective practices due to government interventions, such as the ban on prenatal sex testing and various social awareness campaigns. Currently, India has a total population of approximately 1.38 billion, with females accounting for 48.04% and males 51.96%. The overall sex ratio has improved considerably, rising from 943 (2011 Census) to 1020 females per 1000 males in 2021. There is, however, a notable divide between rural and urban areas, with rural India reporting a ratio of 1037 compared to 985 in urban centers. The demographic landscape varies significantly across Indian states. Kerala leads the country with the highest sex ratio (reaching up to 1,145 per 1,000 males in certain metrics). Other high-performing states include Bihar (1099), Rajasthan (1090), and Tamil Nadu (1088). States like Manipur, Odisha, and Telangana also maintain healthy ratios ranging from 1045 to 1066.

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Haryana remains at the bottom with a ratio of 926, followed by Punjab (938) and Gujarat (965).

While the national average is improving, these figures underscore the continued need for targeted initiatives to

Importance of the Study

Prof. Amartya Kumar Sen, in his world-famous article "Missing Women," statistically proved that during the last century, 100 million women went "missing" in South Asia. This phenomenon is a result of discrimination leading to death, experienced by women from "womb to tomb" throughout their life cycles. A healthy or balanced sex ratio is of paramount importance for maintaining gender equality, economic growth, and overall social stability. Conversely, an unbalanced sex ratio driven by a preference for male children creates significant demographic, social, and economic challenges. The sex ratio is a key measure of the status and well-being of women in a society. It directly reflects discrimination, such as higher female fetal mortality resulting from practices like sex-selective abortion. A severe shortage of women creates an intense "marriage squeeze," where a large number of men are unable to find brides. Research links regions with highly male-biased sex ratios to increased violence against women and sexual exploitation, rise in human trafficking and forced marriages and distortion of marriage patterns, including the "importation" of brides across state lines. These imbalances disrupt family structures and social harmony. Furthermore, the underlying preference for sons driven by cultural beliefs regarding inheritance, lineage, and old-age support is reinforced by a low sex ratio. This creates a vicious cycle where the girl child is viewed as a liability, particularly due to the systemic burden of the dowry system. Gender inequality limits women's participation in the workforce, which inhibits India's overall growth potential. The World Bank notes that empowering women is essential for economic development; closing the gender employment gap could significantly boost India's GDP. The systemic exclusion of women leads to a loss of talent and productivity. When a large segment of the population is denied access to education and skill development, the nation's total economic output suffers. Additionally, a skewed sex ratio can lead to a long-term decrease in the reproductive-age female population. This eventually slows the growth rate of the labor force, as observed in other countries with similar demographic imbalances. Interestingly, some studies in India suggest that a balanced sex ratio can increase women's intra-familial decision-making power and positively alter gender norms. A balanced sex ratio is fundamental for maintaining a healthy and sustainable population. It is critical for biological reproduction and the health of future generations. Demographic data provides vital insights into migration patterns, mortality rates, and gender-based disparities. An unbalanced ratio signals deep-seated societal issues that

address regional gender imbalances and promote a more equitable

require urgent policy intervention. The rural, urban, and general sex ratios are particularly important as they serve as predictors for the future population structure. A decline in these ratios can have long-lasting, detrimental consequences for the country's social and economic fabric.

Objective

To analyze the systematic causes of gender inequality on geographical background in India and explore strategic solutions to improve women's biological, social and economic standing.

Database and Methodology

The statistical data used for this research paper is secondary in nature, sourced from the **Fifth Round of the National Family Health Survey (NFHS-5)**. Conducted by the Ministry of Health and Family Welfare, Government of India, in 2020-21, this survey provides comprehensive data on population, health, nutrition indicators, and sex ratio across India. Sex ratio refers to the proportion of females to males in a population, typically expressed as the number of females per 1,000 males. For instance, a value of 1,005 indicates there are 1,005 females for every 1,000 males. India has maintained a consistent census exercise since the late 19th century; while the first systematic enumeration occurred in 1872, the first synchronous Census was held in 1881. It has been carried out every ten years without interruption until the 2021 Census was postponed due to the COVID-19 pandemic. To maintain consistency with the definition provided, the sex ratio is calculated using the following formula

Sex Ratio= Total Females /Total Males X 1000

The values derived for each enumeration unit are arranged in descending order and divided into three equal parts to identify High, Moderate, and Low sex ratio regions. These categories are then presented through cartographic maps for further spatial analysis.

To measure the linear relationship in between two variables i.e., sex ratio and per capita income, female literacy, Karl Pearson's Coefficient of Correlation is used. Correlation values (Carl Pearson's) measure the strength and direction of a linear relationship between two variables, ranging from -1.0 to +1.0. A value of +1 indicates a perfect positive correlation, -1 a perfect negative, and 0 indicates no linear relationship. Stronger relationships are closer to 1 or -1. A positive sign (+) indicates that both variables increase together, while a negative sign (-) indicate one variable increases while the other decreases. To calculate the coefficient of correlation following formula is used.

$$r = \frac{\sum xy}{\sqrt{\sum x^2 * \sum y^2}}$$

Where,

r- Coefficient of correlation.

x- First variable i.e., sex ratio.

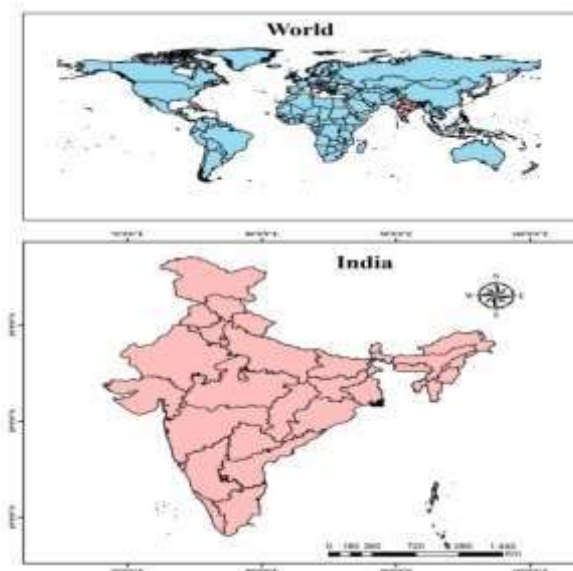
y- Second variable i.e., female literacy and per capita income.

A Geographical and Demographic Overview of India

India lies in the Northern and Eastern hemispheres. It extends between latitudes 8°4'N to 37°6'N and longitudes 68°7'E to 97°25'E. The Tropic of Cancer (23°30'N) passes through eight states, effectively dividing the country into northern and southern halves.

India measures 3,214 km from north to south and 2,933 km from east to west. The total land frontier is 15,200 km, while the coastline stretches 7,516.6 km (including island territories). With a total area of 3,287,263 sq. km, India is the seventh-largest country in the world.

Fig. No. 01



India comprised 36 states and union territories, 640 districts and approximately 6.41 lakh villages. The population stood at 1,21,01,93,422 (approx. 1.21 billion), with a decadal growth rate of 17.64%. At that time, India was the second-most populous country in the world. India is a land of immense geographical diversity. The north is defined by the lofty, ice-capped Himalayas and the fertile Indo-Gangetic Plains, known for their rich alluvial soil. The Thar Desert occupies the northwestern region. India shares land borders with Pakistan, Afghanistan, China, Nepal, Bhutan, Bangladesh, and Myanmar. The southern Peninsular India consists of an uneven plateau flanked by the Western and Eastern Ghats, surrounded by the Arabian Sea, the Bay of Bengal, and the Indian Ocean. The country is drained by major river systems: the Ganga, Yamuna, and Brahmaputra in the north, and the Mahanadi, Narmada, Godavari, Krishna, and Kaveri in the south. This physiographic variety results in diverse soil types—ranging from black cotton and red laterite to saline marshy soils and vegetation spanning from tropical evergreen to alpine forests.

Climatically, while the northern half lies in the subtropical zone, the entire country is governed by a tropical monsoon climate. India receives abundant sunshine and seasonal rainfall, averaging 118 cm annually. Temperatures vary significantly; while northern India maintains a mean temperature between 21°C and 27°C, the south remains warmer, typically between 30°C and 37°C. The weather is further influenced by Western Disturbances in winter and tropical cyclones during the monsoon transitions.

Trends of Sex Ratio in India

The ratio dropped from its peak of **972** in 1901 to its lowest points in the late 20th century, driven by patriarchal social structures, female infanticide, and high maternal mortality. While 1921 was the "Great Divide" for population growth, the real recovery for the sex ratio began

in the **21st Century**, rising to 933 (2001) and 943 (2011). The NFHS-5 (2020-21) data marks a historic shift to **1020**, the first time the survey recorded more women than men, largely attributed to stricter bans on prenatal sex screening and evolving social attitudes. The data shows a significantly healthier ratio in **rural areas (1037)** compared to **urban areas (985)**, suggesting different paces of social or demographic change.

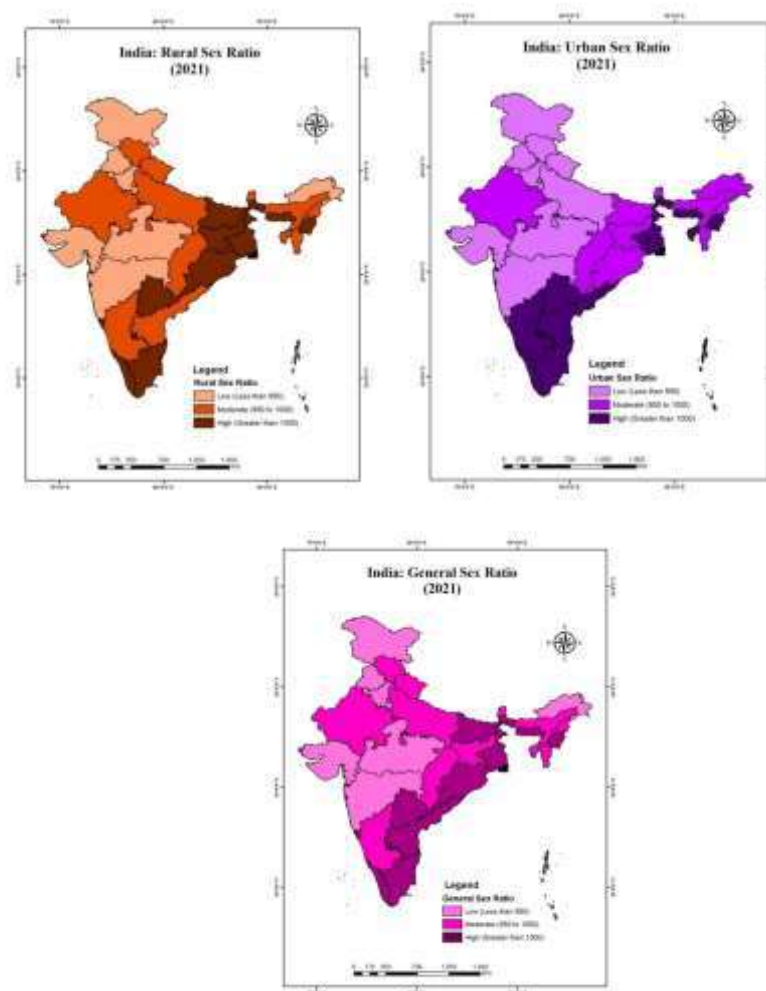
Geographical Distribution of Sex Ratio Regions (High, Moderate and Low)

The Sex Ratio in India is defined as the number of females per 1,000 males in the total population. According to the National Family Health Survey (NFHS-5), directed by the Ministry of Health and Family Welfare in 2019-21, the overall sex ratio for India is **1,020**, with rural and urban ratios of **1,037** and **985**, respectively. Among the states, [Kerala](#) recorded the highest sex ratio at **1121**, while [Lakshadweep](#) led the Union Territories at **1187**. Conversely, [Haryana](#) recorded the lowest sex ratio among states at **926**, and [Dadra & Nagar Haveli and Daman & Diu](#) recorded the lowest among Union Territories at **817**. Compared to the 2011 Census, where the overall sex ratio was **943**, the increase to **1020** represents historic growth. Exactly half of the states and union territories now record more females than males (a ratio above 1,000), while the other half recorded fewer. Regarding the rural-urban divide, 23 states and union territories recorded more females than males. [Nagaland](#) emerged as a unique case, maintaining a healthy sex ratio that shows significant progress compared to previous years.

Region of High Sex Ratio (Greater than 1000)

This category is geographically concentrated in South India and specific coastal or island regions. Includes all major South Indian states (Kerala, Tamil Nadu, Karnataka, Andhra Pradesh,

Fig No 02



Telangana) and coastal/ island UTs like Lakshadweep, Pondicherry, and Andaman & Nicobar. High female literacy and better healthcare access lead to lower female mortality. More progressive gender norms and, in some cases, matrilineal traditions (e.g., parts of the South and Northeast like Meghalaya) naturally support a higher female population. In-Migration Dynamics: Unlike northern cities, southern urban centers often see more balanced or even female-led migration for service sectors like healthcare and education. Includes almost all of South India (Pondicherry, Kerala, Tamil Nadu, Telangana) and the Eastern tribal belt (Odisha, Jharkhand, Bihar). High female literacy, better healthcare access, and matrilineal traditions in some regions contribute to these balanced numbers. In states like Kerala and Bihar, high male out-migration from rural areas for work naturally tilts the rural ratio in favor of females. The sex ratio across Indian states and Union Territories presents a diverse picture, highlighting regional variations in gender balance. Lakshadweep stands out with the highest sex ratio at 1179, followed by Pondicherry at 1129 and Kerala at 1121. These regions reflect a preference for female children and robust healthcare systems, contributing to higher female survival rates. Other notable states include Tamil Nadu (1088), Meghalaya (1069) and

Manipur (1068). The presence of educated populations and social initiatives in these regions may also play a role in their favorable ratios.

Region of Moderate Sex Ratio (950 to 1000)

This category forms a "transitional" zone stretching across Central and Eastern India. It includes the Tribal heartland (Chhattisgarh, Odisha and Jharkhand) and parts of the North East states (Assam, Bihar and West Bengal). Tribal societies (prominent in Chhattisgarh and Jharkhand) historically exhibit more egalitarian gender ratios compared to non-tribal areas. High male out-migration from states like Bihar and Odisha to industrial hubs in the West and North can artificially inflate the local urban sex ratio. These states are in a phase of steady urban growth where gender-selective migration is less extreme than in the mega-metropolises of the North. This zone represents a transition from high-parity regions to the skewed ratios of the North. It includes predominantly the Northeast (Assam, Mizoram, Sikkim, Nagaland, and Tripura) and Central India (Chhattisgarh, Madhya Pradesh, parts of Uttar Pradesh). Stronger gender parity in tribal cultures (Northeast and Chhattisgarh) keeps these ratios



relatively high compared to urban centers. Rural areas in these states often maintain more stable gender distributions than their urban counterparts due to traditional household setups. States like Karnataka (1034) and Jharkhand (1029) show moderate sex ratios, indicating a balance in gender. Although they are above the national average, challenges remain in ensuring equitable treatment and opportunities for women. The ratios in states such as Assam (999) and Sikkim (998) suggest that while progress is being made, there is still work to be done to improve gender equity.

Region of Low Sex Ratio (Less than 950)

This category covers the "Breadbasket" and the primary "Industrial Hubs" of India. It is concentrated in the North (Punjab, Haryana, Delhi, Chandigarh and Uttar Pradesh) and the industrialized West (Gujarat, Maharashtra). These regions contain major economic hubs (e.g., Delhi NCR, Mumbai and Ahmadabad) that attract a massive influx of male laborers from other states, leaving families behind due to high urban living costs. Strong "son preference" persists in many northern states, which can manifest in skewed child sex ratios that eventually impact the adult urban ratio. Urban centers in these regions historically had earlier and easier access to prenatal sex-determination technologies, leading to long-term demographic imbalances. The lowliest rural sex ratios are concentrated in the North and West, particularly in the northern plains. The "Problematic Belt" includes Haryana, Punjab, Delhi, and Chandigarh. Deep-rooted patriarchal structures and a strong preference for male children remain prevalent. Paradoxically, wealthier agricultural regions in the North often show lower ratios, partly due to the historical affordability of sex-selective technologies. While rural areas here are still "low," they are often slightly better than the extremely low ratios found in nearby urban centers like Delhi or Chandigarh. A concerning trend is evident in states with low sex ratios, starting with Chandigarh (893) and Delhi (NCT) (886). This signals potential issues related to gender bias and discrimination in these areas. Haryana (922) and Punjab (934) have consistently low sex ratios, raising alarms about cultural biases against female children that require urgent attention through policy changes and social reform.

Conclusion

- Geographical analysis of the sex ratio in India reveals a stark divide between the northern and southern regions, heavily influenced by socio-cultural norms, economic patterns, and migration.
- The southern states like Kerala and Tamil Nadu along with the northeastern states Mizoram and Meghalaya consistently report higher, more favorable sex ratios. In contrast, the [north-western states](#) like Haryana and Punjab have historically had the most skewed, male-biased ratios.
- Lakshadweep leads with 1179 females per 1,000 males, followed by Pondicherry (1129), Kerala (1121) and Tamil Nadu (1088).
- Chandigarh recorded the lowest state sex ratio at 893, followed by Haryana (922) and Punjab (934).
- Historically, [rural India](#) has maintained higher sex ratios compared to urban areas.
- Lower urban sex ratios are primarily attributed to [male-selective migration](#) for employment and better access to (often misused) sex determination technologies in cities.
- Out-migration of males from states like Kerala and [Uttarakhand](#) to other regions or

countries (e.g., the Gulf) inflates the female-to-male ratio in their home states.

- The [North](#) is characterized by strong patrilineal systems and high son preference, while [Southern and Tribal](#) regions often have more egalitarian or matriarchal cultural roots that favor female survival.
- Higher female literacy rates in the South are positively correlated with better health outcomes and higher survival rates for girls.
- The proliferation of ultrasound and other diagnostic tools in economically prosperous northern states has historically facilitated sex-selective abortions.
- There is a distinct North-South divide, where southern and northeastern states exhibit healthier, more balanced ratios compared to the significantly skewed, male-heavy populations in north-western states like Haryana and Punjab.
- Economic development in northern regions has historically correlated with lower sex ratios, as higher income levels facilitated greater access to illegal sex-selective technologies.
- Rural areas generally maintain more favorable ratios than urban centres, largely due to male-selective migration for work and the concentration of diagnostic clinics in cities.
- Regional variations are deeply rooted in kinship structures; matrilineal or egalitarian traditions in the South and Northeast support female survival, whereas strong patrilineal norms in the North drive son preference.
- States with high rates of male out-migration (like Kerala and Uttarakhand) show artificially inflated female ratios, masking underlying demographic trends.
- A correlation value of **0.1170** represents a **very weak positive relationship**. This suggests that while there is a slight tendency for sex ratios to be higher in areas with higher female literacy, the connection is not strong enough to be considered a defining factor on its own.
- In conclusion, a correlation of **-0.5109** signifies a **meaningful inverse relationship**. While it confirms that higher income levels are statistically associated with a lower sex ratio in this context, the strength of the coefficient suggests that income is only a **partial predictor**.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Original Article

Low-Cost Agricultural Waste-Based Adsorbents for Water Quality Improvement: Integration with WQI And Multivariate Statistical Analysis

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Abstract:

Due to increasing water pollution from industrialization, urbanization, and agricultural activities there is an urgent need for sustainable and cost-effective water treatment technologies. Agricultural waste-derived from adsorbents, including Moringa seed, rice husk, coconut shell, sugarcane bagasse, banana peel, peanut shell, corn cob, and sawdust, have emerged as promising alternatives to conventional treatment because of their low cost, abundance, biodegradability, and high adsorption capacity. At the same time, the Water Quality Index (WQI) has become an important tool for converting complex water quality data into a single value data, while the Langelier Saturation Index (LSI) and Ryznar Stability Index (RSI) are widely used for calculating the scaling and corrosion characteristics of water. Principal Component Analysis (PCA) supports water quality assessment by identifying dominant pollutants and important pollution sources from multivariate datasets. This short review highlights recent advances in agricultural waste-based adsorption, WQI, LSI, RSI, PCA and identifies their integration into a systematic framework for sustainable water quality assessment and improvement. The literature review identifies previous research gaps, including limited on-site validation, limited standardized adsorbent preparation method, and lack of integrated water quality assessment with treatment technologies. Future research should focus on developing intelligent low-cost treatment, and on site-applicable water treatment systems supported by statistical and decision-making tools.

Keywords: Water Quality Index (WQI), Principal Component Analysis (PCA), Langelier Saturation Index (LSI), Ryznar Stability Index (RSI), Agricultural waste adsorbents, Sustainable water treatment.

Introduction:

Water pollution caused due to rapid urbanization, industrialization, and agricultural activities has become one of the most important environmental concerns worldwide (Uddin et al. 2022). The degradation of surface and groundwater quality severely affects human health, aquatic ecosystems, and sustainable water resource management (Tyagi et al. (2013). Conventional water treatment technologies are often expensive and difficult to implement in rural and developing regions (Bhatnagar et al. 2015). Consequently, low-cost and environmentally friendly treatment alternatives have gained increasing attention. Agricultural residue such as Moringa seed, rice husk, coconut shell, sugarcane bagasse, banana peel, peanut shell, corn cob, and sawdust have identified as promising adsorbent materials due to their abundance, biodegradability, adsorption efficiency and pollutant removal capacity (Bhatnagar et al. 2015). Simultaneously, Water Quality Index (WQI) has become important tools for converting complex water quality datasets into a single numerical value for easy evaluation ((Uddin et al. 2022). Corrosion and scaling indices such as the Langelier Saturation Index (LSI) and Ryznar Stability Index (RSI) are also widely used to assess water stability and scaling/corrosion tendency. (Langelier (1936, Ryznar 1944) Currently, multivariate statistical techniques, particularly Principal Component Analysis (PCA), have been increasingly utilised for determining major pollution sources and assess significant variables affecting water quality (Shrestha & Kazama 2007). Although, few studies have integrated agricultural waste-based treatment systems with WQI, stability index assessment and PCA-based pollutant identification. Therefore, this review discusses the combined application of WQI, LSI, RSI, PCA, and agricultural waste adsorbents for sustainable water quality management.

Water Quality Index:

The Water Quality Index is a mathematical method that combines multiple water quality parameters into a single value representing overall water quality status (Tyagi et al. 2013). Commonly used indices include the Weighted Arithmetic WQI, NSF-WQI, Canadian Council of Ministers of the Environment WQI (CCME-WQI), and Fuzzy WQI. Several studies have reported the successful application of WQI for river, lake, reservoir, and groundwater assessment (Uddin et al. 2022). WQI convert complex datasets and facilitates communication with policymakers and the public.

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LSI and RSI Indices:

LSI and RSI are commonly used indices for evaluating the scaling and corrosion tendencies of water.

Langelier Saturation Index (LSI)

LSI indicates the tendency of water to deposit or dissolve calcium carbonate (Wilfred F. Langelier 1936).

- LSI > 0: Scaling tendency.
- LSI = 0: stable condition.
- LSI < 0: Corrosive tendency.

Ryznar Stability Index (RSI)

RSI gives assessment of scaling and corrosion behaviour (John W. Ryznar 1944)

- RSI < 6: Scale-forming water.
- RSI 6–7: Stable water.
- RSI > 7: Corrosive water.

The combined application of WQI, LSI, and RSI provides a broader assessment of water quality by integrating overall water suitability with stability characteristics for domestic and industrial purposes.

PCA in Water Quality Studies:

Principal Component Analysis (PCA) is a multivariate statistical tool used to reduce data dimensionality and identify dominant factors affecting water quality (Ian T. Jolliffe 2002).

Applications of PCA (Helena et al. 2000)

- Identification of pollution sources.
- Determination of critical water quality parameters.
- Reduction of monitoring costs.
- Classification of sampling locations.

Previous Studies have demonstrated that PCA effectively tool distinguishes for differentiating natural influences from anthropogenic sources. Parameters such as TDS, turbidity, nitrate, phosphate, COD, BOD, and heavy metals are frequently identified as dominant contributors to water quality deterioration.

Agricultural Waste Adsorbents:

Agricultural waste-derived materials have gained considerable attention as sustainable and low-cost adsorbents for water treatment (Bhatnagar et al. 2015). Common agricultural wastes such as moringa seed, rice husk, coconut shell, sugarcane bagasse, banana peel, peanut shell, corn cob, orange peel, and sawdust contain cellulose, hemicellulose, lignin, and oxygen-containing functional groups that contribute to their adsorption capacity (Hameed 2012). These materials have been successfully used to remove heavy metals, dyes, nutrients, and other organic pollutants from contaminated water through mechanisms including ion exchange, surface adsorption, electrostatic attraction, and complexation. Compared with conventional adsorbents, agricultural waste-based materials are inexpensive, biodegradable, renewable, and widely available, making them particularly suitable for developing countries and rural communities. However, their adsorption performance depends on factors such as raw material composition, particle size, surface modification, and operating conditions. Although numerous laboratory studies have demonstrated promising removal efficiencies, further research is required to standardize adsorbent preparation methods, evaluate regeneration and reuse, and validate their effectiveness under field-scale conditions. Recent research has increasingly focused on converting agricultural by-products into value-added adsorbent materials for sustainable water treatment applications.

Integrated Framework (WQI, PCA, Agricultural Waste)

An integrated framework combining Water Quality Index (WQI), Langelier Saturation Index (LSI), Ryznar Stability Index (RSI), Principal Component Analysis (PCA), and agricultural waste-based adsorbents provides a comprehensive framework for water quality assessment and sustainable remediation. Initially, water samples are collected and analyzed for physicochemical and biological parameters. WQI is calculated to determine the overall water quality status, while LSI and RSI assess the scaling potential and corrosive tendency of water. PCA is then applied to identify the dominant pollutants and their possible sources, allowing the selection of the most appropriate agricultural waste adsorbent according to the identified target pollutants. After the treatment process, water quality parameters are analysed again, and WQI, LSI, and RSI values are recalculated to quantify treatment performance and evaluate changes in water quality. This integrated approach supports informed decision-making by combining pollution assessment, statistical analysis, and sustainable treatment technologies. It also provides a practical framework for cost-effective and environmentally friendly water resource management.

Flow Diagram:

Water Sample collection

Physicochemical Water Quality Analysis

Calculation of WQI, LSI, RSI for water quality assessment

PCA (Identify Major Pollutants & Sources)

Selection of Agricultural Waste Adsorbent

Adsorption-Based Water Treatment

post-Treatment Water Quality Analysis

Recalculation of WQI, LSI & RSI after treatment

Assessment of Treatment Efficiency and Sustainability

Research Gaps and Future Scope:

- Few studies simultaneously integrate WQI, LSI, RSI, PCA and agricultural waste adsorbents within a single assessment framework.
- Most investigations remain laboratory-scale with limited validation under real river conditions.
- Regeneration efficiency and lifecycle assessment of agricultural waste adsorbents are rarely reported.
- IoT-enabled real-time monitoring combined with adsorption-based treatment has received limited attention.

Conclusions:

Agricultural waste-based adsorbents offer a sustainable and economical solution for water quality improvement. WQI provides an effective method for evaluating overall water quality, while LSI and RSI assess scaling and corrosion characteristics. PCA assists in identifying major pollution sources and critical parameters. The integration of WQI, PCA, and agricultural waste adsorbents represents a promising framework for sustainable water quality management. Further research should emphasize on site-scale implementation, long-term performance evaluation, and development of standardized methodologies to support practical environmental engineering applications.

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Original Article

Integrating Gender Equality and Women's Empowerment for Sustainable Development: A Sociological Study of Purba Medinipur District, West Bengal, India

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Abstract

It is a sociological study, which aims at the integration of gender equality and empowerment of women in sustainable development in Purba Medinipur District, West Bengal, India. The main aims are to have an understanding of the situation about gender equality and empowerment at district level and to formulate strategies for sustainable development of women empowerment. The qualitative research design and the method of collecting data for this study is interview, focus group discussion and observation related to the women experience in Purba Medinipur District. The data is analyzed in the light of a sociological approach and patterns and themes concerning gender equality, women's empowerment and sustainable development are looked into. Though some improvement has been observed in making women's life more gender equal and empowering them, the study results reveal that there are different situations that need to be addressed in Purba Medinipur District. Women's access to sustainable development interventions and their participation is still constrained by factors such as access to education, employment and decision making at district, provincial and national levels in the district. To sum up, there are also some positive programmes and policies mentioned in the study, which have been successful in promoting gender equality and women's empowerment in the district, and can be referred to as important lessons learnt in future. The detailed analysis of the particular area provides this research paper to build on the existing knowledge regarding gender equality, women empowerment and sustainable development. In the context of this study, the experiences and perspectives of women are given special attention as they provide a different perspective to promote the discussion on how Women's empowerment can contribute to sustainable development for the district. The outcome of this study will be beneficial for the policy makers, development practitioners and researchers involved in the endeavor of achieving gender equality and empowerment in the same context.

Keywords: Gender equality, women empowerment, Sustainable development, sociological study, Medinipur District, West Bengal, India.

Introduction

Achievement of gender equality and empowerment of women is an integral dimension of sustainable development worldwide. That gender parity is a key ingredient for long-term social, economic and environmental sustainability is a change over the past few years. It has resulted in greater attention to the gender equality and empowerment mainstreaming in national and international development programmes and policies. The region which has drawn much attention in this regard can be taken up as Medinipur district of West Bengal, India. Medinipur is located in the eastern part of state and its inhabitants including a substantial contingent of women are susceptible to diverse layers of discrimination and marginalization. This is a district that has been the focus of several sociological studies that have aimed to understand the issues confronting women in the district and how to leave a better world for women and women's development by women. This academic introduction will help provide an understanding of the main issues and problems of gender equality and empowerment of women in Medinipur district on the basis of the research gathered from the area and analysis of the sociological points on them. The social, economic and cultural determinants of the gender disparities in the district will be examined, alongside efforts to tackle these disparities and foster sustainable development. Gender disparities at Medinipur District. Medinipur district is known for large gender gap in every aspect of the society with its deep influence on women's life. Medinipur's women are subjected to three types of discrimination and marginalization equal access to education, healthcare and economic opportunities. The disparities can be attributed to various social, cultural, and economical factors that are entrenched in the district as gender inequalities. A prime reason for the gender gap which exists in Purba Medinipur is the presence of the culture and tradition which put advantages of men over women. These norms establish the role and obligations of men and women, women's role is usually under-represented and women's rights in social and economic activity is often restricted.

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This has further contributed to the denials of opportunities in education, employment and decision making of women in Purba Medinipur, which compounded their marginalization. There is also a prevalent dimension of gender inequalities in Medinipur district which is influenced by economic factors. But poverty is also felt disproportionately by females in the area and during development, economic resource procurement is denied to females, so they cannot achieve economic independence and can reduce poverty. Besides, women in Medinipur are also working in low-paid and insecure jobs, putting them in a fragile economic condition. A different field of interest which shows gender disparity in Medinipur district is health care provision. Availability of healthcare facilities, trained healthcare providers in the region is also a challenge for accessing women's quality health care services. This negatively impacts women's health and wellbeing and are an added form of victimization to women's marginalization. The collection of information and statistics, along with the delivery of training and awareness sessions shall be used to achieve the following objectives: There are challenges faced by women in the district but in the field making efforts to promote gender equality and women empowerment in the district. The action has manifested itself in a range of activities and programmes developed by various actors (NGOs, community-based organizations, governmental institutions), all aimed at a more just and equitable world a world that works for sustainable development. One of the key strategies employed to promote gender equality and women's empowerment in Medinipur is through education. An attempt has been made to improve girls/women access to good quality education in the district particularly literacy rate and educational outcomes. Investing in girls' education is perceived as empowering women to make decisions over their life and future, in order to break down the cycle of intergenerational poverty and marginalization. A crucial aspect that has been emphasized in the process of achieving gender equality and women empowerment in Medinipur is economic empowerment programmes. These are efforts to give women the opportunity to access an economic resource, training and support to start up their businesses and expand their economic opportunities, leading to greater financial independence and earning potential. Stakeholders are seeking to increase the women's ability to contribute to the local economy, and decrease their vulnerability to poverty by economically empowering women. The district is also prioritizing the gender aspect of healthcare and is a gender priority district for gender equality and empowerment. Enhancing access to quality healthcare services for women, such as maternal and child health, family planning and reproductive health services. By addressing the unique healthcare needs of women in the region, stakeholders hope to improve women's health outcomes and overall well-being, and to empower them to make informed decisions about their health and bodies.

Literature Review

Achievement of gender equality and empowerment of women is closely linked to 'sustainable development' and is a key factor to ensure social, economic and environmental development. In the past few years, much attention has been placed on the need to include women and gender equality in development interventions. In this literature review, the sociological aspect of gender equality and women empowerment will be discussed in backdrop of the Medinipur District of West Bengal, India. Deep-rooted gender stereotypes and practices underpinning social relations and structures in India continue to pose a big challenge in the promotion of gender equality and

women's empowerment. Kabeer, (1999) defines patriarchy as a social organization that gives more importance to men as compared to women, causing inequality in power relations between the two sexes. There are various forms of patriarchy in Indian society such as lack of resources for women, gender-based violence, and limited opportunities for women in decision-making. Some of the factors that cause gender disparity in Medinipur District are poverty, illiteracy and non-accessibility of healthcare services. With respect to the impacts of poverty, Sen, (2014) recommends that rural women suffer more than men due to unequal access to education and employment opportunities. This economic marginalization also contributes to further perpetuate gender inequalities and to shrink women's right to claim their rights and exercise their voice in development processes. Moreover, women in Medinipur District possess huge challenge to avail medical services, thereby making them more vulnerable to health risk and depriving them of full participation in the society. Kabeer, (2005) remarks that reproductive health is ignored in development programmes and thus rural women suffer high maternal mortality and morbidity rates. Women's physical health is not only impacted by this lack of access to health services but is also deprived of the opportunity to undertake productive activities and participate in the local economy. Besides economic and health problems, women in Medinipur District are also facing social and cultural barriers which limit the autonomy and agency of women. Women's roles and responsibilities in the family and community in Indian society might be restricted because of the traditional gender norms and practices (Mohanty, 2005). These norms remain and perpetuate inequalities between men and women, and limit women's options in their lives and future. In spite of all these problems, some development programmes have been initiated in favor of gender equality and empowerment of women in Medinipur District. For example, in West Bengal, initiatives have been implemented in the areas of women's access to education, health, and economic opportunities. The efforts are to ensure women claim their rights, defy gender norms and engage in decision-making processes at the local level. Besides, there has been a vibrant grassroots movement and civil society organizations working for gender equality and women empowerment in Medinipur District. The importance of women groups and networks in sensitizing people to gender issues, championing for policy change and supporting women victims of violence and discrimination has been highlighted by Rai, (2013). These have been a part of opportunities for women to share their views, create a sense of solidarity and mobilize for social change. In conclusion, gender equality and women's empowerment are essential for achieving sustainable development in Medinipur District, West Bengal, India. This requires tackling gender-related structural inequalities, facilitating gender-sensitive policies and programs, and allowing women to exercise their agency and autonomy to help build a more inclusive and equitable society for all. Efforts towards gender equality and women's empowerment in development should go on and be prioritized, ensuring a more equitable and sustainable future for everyone.

Objectives

Gender equality and women empowerment is a crucial factor in any society for achieving 'sustainable development'. To take account of these factors into development schemes, it is important to understand the sociological dynamics in the context of Medinipur District in West Bengal, India. This academic book would like to explore the relationship between gender equality, 'women



empowerment and sustainable development' from the sociological point of view of Medinipur District.

This study aims at the following:

1. To understand the existing gender norms and attitude of the society of Medinipur District and the impact on access to resources of women, opportunities and decision making.
2. To examine the current status of empowerment programmes in the district, Government policies, NGO and community based programmes and their impact on 'empowerment and advancement of women rights'.
3. To investigate the association between 'women empowerment and sustainable development' indicators such as economic development, social integration, environmental sustainability of Medinipur District.
4. To propose policy recommendations to the policy makers, development practitioners and the community leader on how to make the District to be more gender responsive in 'sustainable development'.

The above-mentioned aims of this study would help in filling the gap of existing literature on gender equality, 'women empowerment and sustainable development' in the context of India, particularly in the context of Medinipur District. Based on the findings of this study, interventions and policies can be guided to ensure gender equality and women empowerment in the district with the ultimate goal of achieving more 'sustainable' and inclusive development outcome.

Method

The qualitative research design was used to understand the integration of gender equality and women empowerment for 'sustainable development' in Medinipur District, West Bengal, India. Qualitative research was used to gain in-depth understanding of social phenomena and the experience of people, which was vital for this research. The purposive sampling method was used for selecting participants for this study. In all, 30 participants (15 females and 15 males) from various age groups and socio-economic statuses were included in the study. The participation of both men and women was significant so as to get different ideas about gender equality and empowerment in the district. This study used semi-structured interviews and focus group discussions as methods of data collection. Interviews were held one on one with all interviewees to receive their personal experiences and views regarding gender equality and women empowerment. Focus group discussions were also conducted to encourage group interactions and discussions on the topic. The participants in all interviews and focus group discussion agreed to be audio recorded. Thematic analysis was used to analyze the data collected from the interviews and focus group discussions. The audio recordings were verbatim transcribed and the following themes and patterns of gender equality and women empowerment in the district were identified by coding and analyzing the transcripts. Data was analyzed using NVivo software to handle the data effectively. Ethical considerations were considered during the research process. All respondents gave their informed consent prior to the interviews and focus group discussions. Participants were assured confidentiality and anonymity, and their identities were protected throughout the study. Participants shared any sensitive information responsibly and sensitively. This study had a small sample size, which may not allow for the generalizability of the findings. In addition, the study was carried out in a particular district of West Bengal, India which may not be representative of the country. Yet the results of the study could offer relevant lessons for the building of gender equality and women's empowerment into

sustainable development in similar settings. Overall, the Methodological approach adopted in this study is found as effective in exploring the integration of Gender equality and Women's empowerment for sustainable development in Medinipur District, West Bengal, India. The results of the study could help augment the body of research on gender equality and women's empowerment and provide policy and programmatic guidance in the region.

Discussion

Gender equality and women's empowerment are vital elements to the 'sustainable development' of any society. This sociological study in the context of Medinipur District, West Bengal, India, highlights the diverse hurdles and opportunities in integrating gender equality and women's empowerment in the journey towards sustainable development.

This study revealed that gender differences are present in most of aspects of life in Medinipur District, one such finding is that. There are many women who are having difficulties to reach the education, health care, and economic opportunities in this region. Women are sometimes unable to fully engage in decision-making processes and/or access resources in society due to patriarchal norms and values. This cycle of inequality and marginalization is stymied the community's overall development. But, there are also some good signs of changing and progression. Grassroots initiatives and community-based interventions are key to achieving gender equality and involving women in development processes, the study finds. At the local level there are innovative programmes underway to try to enhance the economic, social and political empowerment of women. The work has not only improved the life of women in Medinipur District but is contributing towards overall development of the community. One of the most crucial steps towards the integration of gender equality and women's empowerment in 'sustainable development' is a holistic and comprehensive approach. This includes addressing the economic and social inequalities women experience, and deeply rooted gender norms and stereotypes that contribute to inequalities. Attitude change programs in the form of education and awareness rising plays a crucial role in changing attitude and behavior for gender equality. In involving men and boys in these initiatives, an inclusive and equitable society can be established in which women are able to thrive. The policy and governance strand is also an important element of discussion to advance gender equality and women's empowerment. The study also highlights the need for Government intervention and support to provide a conducive environment for women's participation in all aspects of life. This means ensuring that legislation and policies are in place to empower women, women have access to key services such as healthcare and education, and women are equally empowered in the workforce. By making gender equality a priority in policy-making and governance, an equal society for everyone can be realized. The study highlights the need to incorporate gender equality and women empowerment for 'sustainable development' in the context of Medinipur District, West Bengal, India. While there are great challenges to overcome, there are also opportunities to bring about positive change through grassroots efforts, comprehensive approaches and supportive policies. Gender equality and participation of women in all areas is a necessary condition for fostering justice and sustainability for the next generation—a goal that can be accomplished through collaboration.

Results

The main objective of the study was to study the issue 'Gender equality and women's empowerment for



sustainable development' in Medinipur District, West Bengal, India. From a sociological perspective, different dimensions of gender equality and women empowerment in the district were explored to identify the challenges and opportunities for a 'sustainable development'. Our findings reveal that while there have been significant improvements in gender equality and women's empowerment in Medinipur District, there is still several barriers that hinder progress towards 'sustainable development'. The main results of our research were the pervasive nature of patriarchal norms and practices that persist to restrict women's access to resources, opportunities and decision-making power. Although the District has made efforts to give women equal opportunities, traditional gender roles and stereotypes still exist and women are not able to participate equally in social, economic and political activities. Furthermore, for women in Medinipur District, our study revealed that they are subjected to various types of discrimination based on their caste, class and gender identities. This intersectional effect only compounds the barriers women face to accessing education, health care, employment and other areas of critical importance. In addition, we discovered that women in the district frequently have to take care of unpaid work tasks, a factor that also reduces opportunities for their economic empowerment and social mobility. Lastly, in the study in Medinipur District, we identified some programs and initiatives that have been effective in promoting gender equality and empowering women. These encompass women's self help groups, vocational training programmes and community-based projects that have helped women assert their rights, access resources and participate in decision making. The development activities have been of significant importance in the district to empower socio-economic status of women and 'sustainable development' in the district. Overall, our study highlights the importance of gender equality and women empowerment in SD process in Medinipur District. By tackling the underlying causes of gender disparities and ensuring equal access for women to all areas of society we can create a gender equal and sustainable district for the benefit of all district residents.

Conclusions

Finally, the study has brought the importance of incorporating gender equality and empowerment for 'sustainable development' in Medinipur District, West Bengal, India to light. Different aspects of women's marginalization in the region and its impact on the development of the community have been discussed from a sociological perspective. This study revealed that there were a lot of gender inequities prevailing in Purba Medinipur District which directly affected women's access to resources, opportunities and decision making power. These inequalities are entrenched in social norms, culture and institutional frameworks which continue to discriminate against women. This consequently keeps women in periphery of society and denied access to education, health, employment and political participation. Another important result is the important role played by women in the sustainable development of the community. However, women in Medinipur District are actively participating in different aspects of community life despite facing several challenges and barriers, such as agriculture, small businesses, and social welfare work. Their contribution, however, is being undervalued and unrecognized and as a result, the overall development of the region is stalled, and a cycle of poverty and marginalization is perpetuated. It is clear from this that for the purpose of 'sustainable development' in Medinipur District the promotion of gender equality and empowerment of women is required. Achieving gender equality is key to achieving a world that is more inclusive and equitable, where women

enjoy the same opportunities to participate in decision-making as men and have access to the same resources, have the same opportunities to build skills. A specific intervention to address gender inequality and increase women empowerment in the district could be those that improve women access to education, health and economic empowerment. Supporting women empowerment initiatives may help women to build their skills, improve their confidence and enhance their social and economic abilities. Furthermore, the need to engage men and boys as an integral part to achieving gender equality and the empowerment of women should not be overlooked. Transitioning gender roles and creating a positive attitude towards women rights and gender equality will result in a more supportive and inclusive district for women. The results of this study as a whole emphasize the critical need to incorporate 'gender equality and women empowerment in sustainable development' programs in Medinipur District. Through acknowledging the specific issues affecting women in the region and taking proactive measures to tackle these challenges, we can build a more just and equitable society that is good for all. We hope this research will help to drive positive change and spur more action towards 'gender equality and women's empowerment' in the region and beyond.

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Original Article

Water Resource Management for Sustainable Development

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Abstract:

Water is one of the most important, fundamental and valuable natural resources and it is needful for human life and ecosystem survival. It is required for drinking, domestic use, sanitization, agriculture, industry, and ecosystem stability. However rapid growth of world population, increasing pressure on fresh water resource and its result is that urbanization, climate change, pollution, and excessive groundwater extraction have created severe problems in water availability and quality. So Sustainable water resource management is very crucial for solution of this problems. Sustainable water resource management aims to ensure proper, well organized, and environment friendly responsible use of water resources to meet present needs without compromising the ability of future generations to meet their own needs. This paper focus to importance of integrated water resource management, identifies major challenges and problems, and also discusses sustainable plan for water conservation and efficient utilization. The study considers that community participation, technological innovation, policy reforms, and ecosystem-based approaches are achieving long-term water security and sustainable development.

Keywords: Water Resource Management, Sustainable Development, Water Conservation, Integrated Water Resource Management, Climate Change, Groundwater

Introduction:

Water is the foundation of economic development, public health, food security, and environmental sustainability. Despite covering approximately 71% of the Earth's surface, only about 2.5% of the world's water is freshwater, and an even smaller fraction is readily available for human use. Increasing demand due to population growth, industrialization, agricultural expansion, and urban development has placed immense pressure on freshwater resources. Freshwater is a limited and essential natural resource. Proper water resource management, conservation, rainwater harvesting, efficient irrigation, recycling of wastewater, and pollution control are necessary to ensure sustainable freshwater availability for present and future generations. The **need for water resource management** is to ensure that water is available in sufficient quantity and good quality for present and future generations Sustainable Development Goal (SDG) 6 emphasizes ensuring the availability and sustainable management of water and sanitation for all. Effective water resource management integrates social, economic, and environmental considerations while promoting efficient water use, pollution control, watershed protection, and climate resilience. Sustainable management requires coordinated efforts from governments, local communities, industries, and individuals. Water resource management is essential for achieving sustainable development, ensuring water security, protecting the environment, supporting economic growth, and improving the quality of life for present and future generations.

Objectives of the Study:

1. To understand the concept and importance of sustainable water resource management.
 2. To identify the major challenges affecting water resources.
 3. To examine sustainable strategies for efficient water utilization.
 4. To evaluate the role of technology, policies, and community participation in water conservation.
 5. To recommend measures for achieving sustainable water management.
- To create the awareness about importance of water resource management.

Major Challenges in Water Resource Management:

- Rapid population growth and increasing water demand for various purpose in all over the world.
- Overexploitation of groundwater resources, result is that decreasing underground water level.
 - Increasing Water pollution day by day from industrial, agricultural, and domestic waste.
 - Climate change causing droughts, floods, and irregular rainfall in all over the world.
 - Poor irrigation efficiency and water wastage in agriculture due to traditional irrigation system.
 - Unequal distribution of freshwater resources according to region and period.

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- Weak governance and inadequate policy implementation.
- Degradation of wetlands, rivers, and watersheds.

Sustainable Water Management Strategies:

Rainwater Harvesting

- Collection and storage of rainwater for domestic and agricultural purposes.
- Groundwater recharge through recharge wells and percolation tanks.
- Make a house model with a sloping roof.
- Pour water on the roof to demonstrate how rainwater is collected. Understand how rainwater is collected and stored.

Efficient Irrigation

- Adoption of drip and sprinkler irrigation systems.
- Crop diversification toward less water-intensive crops.
- Delivers water directly to plant roots.
- Reduces evaporation and runoff.
- Suitable for fruits, vegetables, and orchards.
- Consider the crop type, growth stage, soil moisture, and weather conditions.
- Avoid both overwatering and under watering.

3 Wastewater Treatment and Reuse

- Recycling treated wastewater for irrigation and industrial use.
- Reducing freshwater demand.

Watershed Management

- Afforestation and soil conservation.
- Construction of check dams and contour bunding.
- Protection of rivers and wetlands.

Technological Innovations

- Smart irrigation systems.
- GIS and Remote Sensing for water monitoring.
- Artificial Intelligence for demand forecasting and drought prediction.

Findings:

The study reveals the following findings:

- Freshwater resources are under increasing stress due to excessive demand and climate variability.
- Groundwater depletion is one of the most critical environmental challenges worldwide.
- Rainwater harvesting and watershed development significantly improve groundwater recharge.
- Modern irrigation technologies can reduce agricultural water consumption by 30–50%.
- Integrated Water Resource Management (IWRM) enhances coordination among stakeholders and promotes equitable water distribution.
- Community participation improves the success and sustainability of water conservation programs.
- GIS, Remote Sensing, and Artificial Intelligence improve monitoring, planning, and decision-making in water management.
- Strong institutional support and effective policy implementation are essential for long-term water sustainability.

Recommendations:

- Promote rainwater harvesting in urban and rural areas.
- Encourage micro-irrigation techniques for agriculture.

- Strengthen groundwater regulation and monitoring.
- Increase investment in wastewater treatment and recycling.
- Enhance public awareness regarding water conservation.
- Implement Integrated Water Resource Management at river basin levels.
- Protect wetlands, forests, and river ecosystems.
- Expand the use of GIS, Remote Sensing and Artificial Intelligence in water resource planning.
- Improve coordination among government agencies, local communities, and private organizations.

Conclusion

Water resource management is fundamental to achieving sustainable development. Increasing water scarcity, pollution, and climate-related challenges require integrated, scientific, and participatory management approaches. Sustainable water management combines efficient use, conservation, technological innovation, ecosystem protection, and strong governance to ensure long-term water security. The adoption of Integrated Water Resource Management, rainwater harvesting, efficient irrigation, wastewater reuse, and modern technologies can significantly improve water availability while protecting environmental resources. Collaborative efforts among governments, researchers, communities, and industries are essential to secure water resources for present and future generations.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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Original Article

Beyond the Green Label: Trust, Transparency, and Consumer Behaviour

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Abstract

Sustainability has become an important expectation among consumers, increasing the significance of green marketing and environmentally responsible business practices. However, the growing prevalence of greenwashing, misleading environmental claims, and vague eco-labels has created green brand confusion and weakened consumer trust. This study examines the relationship between greenwashing, transparency, brand trust, and consumer purchase behaviour. The study adopts a descriptive and conceptual research design using a mixed-method approach comprising literature review, survey evidence, and case illustrations. Primary data were collected from 100 urban consumers familiar with sustainability issues through a structured questionnaire. The findings indicate that consumers demonstrate increasing awareness of sustainability and prefer authentic, transparent, and independently certified environmental claims. A substantial proportion of respondents expressed skepticism toward unsupported environmental claims, while many showed willingness to pay a premium for genuinely sustainable products. The study concludes that transparency, authenticity, credible certification, and honest communication are essential for strengthening green brand trust, consumer loyalty, and purchase intentions. Greenwashing, in contrast, damages credibility and weakens long-term consumer relationships. The study highlights the need for businesses and policymakers to promote reliable sustainability communication and stronger measures against misleading green claims.

Keywords: Green Marketing, Greenwashing, Brand Trust, Transparency, Green Brand Confusion, Green Brand Equity, Consumer Behaviour, Purchase Intention, Sustainability, Eco-labels

Introduction

Sustainability has shifted from being a niche concern to a mainstream expectation. Consumers increasingly demand that organizations demonstrate environmental responsibility through authentic practices. However, the rise of greenwashing—the practice of exaggerating or falsifying eco-friendly claims—has created confusion and skepticism. Misleading advertising and vague terminology often generate green brand confusion, leaving consumers uncertain about product authenticity. This confusion directly impacts brand trust and brand equity, weakening consumer confidence and leading to inconsistent purchase decisions despite rising environmental awareness. Recent studies highlight that trust negatively correlates with greenwashing: when consumers perceive deception, their confidence and loyalty decline. Conversely, transparency and verifiable eco-labels strengthen credibility and purchase intentions.

1. The prevalence and impact of greenwashing.
2. The role of brand trust in mediating consumer perceptions.
3. The influence of sustainability claims on purchase intentions.

This research situates itself at the intersection of trust, transparency, and consumer behaviour. It explores three dimensions:

Literature Review

Green marketing has evolved from a promotional strategy into a comprehensive business philosophy integrating sustainability with corporate performance. Consumers expect organizations to demonstrate responsibility through transparent communication, ethical sourcing, and sustainable production.

1. **Greenwashing:** Misleading claims erode confidence and damage reputation.
2. **Green Brand Confusion:** Similar eco-labels or vague claims weaken loyalty.
3. **Green Brand Image:** Authentic practices foster advocacy and long-term relationships.

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Green Brand Trust: Built through transparency, consistency, and verifiable practices. It mediates the link between claims and consumer behaviour.

Green Brand Equity: Represents the value attached to a brand's environmental reputation. Authenticity enhances equity, while deception diminishes it.

Purchase Intention: Reflects willingness to buy eco-friendly products. Authentic claims strengthen intention; deceptive practices trigger backlash. Despite extensive research, gaps remain. Few studies examine how greenwashing weakens trust, transparency as a recovery mechanism, or integrated frameworks in emerging economies. This study addresses these gaps.



Research Gap and Objectives

1. Limited focus on trust erosion due to greenwashing.
2. Transparency underexplored as a mechanism for rebuilding confidence.
3. Constructs often studied independently, not integrated.
4. Emerging economies underrepresented in sustainability research.

Objectives of the Study

- To analyze the impact of greenwashing on consumer perceptions.
- To examine the role of brand trust in green marketing effectiveness.
- To examine the role of sustainability claims in driving consumer purchase decisions.
- To provide recommendations for authentic and effective green marketing strategies.

Research Methodology

Survey Findings

Survey Statement	Response (%)	Interpretation
Consumers aware of green marketing	62	Awareness of sustainability initiatives is steadily increasing among urban consumers.
Consumers willing to pay a premium for genuinely sustainable products	68	Trustworthy environmental practices positively influence purchase decisions.
Consumers skeptical of environmental claims	70	Greenwashing has significantly reduced confidence in unsupported sustainability claims.
Consumers prefer certified eco-friendly products	65	Independent certifications enhance brand credibility and reduce purchase risk.
Consumers value transparent sustainability communication	72	Transparency strengthens consumer confidence and long-term brand relationships.

Discussion

The findings underscore that **consumer trust is the decisive factor in the success of green marketing initiatives**. While awareness of sustainable products continues to rise, consumers increasingly demand **credible, verifiable evidence** of corporate sustainability

The study adopts a descriptive and conceptual design. A mixed-method approach integrates literature review, survey evidence, and case illustrations.

- **Sample:** 100 urban consumers familiar with sustainability issues, selected via convenience sampling.
- **Instrument:** Structured questionnaire measuring awareness, trust, transparency, eco-labels, and purchase intentions.
- **Data Collection:** Primary survey + secondary sources (journals, reports, corporate disclosures).
- **Analysis:** Descriptive statistics (percentages, frequency distributions). Findings interpreted alongside literature and case studies.

Findings and Discussion

The descriptive survey findings indicate increasing consumer awareness regarding environmental sustainability and growing expectations for authentic corporate environmental responsibility.

commitments rather than relying on promotional claims. The observation that nearly 70% of respondents express skepticism toward environmental messaging highlights the growing challenge of **greenwashing**, which erodes confidence and damages brand reputation. Conversely, the willingness of 68% of consumers to pay a premium for genuinely sustainable products demonstrates that

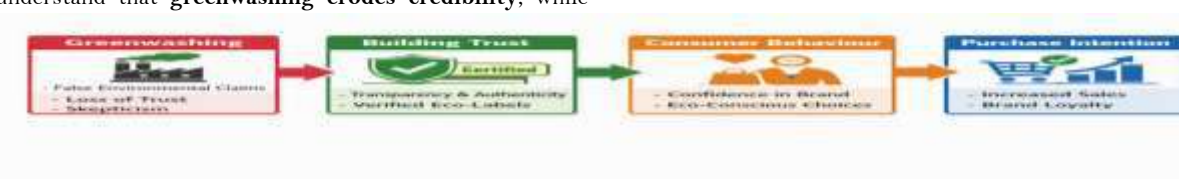
authenticity and transparency drive value creation. Firms that invest in measurable environmental initiatives, independent certifications, and transparent reporting are better positioned to cultivate trust, reduce information asymmetry, and strengthen long-term customer relationships.

Ultimately, the study confirms that **trust functions as the central mechanism linking transparency with sustainable consumer behaviour.** While deceptive communication discourages responsible purchasing, transparent disclosure enhances credibility, increases purchase intention, and fosters enduring brand loyalty.



The survey shows that **trust and transparency are more powerful than the green label itself.** Students should understand that **greenwashing erodes credibility**, while

authentic practices backed by certifications foster loyalty and premium willingness.



The above diagram beautifully shows the entire conceptual flow from deception to authenticity:

1. **Greenwashing** at the start, leading to **loss of trust and skepticism**.
2. **Authentic transparency** building **brand trust**, which strengthens **consumer confidence**.
3. **Trust** directly influencing **purchase intention** and **loyalty**.
4. The final loop highlights that **authenticity → trust → loyalty → sustainable growth**.

Findings Case Studies

The case studies illustrate the contrast between authentic sustainability and deceptive greenwashing. Patagonia demonstrates genuine green marketing through transparent reporting, ethical sourcing, and its "Repair and Reuse" initiative, which reduces waste and strengthens consumer trust. This authenticity has positioned Patagonia as a lifestyle brand aligned with ecological values. In sharp contrast, the Volkswagen emissions scandal highlights the destructive impact of false claims. Its "Clean Diesel" campaign misled consumers and regulators, resulting in reputational damage, consumer outrage, and legal consequences. Within the Indian FMCG sector, adoption of green marketing remains uneven. While some brands rely on vague eco-labels that fuel skepticism, others have gained credibility through tangible initiatives such as biodegradable packaging, refillable containers, and transparent supply chain disclosures. Collectively, these examples confirm that authenticity and transparency are decisive drivers of consumer trust, loyalty, and willingness to pay a premium, whereas greenwashing erodes credibility and long-term purchase intentions.

Discussion

Greenwashing Greenwashing creates a paradox: sustainability attracts consumers, but deceptive claims erode trust and weaken purchase intentions.

Brand Trust Trust is the cornerstone of green marketing. Authenticity, transparency, and credible certifications are essential to build confidence and loyalty.

Consumer Behaviour Eco-conscious consumers reward genuine practices with loyalty and premium purchases. Once deceived, however, they rarely return, underscoring the long-term risks of greenwashing.

Synthesis: Authenticity fosters trust and loyalty; deception erodes credibility.

Implications:

1. **Businesses:** Transparent reporting, credible certifications, avoid vague terminology.
2. **Policymakers:** Stronger anti-greenwashing regulations, standardized eco-labels.
3. **Consumers:** Education to evaluate claims critically.

Limitations of the Study:

1. Small sample size (100 respondents).
2. Descriptive analysis only; no causal relationships.
3. Consumer attitudes evolving with technology and regulation.

Future Directions

1. **AI-driven monitoring** of corporate sustainability claims.
2. **Blockchain-based transparency** in supply chains.
3. **Consumer activism** as a driver of corporate accountability.

Conclusion

Green marketing dynamics reveal a delicate balance between **authenticity and deception**. While genuine



sustainability practices foster **brand trust and consumer loyalty**, greenwashing erodes credibility, damages brand image, and undermines purchase intentions. This study highlights the necessity of **transparency, certification, and honest communication** to reduce green brand confusion, strengthen equity, and build consumer confidence. By aligning sustainable claims with consumer expectations, brands can overcome skepticism and foster long-term loyalty.

Ultimately, authentic green marketing not only enhances consumer trust but also contributes to achieving the **United Nations Sustainable Development Goals (SDGs)**, aligning corporate practices with global sustainability imperatives.

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