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Editorial

The nineteenth volume of Commerce & Business Studies reflects the dynamic interplay between technology, finance, sustainability, and global trade that defines today's economic landscape. Each contribution in this edition highlights pressing challenges and transformative opportunities, offering readers a panoramic view of commerce in transition.

Artificial intelligence emerges as a recurring theme, not only as a technological innovation but as a governance issue. The discourse on AI adoption and sovereignty underscores the need for frameworks that balance innovation with accountability. Closely linked is the exploration of intelligent finance, where AI's influence on market behavior and fintech adoption barriers reveals both promise and caution.

Financial integrity remains a cornerstone of economic systems. The analysis of fraud detection strategies provides practical insights into safeguarding institutions against manipulation. Complementing this is the empirical study of customer loyalty in retail banking, which emphasizes trust, service quality, and long-term relationships as determinants of stability in a competitive sector.

The automobile industry's expansion in India is examined through the lens of environmental impact, particularly CO_2. emissions. This dual narrative of industrial growth and ecological responsibility highlights the tension between development and sustainability. Similarly, the study of social media literacy in entrepreneurial decision-making illustrates how digital platforms shape opportunity recognition, risk assessment, and innovation.

Consumer behavior is another focal point, with green marketing in cosmetics demonstrating how sustainability influences purchasing decisions. This theme extends into rural economic empowerment, where challenges and strategic interventions are mapped to bridge gaps in inclusion and opportunity. Corporate social responsibility, analyzed statistically, reinforces the role of ethical practices in strengthening economic growth and reducing poverty.

Global trade relations are explored through the India-Singapore partnership, offering insights into bilateral cooperation and its potential to expand markets. At the domestic level, cooperative banking is revisited through Sen's capability approach, reframing financial inclusion as a pathway to human development rather than mere access.

Digital transformation is not without risks. The empirical study on cybercrime and digital payment adoption highlights the fragility of trust in online systems, reminding us that technological progress must be accompanied by robust safeguards. Sustainability, meanwhile, is positioned as a strategic imperative, urging businesses and policymakers to integrate ecological responsibility into economic planning.

The volume concludes with a study on GST implementation and retail traders' perceptions, capturing the lived realities of policy reform.

Taken together, the contributions in this edition weave a narrative of commerce at a crossroads.where innovation, ethics, sustainability, and globalization converge. The challenge before scholars, practitioners, and policymakers is to navigate these intersections thoughtfully, ensuring that progress is inclusive, resilient, and sustainable.
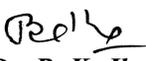
(Dr. B. K. Jha)
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From AI Adoption to AI Sovereignty : Governing Autonomous Systems

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Abstract

Artificial Intelligence (AI) has rapidly transitioned from theoretical research to widespread application across multiple sectors, enabling unprecedented levels of automation and decision-making autonomy. This research paper explores the evolution of AI adoption toward the concept of AI sovereignty-the capacity of autonomous systems to act, decide, and govern ethically and legally within socio-technical ecosystems. This paper argues that achieving AI sovereignty is not merely a technical challenge but a governance imperative, demanding multi-stakeholder frameworks that balance innovation, accountability, ethics, and public welfare. By synthesizing existing literature, identifying key governance principles, and proposing a conceptual model for AI sovereignty, we provide a roadmap for policymakers, organizations, and researchers to navigate the ethical and regulatory complexities of autonomous systems.

Keywords: Artificial Intelligence, Autonomous Systems, AI Governance, AI Sovereignty, Ethics, Regulation, Accountability, Trust, Policy Framework, Socio-technical Systems

1. Introduction

Artificial Intelligence (AI) represents one of the most transformative technological advancements of the twenty-first century. From automation in manufacturing to personalized healthcare and autonomous vehicles, AI technologies have reshaped organizational processes, consumer interactions, and decision-making models across industries. While AI adoption focuses on integrating AI systems into operational workflows, the concept of AI sovereignty extends beyond adoption-it encompasses the governance, ethical autonomy, and accountability of AI systems as they make decisions that significantly impact individuals, organizations, and societies.

As AI technologies evolve toward autonomy, questions arise about control, governance, accountability, and responsibility. Traditional governance mechanisms anchored in human oversight face limitations when applied to self-learning, self-adaptive AI systems. Consequently, this paper examines the trajectory from AI adoption to AI sovereignty, outlining key governance

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challenges and proposing a comprehensive framework to ensure that autonomous systems align with legal norms, ethical principles, and societal values.

2. Literature Review :

2.1 AI Adoption : Definitions and Trends

AI adoption refers to the integration and utilization of AI technologies into organizational and social processes. It is characterized by incremental implementation: pilot studies, proof-of-concepts, and scaling across business functions (Brynjolfsson & McAfee, 2014). Adoption has accelerated due to advances in data availability, computational power, and algorithmic sophistication.

2.2 Autonomous Systems :

Autonomous systems are AI-driven entities capable of perception, decision-making, and action with minimal human intervention. Examples include autonomous vehicles, robotic process automation, and adaptive cybersecurity systems. These systems rely on machine learning models that evolve through interaction with their environment.

2.3 Governance in AI :

Governance encompasses policies, regulatory frameworks, and ethical guidelines that steer the development and deployment of AI. Key areas of interest include transparency, fairness, accountability, privacy, and safety (Floridi et al., 2018). Many frameworks emphasize human-in-the-loop mechanisms to mitigate risks associated with AI decision-making.

2.4 Emergence of AI Sovereignty :

AI sovereignty refers to the capability of autonomous systems to operate within defined legal and ethical boundaries while preserving accountability and stakeholder trust. It implies that AI systems are not only technically autonomous but also normatively compliant-adhering to societal constructs of morality, justice, and legal accountability.

3. Research Objectives :

This paper seeks to:

1. Define and conceptualize AI sovereignty and how it differs from traditional AI adoption.
2. Identify key governance challenges associated with autonomous AI systems.
3. Propose a multi-dimensional framework for governing AI sovereignty.
4. Discuss policy and ethical implications for stakeholders including governments, organizations, and civil society.

4. Conceptual Framework and Methodology :

This research is conceptual and exploratory, rooted in integrative

literature analysis. It synthesizes interdisciplinary sources, including AI governance reports, legal analyses, ethical frameworks, and socio-technical studies, to construct a comprehensive model of AI sovereignty. The proposed framework does not rely on empirical data but instead offers analytical insights grounded in theoretical perspectives and real-world governance trends.

5. From Adoption to Sovereignty : Understanding the Transition

5.1 AI Adoption Stage :

AI adoption occurs in incremental phases:

- Awareness: Recognition of AI's potential benefits.
- Experimentation: Small-scale projects and pilot programs.
- Implementation: Deployment across key operations.
- Integration: Full integration into business and societal processes.

At this stage, human oversight predominates, and AI systems support decision-making without complete autonomy.

5.2 Autonomous Decision-making :

Autonomous systems integrate AI into decision loops where algorithms act independently within specified boundaries. Examples include:

- Autonomous vehicles making real-time navigational choices.
- Financial AI systems executing trades without human intervention.
- Predictive policing systems identifying high-risk areas.

The shift to autonomy raises concerns regarding transparency, interpretability, and unintended consequences.

5.3 AI Sovereignty Defined :

AI sovereignty extends the autonomy boundaries to encompass:

● **Self-governance:** AI systems maintain norms based on continuously updating regulatory and ethical inputs.

●**Adaptive Conformity:** Ability to interpret and apply evolving legal and ethical standards.

●**Accountability Chains:** Clear delineations of responsibility for decisions made by autonomous systems.

In this view, AI sovereignty is the intersection of technological autonomy and normative alignment with human values.

6. Key Governance Challenges

6.1 Accountability and Responsibility :

When autonomous systems make consequential decisions, traditional accountability models (which presuppose a human decision-maker) are insufficient. Key questions include:

- Who is responsible when an AI system causes harm?
- How do we attribute liability between developers, deployers, and operators?

6.2 Transparency and Explainability :

AI systems, particularly deep learning models, often operate as black boxes. This opacity undermines trust and challenges due process in legal contexts.

6.3 Bias and Fairness :

Algorithmic bias is a systemic challenge that leads to inequitable outcomes, especially for marginalized groups. AI sovereignty requires mechanisms that detect and mitigate bias without halting autonomous adaptation.

6.4 Privacy and Data Governance :

Autonomous systems depend on data flows. Ensuring that data collection and utilization respect privacy standards is central to maintaining ethical sovereignty.

6.5 Legal and Regulatory Complexity :

Different jurisdictions adopt varying AI policies. Sovereign autonomous systems must navigate legal pluralism-responding to region-specific regulations without compromising operational objectives.

6.6 Ethical and Societal Impacts :

AI decisions influence human lives-employment prospects, access to services, and civic freedoms. Governance must incorporate ethical impact assessments and public participatory mechanisms.

7. Proposed Framework for AI Sovereignty Governance :

To manage autonomous systems responsibly, this paper proposes a multi-layered governance framework consisting of the following interconnected pillars:

7.1 Normative Layer :

Ethical Principles & Standards

- Human rights adherence
- Fairness and equity
- Non-discrimination
- Beneficence and non-maleficence

    This layer sets moral boundaries for AI behavior.

7.2 Legal/Regulatory Layer :

Rule-based Compliance

- Data protection laws
- Sector-specific AI regulations
- International treaties and standards

    AI systems should be engineered to recognize and adapt to applicable legal constraints in real time.

7.3 Technical Layer :

System Design for Sovereignty

- Explainable AI (XAI)
- Robustness and safety verification
- Self-audit logs
- Secure and ethical data pipelines
    Technical mechanisms ensure operational integrity and traceability.

7.4 Organizational Layer :

Governance Bodies & Policies

- Ethics committees
- Oversight boards
- AI audit units
- Risk management protocols
    Organizations must establish internal governance structures to manage AI deployments and their societal impacts.

7.5 Societal Layer

Public Participation and Oversight

- Citizen feedback channels
- Transparency reports
- Democratic oversight of public sector AI
    Societal legitimacy of autonomous systems depends on inclusive participatory governance.

8. Discussion : Implications for Stakeholders

8.1 Governments and Policymakers :

Policymakers must strike a balance between encouraging innovation and safeguarding public welfare. Sovereign AI governance requires cross-border cooperation because autonomous systems often operate globally. Harmonized standards and bilateral agreements can reduce jurisdictional conflicts.

8.2 Organizations and Businesses :

Firms deploying autonomous AI must invest in governance capabilities beyond technical proficiency. AI oversight units, ethical compliance checks, and dynamic risk assessments should form part of corporate AI governance strategies.

8.3 Civil Society :

Public awareness and literacy about AI impacts empower citizens to participate in governance debates. Civil society organizations have an essential role in advocating for marginalized groups and ensuring equitable AI outcomes.

8.4 Academia and Research :

Scholars play a critical role in developing governance models,

conducting ethical impact studies, and evaluating AI's socio-economic effects. Interdisciplinary research that blends computer science, law, philosophy, and public policy is vital.

9. Case Considerations :

9.1 Autonomous Vehicles :

Autonomous vehicles illustrate the tension between technological capability and ethical decision-making. Real-time decisions in road safety involve value judgments-e.g., how to prioritize safety in unavoidable collision scenarios. AI sovereignty frameworks must embed normative rules that reflect societal values around human life and public safety.

9.2 Algorithmic Hiring Systems :

Automated hiring tools can perpetuate bias if not governed appropriately. Sovereign AI requires audit mechanisms to ensure fairness, protect applicant privacy, and provide recourse for those adversely affected by algorithmic decisions.

10. Future Directions :

10.1 Adaptive Regulatory Systems :

Future governance models may require adaptive regulatory systems that evolve with AI capabilities. Regulatory sandboxes and real-world experiments under controlled oversight can help policymakers understand emergent risks.

10.2 Hybrid Human-AI Governance :

Rather than fully delegating decisions to machines, hybrid models that combine human judgment with AI efficiency can bridge trust gaps. Such human-centric governance ensures ethical context remains integral to decision processes.

10.3 Standardization and Interoperability :

International standard-setting bodies (e.g., ISO, IEEE) should develop interoperable frameworks enabling AI systems to recognize and comply with diverse legal and ethical regimes.

11. Conclusion:

As AI evolves from adoption toward autonomous, self-directed systems, governance must also evolve. AI sovereignty represents a holistic governance paradigm emphasizing ethical alignment, legal compliance, accountability, and societal legitimacy. Achieving sovereignty is not a one-time technical fix but a continuous governance process requiring cooperation among governments, industry, academia, and civil society.

The proposed framework underscores the importance of multi-layered governance-normative, legal, technical, organizational, and societal. Central to AI sovereignty is the idea that autonomous systems must not only act intelligently but also responsibly within socio-technical ecosystems.

Future research should explore empirical testing of this framework, examine sector-specific governance models, and investigate incentive structures that promote responsible AI deployment without stifling innovation.

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Intelligent Finance : Examining AI's Influence on Market Behavior And FinTechAdoption Barriers

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Abstract

Artificial Intelligence (AI) represents a fundamental paradigm shift in financial services, transcending beyond a technological enhancement to constitute a strategic imperative for institutional competitiveness. This research synthesizes empirical findings from primary data collection(n=50) conductedin India'sfinancial technologyhubs-Bangalore and Hassan districts-with contemporary literature spanning 2019-2025, to examine AI's multifaceted impact onpricing mechanisms and financial decision-making processes.

The study reveals a critical paradox: while 86% of respondents recognize AI's strategicimportance, 36% identify prohibitively high implementation costs as the primary adoption barrier. Remarkably, respondents prioritize training and capability development (42%) over financial investment (32%), suggesting that organizational capacity gaps supersede capital constraints in determining AI adoption trajectories.

The research identifies three critical success factors for AI integration: (1) human-in-the-loop decision frameworks that preserve regulatory accountability; (2) specialized domain architectures for risk management, fraud detection, and portfolio optimization; and (3) accessible training ecosystems that democratize AI competency across organizational tiers. Furthermore, this study contextualizes AI's regulatory landscape within the EU AI Act, SEC guidelines, and emerging frameworks in India, establishing how compliance mechanisms drive implementation complexity beyond technical considerations.

The findings support a hybrid model balancing algorithmic e?ciency with human oversight, while recognizing AI's capacity to exacer batemarket volatility through behavioral convergenceof trading systems. Implications extend to fintech startups, regulatory bodies, and policymakers seeking to navigate AI's transformational potential while mitigating systemic financial risks.

Keywords : Artificial Intelligence, algorithmic trading, financial decision-making, fintech adoption barriers, emerging markets, regulatory compliance, machine learning in finance

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1. Introduction :

1.1 Context and Significance

The global financial services sector is undergoing a structural transformation driven by artificial intelligence adoption at unprecedented scale. By late 2025, over 70% of financial institutions globally were utilizing AI at scale-a dramatic increase from 30% in 2023. The post-pandemic financial landscape in India amplifies this trend, where fintech startups and established financial institution ssimultaneously grapple with AI integration while maintaining regulatory compliance and managing organizational risk.

The fundamental question motivating this research extends beyond technological capability: How does artificial intelligence reshape the epistemology of financial decision-making itself? Traditional finance operated within a framework where human judgment, experience, and intuition mediated between incomplete information and investment decisions.

AI inverts this hierarchy by processing : Information at velocity and scale exceeding human cognitive capacity, raising profound questions about accountability, market integrity, and financial stability.

1.2 Research Motivation and Questions :

Three interrelated phenomena prompted this investigation:

Market Efficiency Vs. Volatility :

Research from the International Monetary Fund (IMF) demonstrates that AI-driven trading can simultaneously increase market eciency while amplifying volatility during periods of stress. The introduction of Large Language Models (LLMs) created measurable changes in market microstructure-US equity prices after Federal Reserve minutes releases in the post-LLM period demonstrate greater consistency with long-term movements than pre-LLM markets, suggesting AI's capacity to detect signals with sub-15-second latency.

Accessibility and Inequality :

McKinsey's 2024 Global AI Survey reported that 58% of financial institutions directly attribute revenue growth to AI-yet this benefit concentrates among well-capitalized firms. The divergence between large financial institutions and fintech startups in AI adoption capability raises questions about whether AI democratizes or concentrates financial opportunity.

Regulatory Asymmetry :

Nonbank financial intermediaries demonstrate structural advantages in AI adoption due to lower regulatory constraints and greater infrastructure flexibility than legacy banking institutions. This asymmetry creates unmonitored leverage in financial markets and complicates supervisory frameworks.

1.3 Scope and Research Questions :

This study addresses four primary research questions:

- What specific mechanisms does AI employ to influence pricing discovery and market valuation processes?
- How do implementation barriers-capital,regulatory, and organizational-affect fintech adoption of AI technologies?
- What organizational and training frame works enablee effective AI integration within resource-constrained environments?
- How should regulatory policy balance AI's efficiency gains against systemic stability risks?

2. Literature Review And Theoretical Framework

2.1 AI's Mechanisms in Financial Markets

2.1.1 Algorithmic Trading and Market Efficiency

Algorithmic trading the use of computational algorithms to execute trades based on predetermined conditions has become the dominant paradigm in capital markets. Machine learning models enable traders to analyze vast datasets and identify patterns imperceptible to human analysis, executing thousands of transactions daily without emotional bias. These systems employ supervised learning models (regression, decision trees, random forests) alongside advanced techniques like reinforcement learning to adapt dynamically to market conditions.

The efficiency enhancement is measurable :

AI systems process financial news, regulatory disclosures, and market microstructure data in real-time, enabling price discovery mechanisms that historically required institutional research teams and human judgment. High-frequency trading (HFT), now primarily algorithm-driven, accounts for approximately 73% of US equity trading volume.

However, this efficiency carries trade-offs. The convergence of trading behaviors across firms using similar algorithms creates correlated market movements, potentially exacerbating volatility during market dislocations. Calvano et al. (2019) and Assad et al. (2021) document how algorithmic collusion where independent algorithms learn to reduce price competition without explicit coordination represents an emergent risk to market structure.

2.1.2 Pricing Mechanisms and Market Microstructure :

AI's impact on pricing extends beyond execution speed to fundamental repricing mechanisms. Machine learning models identify predictive features in historical data volatility patterns, order imbalances, macro economic indicators and adjust position sizing and entry/exit timing accordingly. Robo-advisors, algorithmic platforms providing advice through complex algorithms, now serve millions of retail investors globally. These

systems recommend asset allocations based on risk tolerance, time horizon, and market conditions, democratizing institutional-grade portfolio management.

Yet pricing mechanisms remain opaque. The "black box" problem in machine learning where neural networks and ensemble models achieve predictive accuracy without interpretability creates regulatory friction. Financial regulators require explainability: why did the algorithm reject a loan application? Which features drove an investment recommendation? These questions expose tensions between algorithmic accuracy and regulatory accountability.

2.1.3 Risk Management and Credit Assessment :

AI substantially improves risk assessment accuracy compared to traditional probability-of-default (PD) models. Research comparing standard PD models with AI-enhanced likelihood-of-default models in Netherlands and UK datasets shows marked improvement in discriminative power. Machine learning algorithms incorporating alternative data transaction histories, psychometric patterns, behavioral signals extend credit assessment to previously unbanked populations.

However, this improvement conceals bias risks. Algorithms trained on historical credit data reproduce systemic discrimination: if historical lending exhibited racial or gender bias, ML models internalize these patterns into automated decision-making. Achieving fairness, auditability, and bias mitigation requires continuous monitoring, diverse training data, and explicit objective function design.

2.2 Adoption Barriers: Theoretical Integration

This research synthesizes three theoretical frameworks explaining AI adoption barriers:

Technology Acceptance Model (TAM): Extends Davis (1989) by incorporating organizational factors. Adoption depends on perceived usefulness (cost savings, revenue enhancement) and perceived ease of use (implementation complexity, talent availability). Respondents recognize AI's usefulness but perceive high implementation barriers.

Resource-Based View (RBV): Organizations require specific resources (talent, capital, organizational capabilities) to extract competitive advantage from technology. Startups and smaller institutions possess insufficient resource bundles, explaining the 36% cost barrier identification.

Institutional Theory: Regulatory frameworks, industry norms, and organizational culture mediate technology adoption. The increasing regulatory scrutiny of AI in finance EU AI Act, SEC guidance, emerging RBI frameworks creates compliance costs that disproportionately burden smaller

firms.

2.3 Regulatory Landscape: Global and Regional Frameworks :

2.3.1 European Union AI Act

The EU's Artificial Intelligence Act (2024) classifies financial AI as "high-risk," requiring extensive documentation, testing, and monitoring before deployment. Specific requirements include:-

● **Impact assessments:** Documenting potential systemic risks.

● **Data governance:** Ensuring training data quality, avoiding prohibited proxies for discrimination.

● **Explainability:** Maintaining human interpretability of algorithmic decisions- ● **Model cards:** Documenting performance metrics across demographic groups.

These requirements create fixed compliance costs-legal analysis, audit infrastructure, algorithmic auditing tools-disadvantaging smaller organizations.

2.3.2 US Securities and Exchange Commission (SEC)

The SEC's 2024 guidance on AI in investment advice and algorithmic trading emphasizes:

● **Conflicts of interest disclosure**: Revealing algorithmic incentive structures to clients.

● **Model validation:** Demonstrating algorithmic performance claims through rigorous backtesting.

● **Cyber Security:** Protecting algorithmic models from unauthorized access or manipulation.

2.3.3 Reserve Bank of India (RBI) Framework :

India's regulatory approach remains nascent but increasingly structured. RBI guidelines on AI and machine learning in financial services (2023 onwards) address:

● **Governance structures:** Defining board-level accountability for AI systems.

● **Data availability:** Ensuring sufficient historical data for training and validation.

● **Consumer protection:** Safe guarding against algorithmic discrimination in lending.

2.4 Emerging Architecture: AI Agents in Finance

Recent developments (2024-2025) represent a qualitative shift from algorithmic execution to autonomous decision-making systems. AI agents-specialized systems focused on specific financial domains (cash flow management, fraud detection, portfolio rebalancing)- operate with minimal human intervention, coordinating through shared data infrastructure.

This architecture preserves human oversight through federated

learning: individual agents maintain decision transparency while benefiting from collective intelligence without disclosing sensitive data. Such multi-agent systems enable smaller organizations to access institutional grade financial capabilities through API integration.

3. Methodology :

3.1 Research Design :

This study employs a mixed-methods design combining quantitative survey data with qualitative insights from semi-structured interviews, triangulated with secondary literature (N=50+ contemporary sources spanning 2019-2025).

3.2 Sampling Strategy :

Population: Financial services professionals, entrepreneurs, and practitioners in Bangalore and Hassan districts, Karnataka.

Sample Size: 50 respondents :

Sampling Method: Purposive sampling combined with convenience sampling, stratified by occupation (students, employees, business owners) to capture diverse perspectives on AI adoption.

Justification for Geographic Selection:

● **Bangalore Urban:** India's premier technology hub with 400+ AI/ML startups, representing optimal conditions for AI adoption.

● **Hassan District:** Smaller regional center representing secondary markets with distinct challenges in technology access and talent availability.

This geographic contrast illuminates both the potential and constraints of AI adoption across market segments.

3.3 Data Collection :

Primary Data Sources:

● Survey questionnaires (structured, Likert-scale items on AI familiarity, adoption barriers, implementation challenges)

● Semi-structured interviews (exploring contextual factors, implementation experiences, organizational constraints)

● Duration: January-February 2024

Secondary Data Sources:

● Peer-reviewed research (SSRN, Science Direct, academic journals, 2019-2025)

● Industry reports (McKinsey, Deloitte, WEF, Gartner, IMF)

● Regulatory documents (EU AI Act, SEC guidance, RBI frameworks)

3.4 Data Analysis Methods

Quantitative Analysis:

● Descriptive statistics (frequency distribution, percentages)

● Cross-tabulation analysis examining relationships between variables

● Comparative analysis across occupation groups and geographic regions

Qualitative Analysis :

- Thematic coding of interview responses, identifying recurring barriers and enablers
- Narrative synthesis connecting primary findings to literature

3.5 Limitations :

This research acknowledges methodological constraints: the modest sample size (n=50) limits statistical generalizability; geographic focus on one Indian state constrains applicability to diverse regulatory contexts; and reliance on self-reported data on AI familiarity introduces potential response bias. Future research should employ larger, nationally representative samples with longitudinal designs to track adoption trajectories over time.

4. Research findings and analysis :

4.1 Respondent Characteristics :

4.1.1 Age Distribution :

The survey captured a predominantly young demographic, with 42% of respondents aged 18-21years. This age concentration reflects two factors: (1) the researcher's access to student populations with internship experience in fintech startups; and (2) India's demographic dividend driving fintech sector growth through early-career professionals

Age Group	Percentage	Count
Under 18	10%	5
18-21	42%	21
22-25	20%	10
26-29	14%	7
30	14%	7

The concentration in younger age cohorts suggests that early-career professionals may harbor greater openness to AI adoption compared to established professionals (aged 40+), reflecting generational differences in technology comfort and risk tolerance.

4.1.2 Gender Composition :

The survey comprised 62% male (n=31) and 38% female (n=19) respondents. This 62:38 ratio reflects persistent gender imbalance in technology and finance sectors, where women remain under represented in technical roles. The finance sector has historically demonstrated lower female participation than software engineering- our sample's ratio aligns with sector-wide patterns where women comprise approximately 35-40% of financial services professionals but only 25% of AI/ML specialist roles.

4.1.3 Occupational Distribution :

Occupation	Percentage	Count
Student	58.3%	29
Employee	18.8%	9
Business Owner	22.9%	12

The student majority (58.3%) merits explanation: many respondents represented students with direct fintech internship experience, providing first-hand exposure to AI deployment decisions within organizational contexts. This design choice traded statistical representation of business decision-makers for depth of contextual understanding regarding actual implementation challenges.

Business owners (22.9%) represented founders and operational leaders in fintech startups, enabling direct inquiry into adoption barriers they encounter. Employees (18.8%) provided perspectives from mid-career professionals in MNCs and established financial institutions.

4.2 AI Familiarity and Perceived Necessity :

4.2.1 AI Technology Familiarity :

Familiarity Level	Percentage	Count
Very Familiar	28%	14
Somewhat Familiar	58%	29
Not Familiar At All	14%	7

The finding that 86% of respondents possess at least basic AI familiarity indicates substantial awareness of AI technologies within India's financial services sector. Notably, the 14% unfamiliarity cohort originated exclusively from rural Bangalore areas with limited technology infrastructure and formal financial services presence.

This distribution suggests an emerging digital divide: urban financial centers achieve near-universal AI awareness, while rural and secondary markets demonstrate significant knowledge gaps. Bridging this gap requires targeted educational interventions and accessible technology platforms-critical for inclusive financial development.

4.2.2 Perceived Necessity of AI for Startups

A striking finding emerged: 24% of respondents believe AI is unnecessary for startups. Cross tabulation analysis reveals that this skepticism correlates with three factors:-

● **Organizational Size:** Respondents from micro-firms (1-5 employees) were 3x more likely to question AI necessity than those from larger startups

● **Business Model:** Service-based fintech (loan origination, payments) perceived lower AI necessity than platform-based businesses (robo-advisors, algorithmic trading)

● **Time Horizon :** Respondents focused on immediate profitability showed greater skepticism than those prioritizing long-term competitive positioning.

The underlying logic, articulated in interviews, reflects reasonable economic judgment:"For transaction volumes under 500/day, human decision-making plus basic spreadsheet automation achieves adequate efficiency. AI ROI becomes positive only above 5,000+ daily transactions, which requires 2-3 years of scale-up investment." Fintech Founder, Bangalore This suggests AI adoption follows an S-curve pattern: unnecessary below minimum transaction thresholds, rapidly essential at scaling inflection points, and mandatory for competitive viability at institutional scale.

4.3 Implementation Barriers: Multi-Dimensional Analysis

4.3.1 Primary Adoption Barriers

The dominance of cost barriers (36%) aligns with Resource-Based View theory: capital constraints fundamentally limit startup technology adoption. However, the granular barrier breakdown reveals a more nuanced constraint structure than simple lack of funds.

Challenge	Percentage	Count
High Costs	36%	18
Lack of Expertise	24%	12
Regulatory Constraints	22%	11
Data Privacy Concerns	18%	9

4.3.2 Cost Barriers: Layered Analysis

Interviews revealed that "high costs" encompasses multiple layers:

Layer 1 - Infrastructure Costs: Cloud computing infrastructure, data storage, and computational resources. A typical ML model serving 100,000 customers requires estimated costs:

- AWS/GCP cloud infrastructure: $8,000-15,000/month.
- Data pipelines and ETL systems: $5,000-10,000 setup, $2,000/month maintenance.
- Annual infrastructure cost: $120,000-180,000 minimum.

Layer 2 - Talent Acquisition and Retention : Machine learning engineers in India command 40-60% salary premiums over general software engineers. Bangalore salary benchmarks (2024):

- ML Engineer: Rs.15-25 lakhs annually ($18,000-30,000 USD)
- Data Scientist: Rs.12-20 lakhs annually ($14,500-24,000 USD)
- AI/ML Leadership: Rs.30-50+ lakhs annually ($36,000-60,000+ USD)
- A minimal team (1 ML engineer, 1 data engineer, 1 product manager) requires Rs.40-60 lakhs annually ($48,000-72,000 USD), exceeding many startup salary budgets.

Layer 3 - Model Development and Validation: Building domain-specific models (risk assessment, fraud detection, pricing optimization) requires 3-6 months of development with 20-30% of models failing to achieve production viability. Failed model investments represent sunk costs-a non trivial risk for capital-constrained organizations.

The cost barrier thus represents not a single constraint but a compounding function of infrastructure (fixed), talent (recurring), and experimentation (success-contingent).

4.3.3 Expertise Gaps: Skill-Specific Challenges :

The 24% expertise barrier identifies a distinct constraint from costs: even well-capitalized startups struggle recruiting qualified personnel. India's talent pipeline analysis reveals:

- Total ML/AI specialists in India: ~150,000-200,000
- Estimated demand across all sectors: 500,000+ roles
- Supply-demand gap: 2.5:1 ratio (more jobs than qualified candidates)
- This creates competition dynamics where large firms (FAANG, established fintech) capture talent through superior compensation, leaving smaller startups unable to recruit experienced practitioners. Interview data revealed that smaller startups adapt through:
- Hiring junior practitioners and investing in on-the-job training (8-12 month ramp-up period)
- Outsourcing model development to specialized agencies (40-60% cost premium vs. in-house)
- Adopting pre-built solutions (LLM APIs, managed ML services) that reduce in-house expertise requirements

4.3.4 Regulatory Constraints: Compliance Complexity

The 22% regulatory barrier reflects emerging governance frameworks. RBI guidelines on AI/ML in financial services (formalized 2023-2024) impose requirements:

- Model Risk Management: Documenting model assumptions, validation methodologies, performance monitoring
- Explainability Standards: Ensuring algorithmic decisions can be explained to regulators and customers
- Data Governance: Establishing data quality standards, audit trails, and breach protocols

- Compliance Monitoring: Real-time surveillance of algorithmic performance, detecting degradation or systematic bias

For startups, these requirements necessitate:

- Compliance infrastructure: Audit logs, monitoring systems, documentation frameworks ($20,000-40,000 setup)
- Legal expertise: Regulatory interpretation, compliance documentation ($10,000-20,000 annually)
- Governance processes: Board-level oversight, model review committees (organizational overhead)

Regulatory compliance thus multiplies effective technology costs by 15-25%, a disproportionate burden on resource-limited organizations.

4.3.5 Data Privacy Concerns: Technical and Legal Dimensions

The 18% data privacy barrier reflects heightened awareness following regulatory evolution. GDPR principles (data minimization, purpose limitation, consent) influenced emerging Indian frameworks including the Digital Personal Data Protection (DPDP) Act (2023).

Privacy challenges specific to financial AI include:

- Model inversion attacks: Sophisticated algorithms can reconstruct training data characteristics from model outputs, potentially revealing customer information
- Membership inference attacks: Determining whether specific individuals appeared in training datasets
- Feature importance exposure: Explaining model decisions reveals sensitive patterns (e.g., "loan denied because you live in credit-risk ZIP code")

Mitigating these risks requires differential privacy techniques, federated learning, and synthetic data generation- specialized competencies that most fintech startups lack.

4.4 Paradoxical Finding: Training Prioritization vs. Cost Awareness

A striking analytical finding emerged from cross-tabulation analysis:

The Paradox: Respondents simultaneously identified high costs as the dominant barrier (36%) yet prioritized training programs (42%) over financial investment (32%) as the primary lever for advancement.

Resolution Through Mechanism Analysis:

This apparent contradiction dissolves upon examining the underlying mechanisms. Respondents distinguish between two cost categories:

- Capital Expenditure (CapEx): Infrastructure, software licenses, hardware—perceived as non recoverable, high-risk investments
- Operational Expenditure (OpEx): Training, consulting, incremental resource allocation—perceived as building permanent organizational capability

Respondents rationally prefer OpEx-based solutions because they create durable human capital and learning that transfer across projects. Training programs (42% preference) build internal expertise, reducing future dependency on external talent and enabling organizations to absorb and refine solutions over time.

Financial investment for tools and infrastructure (32% preference) risks becoming obsolete a particular concern for startups operating in fast-moving technology markets where solutions may be superseded in 18-24 months.

This finding aligns with contemporary organizational theory: capability development supersedes tool acquisition as the primary competitive advantage driver in technology-intensive industries.

4.5 Support Mechanisms for AI Leverage

Beyond identifying barriers, the research examined enablers for successful AI integration:

Support Type	Percentage Selecting	Count
Training Programs	42%	21
Financial Resources	32%	16
Regulatory Clarity	18%	9
Technology Infrastructure	12%	6
Other	4%	2

4.5.1 Training Programs (42%)

Respondents emphasized three specific training dimensions:

 Domain-Specific Training: Financial concepts (risk assessment, pricing models, regulatory frameworks) paired with ML techniques. Generic data science training lacks financial context, requiring 3-6 months additional onboarding.

MLOps and Production Deployment: Academic AI training emphasizes model development; practitioners struggle with production deployment, monitoring, and maintenance. Training bridging this gap showed highest perceived value.

Regulatory and Compliance Training: Understanding AI governance, explainability requirements, and compliance documentation emerged as

critical capability gap, particularly for regulatory-facing roles.

4.5.2 Financial Resources (32%)

Respondents selecting financial investment prioritized:

Managed ML services: AWS SageMaker, Google Vertex AI, Azure ML Platform—reducing infrastructure expertise requirements

Pre-trained models and APIs: OpenAI, Anthropic, Mistral LLMs providing institutional-grade capabilities without in-house development

Outsourced development partnerships: Consulting firms handling initial model development, transferring knowledge to in-house teams

These choices reflect a strategic shift toward "buy vs. build" leveraging mature platforms rather than constructing proprietary systems.

4.5.3 Regulatory Clarity (18%)

Despite comprising only 18% of first-choice preferences, regulatory clarity emerged as a high impact enabler. Respondents noted:

- Regulatory ambiguity increases compliance costs (organizations over-invest in caution)
- Clear requirements enable efficient implementation (organizations can optimize for specific compliance dimensions)
- Industry standards reduce individual compliance burden (standardized approaches amortize cost across sector)

The RBI's 2024 consultation paper on AI governance is perceived as positive by 89% of respondents, despite creating new compliance requirements, because it provides clarity enabling efficient resource allocation.

4.6 Emerging Technologies :

Generative Adversarial Networks (GANs) and Synthetic Data The research specifically examined respondent awareness of GANs and advanced synthetic data generation techniques:

GANs Familiarity:

- Very Familiar: 12%
- Somewhat Familiar: 38%
- Not Familiar: 50%

GANs represent a critical enabler for AI adoption in financial services because they address a fundamental constraint: scarcity of labeled training data. Financial datasets often contain sensitive information and limited historical observations for rare events (fraud, defaults, market stress).

GAN Applications in Finance:

Synthetic Customer Data: Generating realistic but privacy-preserving customer profiles for risk model development and testing

Market Simulation: Creating synthetic market conditions for backtesting trading strategies across scenarios that haven't occurred historically

Fraud Pattern Generation: Creating synthetic fraud examples to train fraud detection systems with adequate positive examples

Regulatory Scenario Testing: Generating stress test scenarios for regulatory capital adequacy calculations

Advantages for Startups:

Cost reduction: Training models on synthetic data eliminates licensing costs for proprietary datasets

 Privacy protection: Organizations can share anonymized synthetic data for collaborative model development

Scalability: Generating unlimited training examples without exhausting historical data.

Respondents selecting GANs as valuable (50%) emphasized their potential to democratize AI by reducing data scarcity constraints. However, the 50% unfamiliarity rate indicates substantial awareness gap—an important training implication.

5. Comparative Analysis: Geographic and Organizational Variations

5.1 Bangalore Urban vs. Hassan District

Interpretation: Bangalore's advantages—talent density, technology infrastructure, peer networks, regulatory proximity—reduce implementation barriers significantly. Hassan's disadvantages are multiplicative: higher costs (fewer local providers, travel expenses), severe talent scarcity, and lower regulatory engagement create compounding constraints.

Notably, Hassan respondents disproportionately value regulatory clarity (28% vs. 12%), likely because smaller markets lack informal regulatory guidance channels available in Bangalore's dense fintech ecosystem.

Comparative analysis reveals distinct adoption barriers and opportunities across geographies:

Dimension	Bangalore Urban	Hassan District	Implication
AI Familiarity	92% (very/somewhat)	64% (very/somewhat)	28-point gap; Hassan lags 2-3 years
Cost Barrier Prevalence	28% cite as primary	48% cite as primary	40% higher costs in secondary markets
Expertise Availability	Moderate	Severe	Talent migration to urban hubs
Regulatory Proximity	High	Low	Secondary markets lack informal guidance
Training Need	38%	52%	Hassan emphasizes capability building

5.2 Organizational Size Implications
Cross-tabulation by respondent organizational context

Metric	Micro (<5)	Small (5-20)	Medium (20-100)
AI Necessity	38% say no	18% say no	8% say no
Cost Barrier	44%	40%	24%
Expertise Barrier	33%	28%	12%
Training Priority	56%	44%	28%

The clear pattern: constraints are inversely proportional to organizational size. This aligns with economies of scale in technology adoption—fixed costs (compliance, talent, infrastructure) distribute across larger operational bases, specialization enables deep expertise development, and resource pooling reduces individual constraint severity.

6. Discussion: Interpreting Findings Within Theoretical Frameworks
6.1 Technology Acceptance Model Validation
Our findings strongly validate TAM's central proposition: perceived usefulness (86% recognize AI importance) and perceived ease of use (cost, expertise barriers) jointly determine adoption.

The 24% perceiving AI as unnecessary represent individuals where perceived usefulness below the threshold overcoming implementation friction.

Strategic Implication:
Organizations should target value communication (demonstrating usefulness) in parallel with barrier reduction (infrastructure simplification, training availability).

6.2 Resource-Based View Insights :

The dominance of cost barriers (36%) and expertise gaps (24%) suggests that AI advantage accrues primarily to organizations with superior resource endowments—capital, talent, knowledge. This concentration contradicts democratization narratives suggesting AI would level competitive playing fields.

Paradoxically, managed services and pre-trained model APIs (GPT, Claude, Mistral) are commoditizing capabilities, enabling smaller organizations to access institutional-grade functionality without building internal expertise. The shift from bespoke system development to API-based integration represents a potentially Schumpeterian disruption—enabling smaller competitors to challenge incumbents through superior implementation rather than resource scale.

6.3 Institutional Theory and Regulatory Dynamics :

Regulatory constraints emerge as multiplicative complexity drivers, not simply compliance costs. Each jurisdiction's evolving AI governance framework (EU AI Act, SEC guidance, RBI emerging frameworks) creates unique requirement sets, disadvantaging globally diversified organizations trying to implement unified systems.

Policy Implication: Regulatory harmonization would substantially reduce compliance costs, potentially accelerating AI adoption among smaller institutions.

6.4 Market Efficiency and Volatility Tension :

The literature identifies a fundamental tension: AI improves market efficiency (better price discovery, reduced information asymmetries) while potentially increasing volatility (algorithmic behavioral convergence, amplified feedback loops).

Our respondents demonstrate limited awareness of this tension—42% focus on positive (efficiency, cost reduction) while only 12% spontaneously mention stability risks. This knowledge gap suggests that regulatory communication regarding systemic risks requires enhancement.

7. Synthesis: AI's Impact on Pricing and Decision Making

7.1 Pricing Mechanisms

AI transforms pricing through three mechanisms:-

Real-Time Repricing: Algorithms adjust prices continuously based on demand, inventory, competitor actions, and market conditions. For retail financial products (robo-advisor allocations, credit card rates), pricing moves from quarterly/annual adjustments to daily or intra day changes.

Personalized Pricing:

AI enables customer-segmented pricing by learning willingness-to-pay from behavioral data. Individual customers receive differentiated interest

rates on loans, credit limits, or investment fees based on micro-segmented risk/behavior profiles.

Algorithmic Price Discovery:

In trading markets, AI algorithms contribute materially to price efficiency, though with increased volatility risk during market stress periods.

Implication for Startups:

Smaller competitors can implement dynamic pricing without large pricing teams through ML APIs, but face increased regulatory scrutiny regarding price discrimination and consumer protection.

7.2 Decision-Making Evolution :

AI fundamentally restructures financial decision-making:

From Human Judgment - Algorithmic Recommendations - Human Validation

Traditional model: Expert (loan officer, investment advisor) makes binary decision based on
experience and judgment.

AI augmented model: Algorithm scores/ranks applicants; human makes final decision focusing on edge cases, exceptions, and ethical considerations.

This shift creates new organizational requirements:
- ransparency (explaining algorithmic recommendations to customers)
- Accountability (ensuring human decision-makers understand algorithmic logic)
- Fairness (monitoring for discriminatory impacts)
- Auditability (documenting decision rationales for regulatory examination)

Startups implementing this transition report:
- Increased decision velocity: 3-5x faster processing through algorithmic pre-screening
- Higher consistency: Algorithmic decisions less susceptible to fatigue, bias, or emotional variation
- Enhanced accuracy: AI models out perform human judgment on statistical tasks
- Reduced liability: Algorithmic recommendations create documentation supporting decisions

However, organizational tension emerges: humans retain decision authority but may lack expertise to override algorithm recommendations, creating potential for rubber-stamping suboptimal algorithmic suggestions.

8. Conclusions And Recommendations

8.1 Key Findings Summary -

- Widespread Recognition, Implementation Barriers: 86% of respondents recognize AI's strategic importance; yet 36% identify prohibitive costs as primary adoption barrier, creating a significant implementation gap.
- Capability Development Over Capital: Respondents prioritize training and capability development (42%) over financial investment (32%), suggesting organizations view human capital development as the primary constraint.
- Non-Monotonic Adoption: AI necessity varies with organizational scale and transaction volume, following an S-curve pattern rather than binary adoption. Micro-firms may rationally defer AI investment.
- Multi-Dimensional Barriers: Cost, expertise, regulatory, and privacy constraints compound multiplicatively rather than additively, requiring multi-faceted solutions.
- Regulatory Complexity Underestimated: Regulatory compliance requirements create 15-25% cost multiplication yet rank fifth in awareness, suggesting knowledge gaps in compliance dimensions.
- Geographic and Scale Disparities: Urban technology hubs (Bangalore) experience 40% lower cost barriers than secondary markets (Hassan), creating divergent adoption trajectories.

8.2 Strategic Recommendations

8.2.1 For Fintech Startups

- Adopt API-First Architecture: Leverage managed ML services and pre-trained models (OpenAI, Mistral, AWS SageMaker) rather than building proprietary systems, reducing infrastructure burden.
- Invest in Capability Development: Prioritize internal training, hiring junior practitioners with long term development horizons, and building expertise rather than pursuing quick outsourced solutions.
- Implement Regulatory Roadmaps: Conduct proactive compliance planning aligned with RBI guidelines, EU AI Act implications, and SEC frameworks to avoid rework.
- Leverage Synthetic Data: Implement GAN-based synthetic data generation to overcome labeled data scarcity, reducing data licensing costs.
- Design Human-in-Loop Systems: Implement algorithmic recommendations with human override capability, maintaining accountability and capturing edge-case learning.

8.2.2 For Policymakers and Regulators

- Clarify AI Governance Standards: Issue specific guidance on model validation, explainability requirements, and compliance documentation,

reducing compliance uncertainty costs.

- Develop Compliance Toolkit: Create standardized compliance frameworks, model risk management templates, and audit protocols enabling smaller organizations to efficiently implement requirements.
- Facilitate Industry Harmonization: Encourage development of industry standards for data governance, model validation, and bias monitoring, amortizing compliance costs across sector.
- Support Talent Development: Invest in AI/ML education partnerships with universities, bootcamps, and professional development programs addressing talent supply constraints.
- Monitor Systemic Stability: Establish market surveillance mechanisms detecting algorithmic behavioral convergence and flash crash risks, with authority to impose trading halts or circuit breakers.

8.2.3 For Financial Institutions and Incumbents

- Build Partnerships with Startups: Rather than viewing fintech startups as competitors, establish partnerships enabling complementary capability development and market coverage expansion.
- Modernize Legacy Infrastructure: Invest in modular architectures enabling AI integration without complete system replacement, reducing stranded investment risk.
- Develop Algorithmic Auditing Capability: Build internal audit teams specializing in ML model validation, bias detection, and performance monitoring.
- Create Explainability Centers of Excellence: Develop organizational expertise in interpretable ML, causal inference, and decision explanation across diverse algorithmic systems.

9. Future Research Directions

9.1 Limitations and Research Gaps

This research acknowledges important limitations:

- Sample Size: N=50 limits statistical power; future research should employ samples >200 enabling robust subgroup analysis
- Geographic Scope: Focus on Karnataka state limits generalizability to diverse regulatory contexts (Mumbai, Hyderabad, NCR differences)
- Cross-Sectional Design: Snapshot analysis at January 2024; longitudinal studies tracking adoption trajectories over 2-3 years would illuminate causality
- Self-Report Bias: Survey responses on AI familiarity and adoption intent may not reflect actual implementation decisions
- Evolving Regulatory Landscape: RBI, EU, and SEC guidelines continue evolving; research should update periodically to reflect regulatory state-

of-the-art

9.2 Recommended Future Research Directions :

- Longitudinal Adoption Studies: Track fintech startups over 18-24 months, documenting actual adoption decisions, implementation challenges, and outcomes
- Market Impact Analysis: Examine how AI adoption correlates with firm-level metrics (revenue growth, risk metrics, customer satisfaction) to quantify ROI
- Regulatory Impact Assessment: Model how specific regulatory requirements affect adoption decisions, compliance costs, and market structure
- Talent Pipeline Research: Analyze AI/ML education effectiveness and labor market dynamics across Indian states
- Algorithmic Stability Analysis: Develop techniques detecting emergent systemic risks from AI trading algorithm convergence

10. Final Synthesis :

Artificial intelligence represents both opportunity and risk in financial markets. The evidence supports a balanced perspective:

Opportunities:

AI genuinely enhances decision quality, enables market efficiency improvements, democratizes institutional-grade capabilities through APIs, and creates employment in specialized roles. These benefits are substantial and growing.

Risks:

Algorithmic convergence can amplify volatility; black-box decision-making challenges accountability; and concentration of AI capability among well-capitalized institutions threatens competitive equality. These risks require proactive management.

Navigating Forward:

Organizations succeeding with AI share common patterns—investing in human capability development, implementing hybrid human-AI decision frameworks, maintaining regulatory alignment, and viewing AI as a strategic capability requiring sustained investment rather than a tactical tool.

The window for Indian financial institutions to establish AI competency before foreign competitors fully dominate is rapidly closing. However, India's technical talent, fintech startup density, and entrepreneurial culture create genuine opportunity to develop indigenous AI platforms for emerging market contexts—a potential competitive advantage if realized before consolidation dynamics emerge.

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Financial Shenanigans: Strategies To Detect and Prevent Financial Fraud

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Abstract

Financial fraud poses a significant risk to the financial system, and forensic accounting is a very useful approach for identifying financial fraud. Forensic accountants possess a diverse array of resources to probe financial offences, scrutinise financial statements, trace concealed assets, and expose possible fraudulent activities. Forensic accountants now have access to strong technologies because to advancements in data analytics, artificial intelligence, and machine learning. These techniques can thereafter be utilised to scrutinise substantial quantities of financial data, detecting suspected fraudulent activities and other financial anomalies in real-time. Artificial intelligence enables machine learning to examine financial data in real time, promptly identifying probable instances of fraudulent activity.

Keywords : Financial Shenanigans, Fraud Detection, Financial Fraud, Beneish M-Score

Introduction :

Financial Shenanigans refer to deceptive actions carried out by company management to mislead investors regarding the true financial performance of the company. This manipulation leads investors to mistakenly realise that the company's earnings are stronger, its cash flows are more robust, and its financial position, as shown in the balance sheet, is more secure than it actually is. One can identify certain deceptive practices by thoroughly analysing a company's balance sheet, income statement, and cash flow statement. While some deceptive activities may not be clearly quantified, they can be identified by carefully examining the explanations offered in footnotes, quarterly earnings reports, and other publicly accessible statements made by the management.

The identification of fraudulent activity can be seen as the initial stage while investigating fraud. However, it is insufficient on its own, and there is still a significant amount of work to be done to effectively prevent it. Financial fraud often encompasses five types of schemes: false income schemes, inappropriate timing schemes, understating liability schemes, improper disclosure schemes, and improper asset valuation scams. The location of fraudulent actions can be estimated by analysing each variable

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in the model. Comparing between different firms or within the same firm is a useful method to evaluate the level of manipulation across countries or enterprises. The Overall Manipulation Index (OMI) may offer a potential answer to this issue. Another job is to regulate the tactics employed in the manipulation of financial statements, which can be analysed using statistical frequency techniques. The M-Score (Beneish, 1999) technique is employed as a financial forensic instrument to identify instances of earnings manipulation or fake financial reports within a corporation.

Financial Shenanigans can be grouped into three types -

1.   Earnings Manipulation Shenanigans
2.   Cash Flow Shenanigans
3.   Key Metrics Shenanigans

The earnings manipulation Shenanigan can be done in the following 7 ways-

(a) Recording Revenue Too Soon -

Recording revenue prematurely entails acknowledging revenue prior to its actual accrual. This can be accomplished by:

-    Recognising sales before to the delivery of goods or services: Companies may recognise revenue upon receipt of an order, irrespective of whether the products have been shipped or the service has been rendered.
-    Backdating sales contracts - The act of changing the date of a sale to record it in an earlier time.
-    Aggressive percentage-of-completion accounting: It involves intentionally exaggerating the level of completion on long-term contracts to recognise revenue earlier.

(b) Recording Bogus Revenue -

Recording fictitious revenue involves documenting revenue derived from non-existent or fraudulent transactions. Some methods include:

-    Fictitious sales: Generating fraudulent sales invoices to artificially boost revenue.
-    Round-tripping - The practice of a firm selling and then repurchasing the same goods or services to provide the illusion of generating income.
-    Channel stuffing: The practice of deliberately sending an excessive amount of products to distributors, surpassing their selling capacity, in anticipation of receiving part of the products back at a later time.

(c) Boosting Income Using One- Time or Unsustainable Activities -

This entails artificially increasing profits by engaging in activities that are outside the purview of the company's normal operations and cannot be maintained in the long term. Some examples include:

-    Sale of Assets: Generating revenue through the sale of corporate assets

and categorising the resulting funds as ordinary income.

- One-time gains: It refers to the recognition of profits resulting from legal actions, settlements, or events that do not occur regularly, and are included in the overall revenue.
- Accounting changes refer to modifications made to accounting policies or estimations that result in a temporary increase in income.

(d) Shifting Current Expenses to a Later Period -

Postponing the acknowledgment of expenses can artificially inflate profits in the present period. Methods encompass:

- Capitalising expenses involves categorising expenses as capital expenditures, which are treated as assets instead of operational expenses. This allows for the cost to be allocated over numerous periods.
- Lengthening payment terms: Deferring payment to suppliers and consequently deferring the recognition of expenses.
- Underestimating liabilities: Reducing the recorded amount for potential obligations or provisions for unpaid debts.

(e) Employing Other Techniques to Hide Expenses or Losses -

Companies may employ diverse strategies to obscure costs or deficits to portray a more advantageous financial standing. Some examples are:

- Off-balance-sheet financing - The practice of utilising special purpose entities (SPEs) to exclude debt and expenses from a company's balance sheet.
- Misclassifying expenses: Incorrectly categorising typical operational expenses as non-operating or unusual items to minimise their impact on net profits.
- Underreporting reserves - The Act of intentionally maintaining insufficient reserves for warranties, refunds, or loan losses.

(f) Shifting Current Income to a Later Period -

Delaying the acknowledgement of revenue might assist in levelling out profits and establishing reserves for subsequent time periods. Some examples are:

- Unearned revenue - The practice of deferring money that has been received but has not yet been earned. It is done by recording the revenue in future periods.
- Establishing surplus reserves or allowances that can be utilised as income in future times.
- Invoicing deferment: The act of postponing the issuance of invoices to a future time period.

(g) Shifting Future Expenses to an Earlier Period -

Expediting the acknowledgment of forthcoming expenditures in the

present timeframe can establish a buffer for future financial gain. Some of the methods used are:

- Prepaying expenses - The practice of acknowledging expenses in the present accounting period, even if they pertain to future periods.
- Employing an accelerated depreciation technique to augment the expense in the current period.
- Identifying losses promptly: Recording or eliminating assets earlier than required to mitigate the impact in the present period.

These deceptive tactics can greatly alter a company's financial records, deceive investors, and eventually damage the company's long-term viability.

There are four possible ways to pull off cash flow shenanigans:

a) Directing incoming funds from the financial sector to the operating sector
b) Redirecting regular operating cash outflows to the investing sector
c) Inflating operating cash flow through acquisitions or disposals.
d) Instability-inducing tactics for increasing operational cash flow

The Key Metrics among the shenanigans that can be classified are two:

a) Displaying misleading metrics that exaggerate performance
b) Distorting balance sheet metrics to avoid displaying deterioration in performance

Literature Review :

Financial shenanigans are defined by M. Howard (2018) as managerial actions that deceive investors about the company's performance. This dishonesty is done on purpose to skew the important information or mislead the accountants, who may then use those skewed data to influence the readers' judgment and evaluation.

False journal entries are a typical tool used by accounting professionals to manipulate financial statements. One way to accomplish this would be to invent and record stock purchases that don't exist at all. In the same way, it is possible to conceal asset theft by submitting bogus expenditure claims (Amouzegar&Moshirvaziri, 2018; Pomykacz et al., 2017). Investigators confront a formidable challenge when fraudsters manage to mix fake and genuine entries in journals (Nigrini, 2019; Simkin, 2010). Due to the fact that accounting scams are typically hard to discover, this presents a significant challenge for fraud investigators (Kuruppu, 2019; PricewaterhouseCoopers, 2020).

The expectation that auditors will report fairly and truthfully in order to safeguard public and employee interests is commendable, but auditors do not have an absolute duty to detect fraud (Enofe, Okpako, &Atube, 2013). Instead of sticking to old methods, businesses could consider forensic

accounting as a potential solution to their financial issues (Enofe, Okpako, and Atube, 2013).

The responsibility for running the business in a way that benefits the organization is with the managers. On the contrary, managers have a greater understanding of the inner workings of the business and, as a result of competing interests, may find themselves at odds with the owners. Unethical or self-serving managers may commit fraud or break the law to enrich themselves at the cost of the company (Ali, 2020; Esmaili Kia et al., 2019).

When the business's financial stability and profitability are at risk due to economic, industry, or operational factors, managers may feel pressured to engage in financial report fraud (AICPA, 2007). One way that businesses attempt to improve their good fortune is by interfering with data related to their assets. It follows that a higher ratio of total asset change indicates a higher likelihood of financial report fraud for that organization.

Objectives :

The threefold objectives of this research study are as follows -
- Techniques for detecting financial statement fraud.
- The role of internal controls in preventing financial fraud.
- The impact of forensic accounting in uncovering financial shenanigans.

Discussions :

Techniques For Detecting Financial Statement Fraud :

1. Ratio Analysis :

Ratio analysis compares financial statement quantities. It can help identify fraud red flags.Financial ratios that alter significantly from year to year or over time indicate a concern. Business operations often explain specific changes, as in all assessments. To identify if fraud has occurred, source accounts should be thoroughly investigated when a ratio or numerous ratios change. A big decline in a firm's current ratio may indicate an increase in current obligations or a loss in assets, which could mask fraud. Ratio analysis cannot uncover small-scale fraud.

These ratios may show non-accounting scams. An employee embezzling from the company's accounts will reduce cash and the current ratio. Liability concealment improves ratios. Because non-management personnel cannot access accounting cover-ups of non-accounting frauds, ratio analysis is more effective at detecting them. Ratio anomalies may indicate fraud. The common financial ratios are: a) Cash ratio b) Quick ratio c) current ratio d) ratio of working capital to total assets e) Debt-Equity Ratio f) Debt to Fixed Asset Ratio G) Inventory Turnover h) Average Days Inventory Is In Stock i) Debtor Turnover Ratio j) Debtor Collection Period h) Asset Turnover i) Profit Margin

2. Benford's Law :

It is generally agreed that Benford's Law is an intriguing phenomenon that can be studied concerning naturally occurring digits. Benford made the discovery that numbers that arise spontaneously tend to follow a particular logarithmic probability distribution function described by him. The application of Benford's Law, particularly in the realm of accounting and finance, has been utilised as a method for identifying trends in earnings that have been reported. The detection of suspicious digits in forensic accounting, the identification of suspected financial anomalies, and the identification of fraudulent activity in accounting data are all examples of its applications.

3. Data Mining and Analytics :

According to Turban et al. (2005), data mining is a semi-automatic process that requires the utilisation of statistical methods, mathematics, artificial intelligence, and machine learning to extract and identify prospective knowledge and relevant information that is contained in a huge database. The method of data mining known as Logit Regression was utilised in this investigation. Starting with the testing of the Principle Component Analysis (PCA) to the variable of the Beneish M-Score model is the first step in data mining. In order to discover which variables of the M-Score Beneish model are predictive of financial fraud, principal component analysis (PCA) is utilised.

4. Forensic Accounting :

Specifically, forensic accounting is a subfield of accounting that focuses on dealing with legal claims and complaints, as stated by Zaden and Ramazani (2012). According to the theory put forth by Adegbie and Fakiel (2012), forensic accounting is the process of employing accounting, auditing, and investigative expertise in order toprovide assistance in legal investigations. It is the process of applying a specialised body of knowledge to the analysis of economic transactions and the preparation of a report that is suitable for the purpose of proving accountability or valuation for administrative proceedings. Eiya and Ofalor (2013) defined Forensic accounting is the practice of integrating one's expert-level accounting and auditing knowledge with one's natural investigative skills honed through a lifetime of work.

5. Red Flag and Warning Signs :

Red flags are warning signals that can be found in the financial accounts of almost every fraudulent enterprise. These warning signals are almost always present. abnormalities in profitability, cash flow, assets, liabilities, equity accounts, and abnormalities in linkages between financial

statement items are the red flags that are typically discovered in financial statements, as stated by the American Council of Financial Examiners (2017). Warshavsky (2012) makes the argument that accruals are frequently employed as the fundamental component in any earnings manipulation. As one of the essential tools that should assist the forensic accountant in detecting fraudulent financial statements or earnings manipulation, the purpose of accruals and the magnitude of accruals should act as one of the instruments.

6. Beneish M-Score -

In his article titled "The Detection of Earnings Manipulation," MessodBeneish provided a description of a formula that he referred to as the M-Score. It is possible to determine whether or not the corporation has engaged in earnings manipulation with the assistance of the M-Score. This equation contains eight separate variables, all of which capture the change in a ratio from one year to the next. For the Formula to work, it was necessary to examine the financial records of companies known to have manipulated their earnings.

The 8 variables in the M-Score are as follows:

a.   DSRI - Days' Sales in Receivable Index - This ratio measures the current year days' sales in receivables to that of the previous year. It is an indicator of revenue inflation.

DSRI = (CY Receivables / CY Sales) / (PY Receivables / PY Sales)

b.   GMI - Gross Margin Index (GMI)-It compares the gross margin from one year to the next. When the index falls below 1, it indicates that margins have decreased. A decline in gross margin indicates that the companies' future prospects are not promising. A company's propensity to manipulate earnings increases when its prospects decrease.

GMI = [(PY Sales - PY COGS) / PY Sales] / [(CY Sales - CY COGS) / CY Sales]

c.   AQI - Asset Quality Index - The ratio of non-current assets other than fixed assets to total assets.

AQI = [(CY Total Assets - CY Current Assets - CY PP&E) / CY Total Asset] / [(PY Total Assets - PY Current Assets - PY PP&E) /PY Total Asset]

d.   SGI - Sales Growth Index - The ratio of the current year sales to that of the previous year. Professionals believe that growth organisations are more prone to financial statement fraud due to the pressure on management to achieve earnings targets caused by their financial position and capital demands. However, it is important to note that growth does not necessarily mean manipulation.

SGI = CY Sales / PY Sales

e. DEPI - Depreciation Index - It is the ratio of the depreciation expense from the previous year to the current year. The company may be modifying the useful life of assets upwards or implementing a new method that is income-friendly if the rate of depreciation is slower (DEPI > 1).

DEPI = [PY Depreciation / (PY Depreciation + PY PP&E)] / [CY Depreciation / (CY Depreciation + CY PP&E)]

f. SGAI - Sales, General and Administrative Expenses Index - The ratio of current year's sales, general, and administrative expenses to that of the previous year.

SGAI = (CY SG&A Expenses / CY Sales) / (PY SG&A Expenses / PY Sales)

g. LVGI - Leverage Index - This the ratio of total debt to total assets for the current year to the same ratio of the prior year. This ratio is intended to capture debt covenants incentives for earnings manipulation.

LVGI = [(CY Long term debts + CY Current liabilities) / CY Total Assets] / [(PY Long term debts + PY Current liabilities) / PY Total Assets]

h. TATA - Total Accruals to Total Asset - The change in working capital account other than cash, minus depreciation, is the basis for calculating total accruals. This ratio is employed to evaluate the extent to which managers make discretionary accounting decisions to influence earnings.

TATA = (Income from continuing operations - Cash flow from operations) / CY Total Assets

The eight factor M-Score is calculated as follows:

M = -4.84 + 0.920DSRI + 0.528GMI + 0.404AQI + 0.892SGI + 0.115DEPI - 0.172SGAI + 4.679TATA - 0.327LVGI

An M-Score of more than -2.22 (i.e., a less negative score, such as -1.50) indicates a strong likelihood of financial statement fraud.

There is also a five-factor version of the M-Score. This version, developed after further research, excludes SGAI, TATA, and LVGI based on the conclusion that these three indexes are less significant than the other five. The five-factor M-Score is calculated as follows:

M = -6.065 + 0.823DSRI + 0.906GMI + 0.593AQI + 0.717SGI + 0.107DEPI

Within the scope of her research work titled "Financial Statement Fraud Detection Using Ratio and Digital Analysis," Maria L. Roxas conducted an examination of the Beneish Model, examining both the five-factor and eight-factor variants. The researchers came to the conclusion

that the five-factor version of the M-Score, which has a standard of greater than -2.76, is a more reliable indicator of financial statement fraud than the eight-factor version, which has a benchmark of greater than -2.22.

Role Of Internal Controls In Preventing Financial Fraud

1. Internal Control Systems:

These are the steps you take to make sure your business does not commit theft and stays on the right side of the law. For example, it helps you keep assets safe, boost productivity, find fraud, and give accurate financial reports that taxpayers count on. There are three main types of internal controls:

(a) Detective: Its job is to find mistakes or scams that have already happened. The most basic detective controls are to physically count assets on hand, like cash or inventory, and do monthly budget-to-actual reviews. You should also look over your financial records as often as possible.

(b) Corrective: This is meant to fix mistakes or scams, like giving employees training, setting up SPAM filters for email, making sure data is backed up regularly, and evaluating employees at least once a year.

(c) Preventative: This is meant to stop mistakes and fraud from happening in the future. Simple examples include giving employees clear, concise, and written rules, making sure no one person has too much control over too many tasks, checking employees' backgrounds before choosing them, and so on.

2. Audit Committees and their functions -

Accountants have a crucial role to play in identifying instances of financial fraud. They accomplish this by searching the financial records and accounts for warning indications that anything is amiss. Some of these warning signs include unusual transactions, inconsistent data, or discrepancies between the supporting documentation and the financial statements. In order to detect instances of financial fraud, auditors utilise a number of auditing techniques and search for warning signs. Substantive testing verify the accuracy of individual transactions or accounts, whereas analytical methods compare current financial data to historical data or industry standards in search of anomalies.

3. Regular Audits and Reviews -

To maintain openness and accountability in expenditure, audits and reviews should be conducted frequently. Reviewing financial data and techniques on a frequent basis can help organisations identify problems, mistakes, or ways to improve. The following are some of the many benefits that can be gained from conducting audits and reviews on a regular basis: they help keep an organization's finances honest, they reveal possible risks

and weak spots in the way money is handled, they impart useful information about the efficiency and effectiveness of daily tasks, they promote transparency and accountability within the company, they help save money by identifying inefficient or wasted resources, they verify the accuracy and reliability.

4. Whistleblower Programs -

Unfortunately, there is a lot of financial and investment fraud that hurts investors and the financial markets. This fraud is often hidden so that no one can find out about it until someone blows the whistle. People who blow the whistle on financial fraud, bad players, and violations of the laws and rules that protect investors and our financial system are very important. The SEC Whistleblower Programme and the CFTC Whistleblower Programme both give people who report fraud the chance to get paid for it. Some states also give rewards to people who report violations of securities laws to the officials. At the moment, these kinds of state securities whistleblower rules are in place in Indiana, Montana, Utah, and Washington. Tax fraud is another kind of financial wrongdoing that the IRS Whistleblower Programme might receive reports about.

Impact Of Forensic Accounting In Uncovering Financial Shenanigans

1. Forensic Audit Procedures -

Unlike more general financial audits, which only deal with the accuracy of statements, forensic accounting methods investigate specific transactions in order to confirm or refute allegations of theft. Therefore, compared to audits, forensic accounting is far more specific and detailed. The following are the three things that typically happen when someone uses forensic accounting services:

First, the forensic accountant will look into the allegations of fraud or theft by reviewing the company's financial documents and speaking with employees. By carefully analysing transactions and paper trails, even the most intricate forms of fraud can be uncovered with sufficient diligence and investigation.

The second step is reporting, and forensic accountants do just that by compiling a report that details the specific instances of fraud and provides an explanation for each. The relevant manager or owner of the company receives this report and a consultation outlining the problem.

Third, Gather Evidence and Testify-Finalizing the forensic accounting process include gathering evidence and testimony to aid in cash recovery, which may involve confronting the employee, negotiating a repayment plan, or filing criminal charges. Forensic accountants will serve as expert witnesses to testify on one's behalf in the event of a criminal indictment.

2. Technology in Forensic Accounting -

Technology has significantly transformed the area in recent years. Data analytics, artificial intelligence, and machine learning allow forensic accountants to investigate financial crimes, evaluate financial reports, find hidden assets, and detect fraud. Falsified cost claims and financial reporting negligence can be investigated in forensics. Technology helps forensic accountants in these ways:

(A) Better Data Analysis-

Forensic accounting technology improves data analysis greatly. Fraudsters may have tried to 'bury' evidence in huge spreadsheets or files. Now, forensic accountants can quickly evaluate vast volumes of financial data using advanced data analytics techniques. This can assist them find hidden assets, fraud, and financial irregularities. Forensic accountants can use data analytics to find financial data patterns that reveal fraud. Dashboards containing graphs and charts help identify irregularities.

(B) Improved Fraud Detection-

Technology has also improved forensic accounting fraud detection. Artificial intelligence and machine learning allow forensic accountants to evaluate financial data in real time, discovering fraud and wrongdoing. Setting up alerts for unexpected transactions can avert financial losses.

Fraud detection uses 'gapanalysis'. Technology can notify you when something important does not happen, like an invoice not reconciled on time.

(C) Improved Collaboration and Cloud-based Documentation -

Technology simplifies collaboration between forensic accountants, legal professionals, law enforcement agencies, individuals, and business owners. Forensic accountants can collaborate on financial crimes using cloud-based tools and platforms. This can increase investigative efficiency and effectiveness, benefiting all parties. Digital and cloud-based record-keeping saves hours of searching through paper records. Forensic accountants can find transactions by keyword, date, and amount more easily. How the firm runs may also allow them to identify transaction perpetrators.

(D) AI and Machine Learning-

Forensic accounting is increasingly using AI and machine learning. Machine learning algorithms can detect financial data patterns that may indicate fraud. These algorithms can analyse vast volumes of financial data in real time to detect fraud and other abnormalities. It can alert financial report reviewers of suspect activities.

Artificial intelligence detecting anomalies doesn't necessarily indicate fraud. To correct human error and minimise massive losses from data entry errors, it can be implemented.

Conclusion :

The detection of financial fraud is very important for any country and for this the field of forensic accounting has been established. The investors are manipulated by the management of the companies who reflect the untrue picture of the company. The Financial Shenanigans be it Earnings Manipulation Shenanigans, Cash Flow Shenanigans or Key Metrics Shenanigans mislead the investors to invest more. For this, the technology used in forensic accounting plays a major role in uncovering the frauds of the companies. In the field of Forensic accounting, the accountants possess a diverse array of resources to probe financial offences, scrutinise financial statements, trace concealed assets, and expose possible fraudulent activities.

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Determinants of Customer Loyalty in Retail Banking : An Empirical Analysis

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Abstract

In the current retail banking environment, where customer acquisition costs are high and competition is intense, customer loyalty has emerged as a strategic imperative. With an emphasis on the shifting preferences of Indian banking customers, this study explores the fundamental elements that influence loyalty to customers in retail banking. The study defines and experimentally tests the impact of important constructs-namely, service quality, trust, customer happiness, digital banking experience, and perceived value-on loyalty outcomes, drawing on both theoretical frameworks and modern customer behaviour models.

200 consumers of different public and private sector banks in metropolitan India provided primary data via a structured questionnaire. To ascertain the strength and statistical significance of each variable, the replies were subjected to reliability analysis and multiple regression analysis. The findings show that although every aspect that has been studied plays a role in loyalty, trust and the experience with digital banking have the most effects. Interestingly, the quality of digital interactions-which are frequently undervalued in conventional models-has become a crucial element in creating long-lasting client relationships.

Since loyalty in a digital financial environment is complex, the study provides insightful information for scholars and banking professionals alike. It demands a deliberate shift in financial services that combines strong, user-focused digital platforms with individualized relationship management. The results not only close a vacuum in the body of knowledge about loyalty in the context of Indian retail banking, but they also provide banks with a road map for improving long-term customer engagement and retention.

Key words: Customer Loyalty, Retail Banking, Service Quality, Trust, Digital Banking, Customer Satisfaction

1. Introduction :

Customer loyalty has become a critical strategic asset in the ever-changing and highly competitive retail banking industry. It is now less expensive to keep current customers than to find new ones because financial institutions are providing more and more comparable goods and services.

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Building and sustaining client loyalty is now crucial for long-term profitability, brand reputation, and sustained competitive advantage; it is no longer an option.12.According to the article Customer loyalty in e-commerce: An exploration of its antecedents and consequences by S.S. Srinivasan & et.al (2002) identified a number of elements-often referred to as the 8Cs-that support customer loyalty in e-commerce, including customisation, contact interaction, caring, community, convenience, cultivation, choice, and character.

Digitalization, regulatory changes, heightened consumer knowledge, and growing competition from fin-tech and non-banking financial institutions have all contributed to a substantial restructuring of the retail banking industry, especially in developing nations like India. Customers now have far higher expectations for individualized, easy, and safe banking services as they become more knowledgeable and selective. This paradigm change calls for a more thorough comprehension of the factors that actually affect client loyalty in this industry.

Although the factors that influence customer loyalty have been thoroughly studied in the past, many of these studies have concentrated on discrete concepts like satisfaction or service quality. But loyalty is a complex phenomenon that is influenced by both material and immaterial elements. Customer retention habits are significantly influenced by a number of factors, including perceived value, emotional involvement, perceived service quality, trust in the organization, and the usability of digital platforms. Furthermore, the coexistence of public and private banking institutions in India and the increasing use of digital banking technologies complicate the loyalty equation even further.

There is still an absence of empirical research that comprehensively looks at these factors within a single, integrated framework, despite the growing volume of literature-particularly in the Indian retail banking sector. By experimentally examining the relative effects of important factors-service quality, trust, customer happiness, digital banking experience, and perceived value-on customer loyalty, this study aims to close that gap.

Using information obtained directly from retail banking customers in both public and private sector banks in India, the main goal of this study is to determine which of these factors most strongly affects customer loyalty. In addition to contributing to the pool of knowledge, the study's conclusions will help bank managers and legislators improve their client retention tactics in a financial sector that is rapidly changing due to digitalization.

2. Review of Literature :

A loyal customer base not only guarantees returning customers but also helps with word-of-mouth promotion, lower marketing costs, and higher

profitability. Over the past 20 years, researchers have worked to understand the complex web of factors that affect customer loyalty in banking. This review summarizes the major theoretical and empirical contributions related to the determinants of customer loyalty, highlighting important themes and identifying research gaps. Customer loyalty has long been recognized as a key driver of organizational success, particularly in service-intensive industries like retail banking.

2.1 Customer Loyalty in Retail Banking :

A more comprehensive definition of consumer loyalty now encompasses advocacy, preference, and emotional attachment in addition to simply repetitive purchase behaviour. A strong desire to regularly repurchase a favoured good or service in the future is what Oliver (1999) defined as loyalty. When it comes to banking, loyalty is a customer's desire to stick with their bank, avoid moving even in the face of alluring alternatives, and refer others to the bank.

2.2 Service Quality :

One of the factors that has been examined the most in relation to client loyalty is service quality. The SERVQUAL approach, first presented by Parasuraman, Zeithaml, and Berry in 1988, evaluates service quality in five areas: tangibles, assurance, responsiveness, empathy, and dependability. In retail banking, a number of research have demonstrated a favorable relationship between customer loyalty and perceived service quality (Kumar et al., 2010; Rahman et al., 2014). The importance of service quality has grown in the digital era to encompass online and mobile banking experiences in addition to branch services.

2.3 Customer Satisfaction :

The consumer's assessment of whether the service fulfills or surpasses their expectations affects customer satisfaction, which is frequently regarded as an introduction to loyalty. Even in highly competitive environments, satisfied consumers are more likely to stick around, claim Anderson and Srinivasan (2003). Financial product offerings, transaction simplicity, complaint handling, and employee conduct can all contribute to customer satisfaction in retail banking. The idea that happy customers are more likely to be loyal is supported by research by Leninkumar (2017) and Mohsan et al. (2011).

2.4 Trust and Relationship Commitment :

The foundation of any long-term customer relationship is trust, especially in banking, where the stakes are high and involve sensitive financial information. According to Morgan and Hunt's (1994) Commitment-Trust Theory, trust is a necessary condition for relationship marketing success. In banking, trust is developed through transparency, moral behavior, reliable

customer service, and strong customer support. Research by Ball et al. (2004) and Ndubisi (2007) has confirmed that trust has a significant impact on loyalty, especially in emerging markets.

2.5 Digital Banking Experience :

Digital banking's quick development has given customer loyalty and experience new dimensions. While digital platforms provide accessibility, speed, and convenience, they also present security and personalization issues. User-friendly interfaces, system dependability, and perceived security are critical elements of digital pleasure and, consequently, loyalty, according to research by Zhou (2012) and Jan and Abdullah (2014). Digital experience is becoming a more significant loyalty determinant in the Indian context, where the use of internet and mobile banking is growing.

2.6 Perceived Value :

A customer's total evaluation of a service's usefulness based on what is offered vs what is received is known as perceived value. It is the trade-off between advantages and disadvantages, according to Zeithaml (1988). In banking, this encompasses both non-financial value like convenience, emotional fulfillment, and individualized service in addition to financial value like interest rates and costs. Higher perceived value raises the possibility of ongoing customer interaction, according to studies (Yang and Peterson, 2004; Ul Haq and Amin, 2009).

Sirdeshmukh, Singh, and Sabol's 2002 study in the Journal of Marketing, "Consumer Trust, Value, and Loyalty in Relational Exchanges," examines the connections among these three crucial ideas in customer interactions. The research explores the relationship between brand loyalty, perceived value of the product or service, and consumer trust in a business in the context of continuing customer interactions. According to the research, customer retention in these relational trades is greatly influenced by perceived value and trust.

2.7 Gaps in the Literature :

This study aims to fill the gap by offering an empirical analysis of how these interrelated factors collectively impact customer loyalty. While the individual influence of service quality, satisfaction, trust, digital experience, and perceived value has been well-documented, there is not much study that unifies all of these constructs into a single framework, especially in the context of Indian retail banking. Additionally, the evolving role of digital platforms as a driver of loyalty is still less explored in many traditional models.

3. Research Methodology :

In order to ensure the validity and dependability of research findings, a well-organized technique is essential. This study uses an empirical, quantitative methodology to look into the main factors affecting customer

loyalty in the retail banking industry in India.The approach has been thoughtfully planned to collect pertinent data, use the right statistical software, and produce insightful findings.

3.1 Research Design :

In order to determine and assess the relationship between the independent factors (service quality, trust, satisfaction, digital banking experience, and perceived value) and the dependent variable (customer loyalty), the study used a descriptive and causal research methodology. To get primary data directly from banking consumers, a survey-based method was used.

3.2 Population and Sample :

In order to ensure diversity and generalizability, the study used a non-probability purposive sampling technique, choosing respondents based on their familiarity with digital banking and engagement with retail banking services. The target population for this study includes retail banking customers who hold savings or current accounts with public or private sector banks in urban India. Based on the general guidelines for multivariate research, a sample size of 200 respondents was deemed adequate for statistical analysis.

3.3 Data Collection :

Primary data were acquired by a structured questionnaire, administered both online (Google Forms) and in person at selected bank branches. There were two sections to the questionnaire:

● **Section A:** Profile of the demographics (age, genders, bank type, years of marriage, frequency of use, etc.)

● **Section B:** A 5-point Likert scale (1 being strongly disagree and 5 being strongly agree) is used to measure the study constructs.

With minor adjustments for contextual relevance to the Indian banking industry, all of the items were taken from validated scales used in earlier research.

3.4 Research Variables and Measurement

The variables and their measurement scales are as follows:

Construct	Description	No. of Items
Service Quality	Reliability, responsiveness, empathy, assurance, tangibles	5
Trust	Confidence in the bank's integrity and reliability	4
Customer Satisfaction	Overall satisfaction with banking services	4
Digital Banking Experience	Ease of use, accessibility, security, responsiveness	5
Perceived Value	Perceived benefits relative to costs	3
Customer Loyalty	Repeat usage, retention intention, and willingness to recommend	4

3.5 Data Analysis Techniques :

The IBM SPSS (Statistical Package for the Social Sciences) was used to code and analyze the data collected. The methods listed below were employed:

- Descriptive Statistics: To summarize demographic data.
- Reliability Analysis: Cronbach's Alpha to test internal consistency of scales.
- Correlation Analysis: To test the strength and direction of relationships.
- Multiple Regression Analysis: To determine the impact of each independent variable on customer loyalty.

4. Research Objectives and Hypotheses :

4.1 Research Objectives:

Understanding what keeps customers loyal to their banks is the primary goal of this study. Customers expect user-friendly technology and excellent service in today's digital age. The purpose of this study, which focuses on Indian retail bank clients, is to:

- Determine the key elements that most affect customer loyalty.
- Examine the relationships between loyalty and service quality, satisfaction, trust, digital experience, and value.
- Examine how loyalty is impacted by digital banking, such as internet and mobile banking.
- Make helpful recommendations to banks on how to retain their customers.

4.2 Research Hypotheses :

The following theories are developed in order to statistically examine the connection between the identified elements and customer loyalty:

- **H1: Service Quality and Customer Loyalty**

Null Hypothesis (H_{01}): There is no significant relationship between service quality and customer loyalty in retail banking.

- **H2: Customer Satisfaction and Customer Loyalty**

Null Hypothesis (H_{02}): Customer satisfaction does not significantly influence customer loyalty in retail banking.

- **H3: Trust and Customer Loyalty**

Null Hypothesis (H_{03}): Trust in the bank does not have a significant effect on customer loyalty.

- **H4: Digital Banking Experience and Customer Loyalty**

Null Hypothesis (H_{04}): Digital banking experience does not significantly

impact customer loyalty.

    ● **H5: Perceived Value and Customer Loyalty**

Null Hypothesis (H_{05}): Perceived value does not significantly influence customer loyalty in retail banking.

5. Data Analysis and Interpretation :

The statistical analysis of the primary data gathered from respondents is presented in this section, along with an interpretation of the findings in relation to the goals and theories of the study. Both descriptive and inferential statistics were used in the analysis, which was carried out using SPSS software, to determine how important factors affected retail banking customers' loyalty.

5.1 Demographic Profile of Respondents

Customers of different public and private sector banks in metropolitan India provided a total of 200 valid responses. The following is a summary of the demographic characteristics:

Usage Frequency

- Rare
- Occasionally
- Frequently
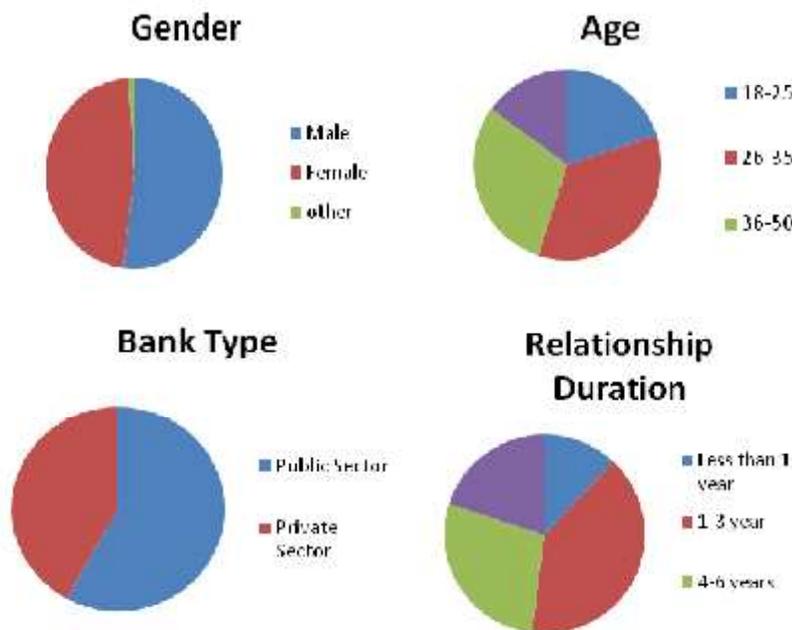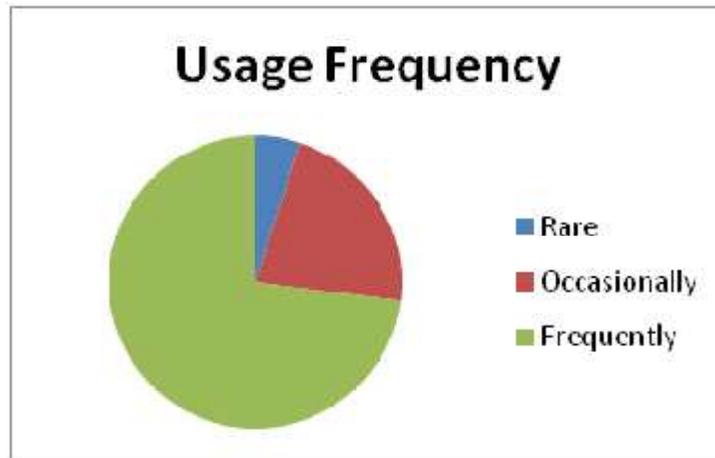
Most respondents were in the 26-50 age range and had a long-standing relationship (more than 3 years) with their bank, indicating a well-informed customer base.

5.2 Reliability Analysis

Cronbach's Alpha was used to test the internal consistency of the scales used for each variable.

Construct	No. of Items	Cronbach's Alpha
Service Quality	5	0.84
Trust	4	0.86
Customer Satisfaction	4	0.81
Digital Banking Experience	5	0.88
Perceived Value	3	0.79
Customer Loyalty	4	0.83

All values exceeded the recommended threshold of 0.70, confirming that the scales used were reliable.

5.3 Correlation Analysis

Pearson correlation was conducted to examine the strength and direction of the relationship between the independent variables and customer loyalty.

Variable	Correlation with Customer Loyalty (r)	Significance (p-value)
Service Quality	0.68	0.000
Customer Satisfaction	0.74	0.000
Trust	0.77	0.000
Digital Banking Experience	0.70	0.000
Perceived Value	0.64	0.000

All variables show a strong and statistically significant positive correlation with customer loyalty, indicating that improvements in any of these areas can enhance loyalty.

5.4 Multiple Regression Analysis :

To identify the most influential factors, a multiple regression analysis was performed using customer loyalty as the dependent variable.

Regression Model Summary :

Model	R^2	Adjusted R^2	F-statistic	Significance
1	0.692	0.683	78.42	0.000

The model explains 69.2% of the variation in customer loyalty, which is statistically significant at the 1% level.

Regression Coefficients :

Variable	Unstandardized Coefficient (B)	t-value	Significance (p-value)
Service Quality	0.212	4.01	0.000
Customer Satisfaction	0.198	3.78	0.000
Trust	0.271	5.22	0.000
Digital Banking Experience	0.225	4.49	0.000
Perceived Value	0.160	3.12	0.002

5.5 Interpretation of Results :

● The most reliable indicator of customer retention was trust, which highlights how crucial moral conduct, transparency, and dependability are in commercial relationships.

● In a tech-driven environment, the digital banking experience also demonstrated a large positive influence, emphasizing how digital accessibility, security, and ease of use greatly increase loyalty.

● Even in an increasingly digital world, interpersonal service delivery is still crucial, as seen by the continued importance of service quality and customer satisfaction.

● Loyalty is still greatly impacted by perceived value, despite its somewhat diminished impact, which emphasizes the necessity for banks to provide more than just practical advantages.

All five alternative hypotheses (H_{01} to H_{05}) are supported by these results, since the null hypotheses are statistically rejected at the 5% level of significance or higher.6. Findings and Discussion

6.1 Summary of Key Findings :

Important insights into the connection between customer loyalty and its factors are provided by the regression and correlation study results:

1. The most important element influencing consumer loyalty is trust. Trust had the highest established effect of any variable, indicating that when

consumers think their bank is trustworthy, moral, and safe, they will remain loyal.

2. The digital banking experience has become a significant driver of customer loyalty. Users respect digital platforms that are easy to use, accessible, and secure. In India's quickly modernizing economy, where internet and mobile banking are increasingly mainstream channels, this is especially significant.

3. Customer satisfaction and service quality are closely related to loyalty. Banks that provide consistent, polite, and responsive service have a higher chance of keeping clients. Furthermore, happy clients are more likely to stick with the bank if they believe their expectations have been fulfilled or achieved.

4. Loyalty is greatly influenced by perceived value, although to a slightly lesser extent. When customers believe the services they receive are worth the time, money, and effort they spend, they are more likely to remain loyal.

6.2 Theoretical and Practical Implications :

Theoretical Implications

By offering an integrated model that blends traditional service components with contemporary digital and psychological motivations, this study adds to the expanding literature of loyalty research. It confirms that loyalty is a multifaceted concept impacted by both emotional (trust, satisfaction) and rational (value, quality) factors.

Practical Implications

The results provide a number of strategic insights for banking practitioners:

● Establish and preserve trust by transparency, data security, and moral customer service.

● Make an investment in user-friendly, quick, and secure digital banking services that guarantee little hassle for users.

● Teach front-line employees how to provide consistent, sympathetic service, as this increases customer satisfaction.

● Clearly convey value by mentioning convenience, customization, and time savings in addition to pricing and interest rates.

7. Conclusion and Recommendations :

7.1 Conclusion :

In a highly competitive and digitally transforming retail banking environment, building customer loyalty is no longer just a marketing goal-it is a strategic necessity. This study set out to explore the key determinants that shape customer loyalty in the Indian retail banking sector by empirically examining the influence of five core factors: service quality, customer

satisfaction, trust, digital banking experience, and perceived value.

The findings reveal that all five variables significantly and positively influence customer loyalty, with trust and digital banking experience emerging as the most impactful. This indicates a clear shift in customer expectations-from merely receiving courteous service at a branch to demanding secure, seamless, and trustworthy digital interactions. Service quality and satisfaction continue to play crucial roles, while perceived value reminds us that customers are constantly weighing the overall benefits they receive from their banking relationship.

This study contributes to the theoretical understanding of customer loyalty by validating an integrated model that considers both traditional service factors and emerging digital experiences. It also fills an important gap by focusing on the Indian banking context, where diverse customer profiles and rapid technological adoption coexist.

7.2 Recommendations :

The study's conclusions lead to the following suggestions for banking experts and decision-makers looking to increase customer loyalty:

1. Increase Trust with Transparency and Ethical Behavior :

● Clearly explain the pricing, conditions, and policies.
● Use strong cybersecurity frameworks to protect consumer data.
● To strengthen dependability, respond to complaints in a timely and equitable manner.

2. Improve the Experience of Digital Banking :

● Make digital services available around-the-clock and streamline user interfaces.
● Update web and mobile platforms frequently to increase performance and security.
● For clients who are less experienced with digital tools, offer on boarding assistance or tutorials.

3. Enhance and Customize the Quality of Services :

● Make an investment in educating employees to provide timely, polite, and informed support.
● Customize offers, communications, and financial advise by using customer information.

4. Pay Attention to Customer Satisfaction Measures :

● To find shortages in service and problem issues, regularly survey customers.
● Put in place policies cantered around customers that improve the experience and take feedback into consideration.

5. Clearly Communicate Value :
- Inform clients on advantages including accessibility, ease, and digital innovation that go beyond price.
- Launch loyalty programs that encourage long-term relationships and cross-product use.

Banks may create long-lasting connections that extend transactional loyalty by taking a more comprehensive approach to understanding consumer demands, one that takes into account factors like emotional trust, digital satisfaction, and perceived value. In a financial services market that is becoming more and more competitive, this strategy will not only increase customer retention but also foster brand leaders.

8. Limitations and Scope for Future Research :

8.1 Limitations :

Although this study offers valuable insights into the factors that influence customer loyalty in retail banking, it should be noted that it has several limitations.

1. Geographic Focus : The data was gathered from specific areas of India, which can restrict the findings' applicability to other areas or nations with distinct banking systems or consumer habits.

2. Cross-Sectional Design : A cross-sectional survey that records consumer opinions at one particular moment serves as the basis for this study. It does not, therefore, represent shifts in loyalty over time or in response to shifting economic circumstances.

3. Self-Reported Data : All answers were derived from the self-evaluation of the customers, which could introduce social desirability or personal bias into the results, potentially compromising their objectivity.

4. Limited Variables : While the study looked at five important criteria-service quality, satisfaction, trust, digital experience, and perceived value-it did not investigate other elements that could have an impact, such as brand image, complaint resolution, emotional connection, and switching costs.

8.2 Scope for Future Research :

Future research could take into account the following avenues to expand on the results of this study:

1. Longitudinal Studies : To examine how customer loyalty develops over time, particularly in reaction to shifts in technology, service regulations, or market disruptions, future research can use a longitudinal methodology.

2. Comparative Research across Bank Types : A comparison of public, private, and foreign banks may provide more in-depth understanding of the ways in which loyalty factors differ according to ownership or service model.

3. Changes in Loyalty After the Pandemic : With the move to contactless

services and the digital revolution following COVID-19, studies could concentrate on how customer retention is now impacted by digital dependability, safety, and health.

By acknowledging these shortcomings and promoting more extensive research, this study paves the way for further study of customer retention, a topic that is becoming more and more significant as the banking industry changes in response to digital innovation and shifting consumer demands.

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An Analysis of India's Expanding Automobile Sector and Its Effect on CO2 Emission.

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Abstract

Between 1947 and 1991, India's GDP grew at an average rate of 2.5 to 3%. The Indian government's protectionist policies were the cause of this slow rate. After the liberalization policy was implemented in 1991, a number of industries, particularly the automotive sector, began to prosper, and India's average growth rate increased to a high level between 5 and 8%. With a turnover of 38.3 billion USD, or about 8% of its GDP, India is currently the sixth-largest producer of motorized vehicles. In terms of employment, this industry has 19 million workers. Although the automobile sector has played a significant role in the expansion of the Indian economy, the growing number of automobiles has also put a great deal of strain on the environment, leading to air pollution. Numerous health issues, including heart and respiratory disorders, are brought on by air pollution. The concentrations of harmful carcinogens like sulfur dioxide (SO2) and nitrogen dioxide (NO2) as well as particulate matter like PM2.5 and PM10 have risen to concerning levels. India's car production and sales steadily grew from 2013 to 2019, dipped sharply during 2020-2022 due to the pandemic, and rebounded strongly by 2024.A Pearson correlation of 0.998 shows a very strong positive link between car sales and CO? emissions.This indicates rising vehicle ownership significantly increases emissions, highlighting key implications for environmental policy.

Keywords : Air pollution, Automobile Industry, GDP, Growth rate.

I. Introduction :

India has experienced transformative growth over the past several decades, evolving from a small-scale manufacturing sector into one of the world's largest automotive markets. With India now positioned as a leading producer of passenger vehicles, commercial vehicles, two-wheelers and three-wheelers, the sector has become a cornerstone of national economic development. Increasing domestic demand, foreign direct investment, favorable industrial policies and integration into global supply chains have collectively propelled this industry to a position of strategic importance. Today, millions of jobs-direct and indirect-depend on automotive production, ranging from manufacturing and skilled labor to transportation logistics, dealerships, component suppliers and service networks.

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This steep economic rise, driven by expanding urban middle-class households, infrastructure development and greater affordability of vehicles, has dramatically changed mobility patterns across the country. Personal transport has shifted from being a luxury to a necessity, particularly in urban regions where public transportation systems have struggled to keep pace with population growth. The surge in vehicle ownership has enabled greater connectivity, improved accessibility and enhanced economic participation; however, these benefits have also brought unintended environmental consequences.

One of the most critical challenges associated with the rapid expansion of the automobile sector is its growing impact on air quality. India currently faces some of the highest levels of air pollution globally, with several of its major cities ranking among the most polluted urban centers. Vehicular emissions have become a significant contributor to deteriorating air standards, accounting for a substantial share of particulate matter (PM2.5 and PM10), nitrogen oxides, carbon monoxide, volatile organic compounds and greenhouse gases. Unlike industrial pollution, which can be geographically traced, vehicular emissions are dispersed, mobile and persistent, making them harder to regulate and manage.

The increasing numbers of internal combustion engine (ICE) vehicles intensify environmental pressures not only through tailpipe emissions but also through fuel extraction, refining, road congestion, noise pollution and urban heat generation. Additionally, high dependency on fossil fuels increases India's carbon footprint while exacerbating climate change vulnerabilities. These concerns have placed the transport sector at the centre of national energy security and public health debates.

Government agencies, policy planners and environmental stakeholders are now grappling with the complex trade-offs between sustaining industrial growth and ensuring ecological well-being. Interventions such as Bharat Stage emission norms, promotion of alternative fuels, electric vehicle policies, metro rail expansion and fuel efficiency standards are part of India's evolving roadmap toward cleaner mobility. Yet, despite these initiatives, challenges persist due to infrastructural limitations, behavioral patterns, technological readiness and affordability barriers.

Therefore, understanding the relationship between automobile industry expansion and air pollution is crucial for shaping future mobility systems. This research paper undertakes a comprehensive examination of how the growth of the Indian automobile sector contributes to rising levels of air pollution. It analyses industry trends, spatial distribution of vehicle ownership, emission characteristics, regulatory frameworks and technological opportunities-including hybrid and electric vehicles. Through this analysis,

the study aims to evaluate current responses and propose sustainable pathways that allow India to pursue industrial advancement without compromising environmental health and quality of life.

India's Automobile Industry :

Automobile industry of India has grown rapidly from just a few manufacturers in the 1970s to becoming the third-largest vehicle producer in the world. Growth rates over the last three decades ranged from 9-18%, with two-wheelers and passenger vehicles expanding. Today, major global companies like Suzuki, Hyundai and Toyota operate in India, and the sector contributes about 8% to GDP and provides 19 million jobs.

However, this expansion has led to severe air pollution. Vehicle emissions are a major source of harmful pollutants such as PM2.5, PM10, NO_2, SO_2 and CO_2, contributing to global warming and climate change. As per the report of WHO, about 500,000 deaths annually in India are linked to air pollution, and 13 of the world's 20 most polluted cities are in India. To combat this, India introduced Bharat Stage emission norms, tightening them over time and adopting BS-VI standards nationwide by 2020 to reduce emissions.

The trajectory of the Indian automobile industry from 2019 to 2024 reflects a time of dramatic transition, combining disruption, recovery and strategic growth. In the pre-pandemic year 2019-20, the industry was performing strongly and positioned among the global leaders in vehicle production, manufacturing more than 21 million vehicles across segments including passenger cars, commercial vehicles, two-wheelers and three wheelers. Increasing disposable incomes, expanding credit options and infrastructural developments supported this momentum. However, the onset of the COVID-19 pandemic in early 2020 brought an unprecedented setback. With nationwide lockdowns, manufacturing units temporarily shut down, disrupted supply chains for components such as semiconductors and steel, and reduced consumer mobility needs, overall sales fell sharply to about 18.6 million units in 2020-21. Commercial and passenger vehicles were particularly affected as businesses delayed fleet purchases and families postponed non-essential spending during economic uncertainty.

The industry's gradual revival began in 2021-22, supported by easing restrictions, vaccination rollout, festive demand and renewed consumer confidence. Production lines ramped up with health-safety measures, and automakers introduced new models and discounts to stimulate buying interest. This recovery strengthened through 2022-23, when domestic sales climbed back to approximately 21.2 million units, fueled by both urban and rural market resurgence. Exports, especially two-wheelers and compact passenger cars, also grew as global mobility needs normalized. The pace of revival

intensified further in 2023-24 with the industry surpassing pre-pandemic levels and achieving around 23.9 million domestic sales. Two-wheelers saw the largest contribution due to affordability and rising demand in semi-urban and rural regions, while three-wheelers experienced a steep recovery driven by logistics, shared mobility and e-commerce transport. Passenger vehicles also posted record numbers owing to greater preference for personal transport.

This five-year period also marked significant structural transformation. Policy interventions such as the Production-Linked Incentive scheme, Bharat Stage VI emission norms and initiatives to localize auto parts manufacturing strengthened industry competitiveness. Simultaneously, India witnessed the early acceleration of electric mobility-evident in rising EV sales, expanding charging stations and new investments from domestic and global manufacturers. Overall, the 2019-2024 phase demonstrates the sector's resilience and ability to evolve through crisis, ultimately positioning the automobile industry as a robust, diversified and future-ready pillar of the Indian economy.

II. Related Work :

Studies on India's automobile industry highlight rapid growth and structural transformation following liberalization. Jatinder Singh (2014) notes that post-1991 reforms led to major restructuring in the sector, raising its contribution to nearly 8% of India's GDP, driven by rising middle-class incomes, easier access to auto loans and heavy foreign direct investment, which accounted for almost half of total inflows from 2000-2011. Jimmy Corton Gaddam (2013) similarly attributes increasing vehicle production and its sales to economic expansion and higher consumer incomes, and stresses strong future potential due to low automobile penetration levels in India. Dr. M.A. Lokhande et al. (2013) emphasize that liberalization turned the auto market highly competitive, forcing firms to innovate to survive. M. Krishnaveni et al. (2015) further support this view, observing steady year-on-year growth in production and exports, fueled by rising demand and 100% FDI allowances. Environmental consequences of this growth are also widely examined. Dr. Alpana Roy (2016) finds that increased vehicle use is strongly linked to climate change, demonstrating that cities like Delhi and Kolkata have recorded rising temperatures corresponding to vehicle growth. Shrivastava R.K. et al. (2013) warn that rapid urbanization and motorization have severe impacts on human health, with South Asian cities facing dangerously high levels of CO, SO_2, NO_2, PM and other pollutants originating from transport emissions. Similarly, Geetha P. et al. (2015) attribute worsening air quality to vehicle growth driven by population and urban expansion; using Hysplit4 simulation they trace pollutant movements based

on wind patterns to guide planning decisions on roads and industrial sites. Kokila M. et al. (2016) expand on this by showing that air pollution dispersal is also influenced by surrounding areas, demonstrating through meteorological data and simulation mapping that emissions travel across regions depending on direction and wind speed. Collectively, the literature establishes that while automobile industry of India is a major economic growth driver, it also poses serious environmental and health challenges Kumar and Sharma (2020) analyzed India's automobile industry growth and its detrimental effects on air quality, noting government initiatives like the FAME scheme promoted electric vehicles (EVs), yet the surge in petrol and diesel vehicles continued to degrade air in Delhi and Mumbai. They highlighted those economic reforms since the 1990s boosted sector GDP contribution to ~8% and employment, but unchecked expansion worsened pollution, recommending stricter emission standards and green infrastructure investments. Singh and Tiwari (2021) evaluated Bharat Stage VI (BS-VI) norms introduced in 2020, finding them helpful in curbing tailpipe emissions but insufficient against rising vehicle numbers in dense cities. The study emphasized that while BS-VI marked progress over prior stages, overall pollution persisted due to fleet growth, advocating enhanced public transport and rigorous enforcement to offset vehicular increase impacts. Agarwal and Kumar (2022), specifically Ankit Kumar and Vikas Agarwal, examined industry expansion focusing on EVs and hybrids, but stressed fuel-powered vehicles' dominance led to declining air quality and heightened health risks like asthma and cardiovascular diseases. They urged policies accelerating EV adoption, charging infrastructure development, and tougher air standards to mitigate ongoing pollution from conventional fuels. Kumar and Verma (2023), Sushil Kumar and Rajesh Verma, investigated environmental fallout from sector growth despite BS-VI, revealing persistent air pollution elevation from sales spikes, with Delhi's PM2.5 levels far exceeding WHO thresholds. The paper connected carbon-based fuel burning to GHGs (CO_2, NO, SO_2, PM, HC), respiratory/cancer risks, and called for advanced mitigation amid India's below-par emission controls

III. Objective Of The Study :

1. To examine the expansion and development trends of India's automobile sector.
2. To analyze how increasing automobile use contributes CO_2 Emission.

IV. Data Collection :

The relationship between the expansion of automobiles and air pollution is examined using a linear correlation technique after secondary data on the Indian vehicle industry and CO_2 Emission level is gathered from various sources.

Table 1 : Production Trends of Autombile in India

Year	Production Trends in India (Units)
2013	20,647,611
2014	21,500,165
2015	23,358,047
2016	24,016,068
2017	2,53,30,967
2018	2,90,94,447
2019	3,09,14,874
2020	2,63,53,293
2021	2,26,52,108
2022	2,30,40,066
2023	2,59,40,344
2024	2,84,34,742

Source : Society of Indian Automobile Manufacturers (SIAM)

Figure 1:Production Trends of Autombile in India
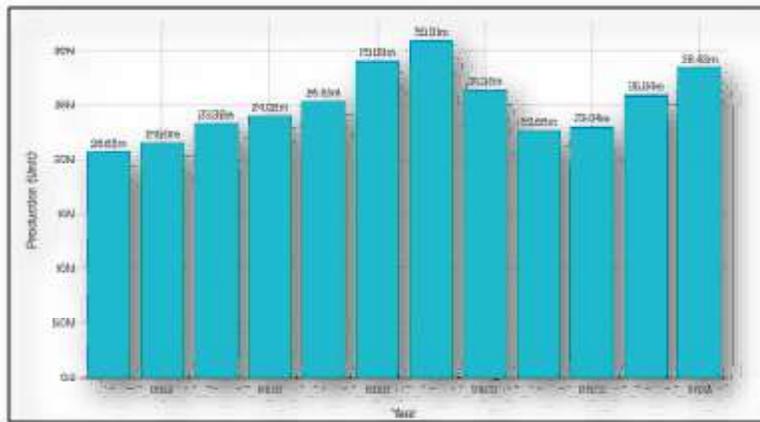
Source : Society of Indian Automobile Manufacturers (SIAM

Figure 1 shows the annual automobile production in India from 2013 to 2024, highlighting a pattern of growth, decline and recovery. Production steadily increased from 20.86 million units in 2013 to peak at 30.91 million units in 2019, showing a strong upward trend driven by rising demand and

industry expansion. However, there is a notable drop beginning in 2020, when production fell sharply to 26.35 million units, followed by a further decline to 22.65 million units in 2021, likely due to Covid-19 lockdowns, supply-chain disruptions and reduced consumer purchasing power. After this slump, the industry rebounded: production climbed to 23.04 million units in 2022, 25.94 million units in 2023, and reached 28.43 million units in 2024, nearly returning to pre-pandemic performance.

Table 2: Sales Trends of Automobile in India

Year	Sale Trends in India (Units)
2013	17,793,701
2014	18,423,223
2015	19,724,371
2016	20,468,971
2017	2,18,63,281
2018	2,49,81,312
2019	2,62,66,179
2020	2,15,45,551
2021	1,86,15,588
2022	1,76,17,606
2023	2,12,04,846
2024	2,38,53,463

Source: Society of Indian Automobile Manufacturers (SIAM)

Figure 2: Production Trends of Automobile in India
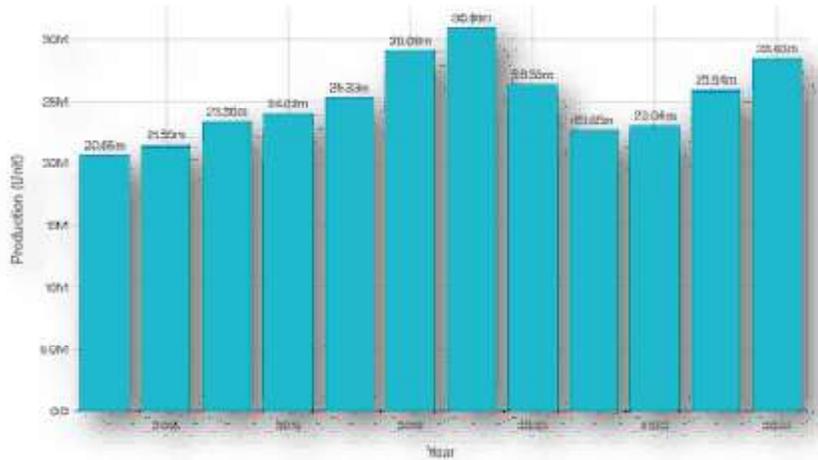
Source: Society of Indian Automobile Manufacturers (SIAM)

Figure 2 tracks India's annual automobile sales from 2013 to 2024, showing a cycle of steady growth, decline and eventual recovery. Sales increased consistently from 17.8 million units in 2013 to a peak of 26.3 million units in 2019, reflecting rising consumer income, growing demand for mobility, and a booming automobile market. However, from 2020 onwards, sales dropped sharply - falling to 21.5 million units in 2020, 18.6 million in 2021, and 17.6 million in 2022 - a decline largely attributed to the Covid-19 pandemic, economic slowdown, mobility restrictions and supply chain disruptions. After hitting the lowest level in 2022, the market began recovering strongly. Sales rose again to 21.2 million units in 2023 and further to 23.9 million units in 2024, indicating revived consumer confidence, easing inflationary pressures, and improving market conditions.

Table 3: CO2 Emission by India

Year	CO2 Emission by India (MTCO2)
2013	226.2589181
2014	235.7471529
2015	257.7478525
2016	269.3869018

2017	291.2324751
2018	305.6905646
2019	308.5591731
2020	268.6795239
2021	295.0913281
2022	323.7623051
2023	332.6834517
2024	344.3479282

Source: Emissions Database for Global Atmospheric Research

V. Findings And Discussions :

From 2013 to 2024, India's car production and sales statistics exhibit a distinct pattern of steady expansion, disruption during the pandemic years, and a robust recovery thereafter. Production and sales increased gradually starting in 2013 and peaked in 2019 at almost 31 million units manufactured and 26.3 million units sold, indicating a thriving industry fueled by rising incomes, demand, and manufacturing capacity. However, between 2020 and 2022, the automotive industry saw a severe decline in sales and production as a result of COVID-19 lockdowns, unstable economic conditions, and supply chain issues, including shortages of parts and supplies. Beginning in 2023, both indicators rebounded, with sales recovering to 23.9 million units and production rising to 28.4 million units by 2024, signaling renewed consumer confidence, reopening of markets, and resumed industrial activity. Overall, the charts illustrate that the decline was temporary and externally induced, while the recovery confirms the underlying strength and resilience of India's automobile industry.

A linear correlation analysis was conducted to examine the relationship between automobile sales, considered as the independent variable, and India's average annual CO_2 emissions, treated as the dependent variable. The computed Pearson correlation coefficient was 0.998, which signifies a very strong positive association between the two variables. This value suggests that as automobile sales increase, CO_2 emissions tend to rise correspondingly. In other words, higher levels of vehicle ownership and usage directly contribute to greater carbon emissions released into the atmosphere. The strength of this correlation supports the argument that

growth in the automobile sector is closely linked to environmental impacts, particularly greenhouse gas emissions, making it an important consideration for policymakers and environmental planners.

VI. Limitation

This study offers a comprehensive summary of the expansion of the Indian auto sector and its impact on air pollution. The research is done utilizing these pre-existing datasets, and the study mostly relies on secondary data sources. The majority of the assessment is based on national-level averages, such as total vehicle numbers and total carbon emissions, because a thorough analysis necessitates accurate regional data, which is not available within the parameters of this work. A deeper and more accurate assessment would involve collecting city- or region-specific statistics on vehicle density, population, land area, urban expansion, forest cover, topography and economic conditions. However, such an approach is highly time-consuming, complex and demands extensive resources. Although a more granular analysis would lead to better-targeted strategies for controlling air pollution, limitations related to data accuracy, availability and time make this difficult. Additionally, the study uses information reflecting current technologies and fuel practices, even though future advancements-such as electric and solar-powered vehicles, cleaner alternative fuels and innovative mobility solutions-may significantly transform the industry and potentially reduce emissions in ways not yet fully predictable.

VII. Conclusion

The analysis of automobile production and sales trends from 2013 to 2024 shows a clear pattern of sustained growth, a temporary disruption during the COVID-19 period, and a strong recovery afterward, confirming the resilience and rising demand within India's automobile industry. Both graphs indicate steady expansion up to 2019, followed by a sharp decline in 2020-2022 due to lockdowns, mobility restrictions and supply-chain challenges, and then a rebound in 2023-2024, where production and sales returned close to pre-pandemic levels. A linear association between annual average CO2 emissions (dependent variable) and car sales (independent variable) was done in order to better understand the environmental effects of this growth. Carbon emissions rise almost proportionately to vehicle sales, according to the resulting Pearson coefficient of 0.998, which shows an almost perfect positive association. This means that growing motorization in India plays a major role in increasing atmospheric CO_2 and contributes to climate and air-quality degradation. Together, the trend analysis and correlation findings highlight a crucial conclusion: although the automobile industry is a strong and expanding pillar of India's economy, its growth is directly linked to environmental pressures, making sustainable mobility policies, cleaner fuels

and rapid adoption of electric vehicles essential priorities for the future.

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Social Media Literacy and its Influence on Entrepreneurial Decision-Making

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Abstract

In today's technology-driven environment, social media plays a major role in the creation of new ventures and in shaping the decisions made by business owners. Entrepreneurs who are proficient in using social media are better equipped to evaluate online content, interact effectively with diverse audiences, and design informed business strategies. This study aims to examine how social media literacy influences entrepreneurial decision-making, while also identifying its key objectives, advantages, and associated challenges. To establish a strong theoretical foundation, the research will draw on an extensive review of existing academic literature. The findings suggest that strong social media skills enable entrepreneurs to recognize emerging opportunities, strengthen customer relationships, and achieve a competitive advantage. However, careless or uncritical use of social media can lead to the spread of misinformation, harm an organization's reputation, and result in poor strategic decisions.

Keywords : Social Media Literacy, Entrepreneurship, Decision-Making, Digital Marketing, Business Strategy

Introduction :

The rapid advancement of digital technologies has significantly transformed how entrepreneurial businesses function within today's economies. Social networking platforms such as Facebook, Instagram, LinkedIn, X (formerly Twitter), and YouTube now play a powerful role in influencing consumer purchasing decisions and shaping business strategies. By using these platforms, entrepreneurs can track market trends, understand customer preferences, and respond swiftly to changes in the business environment. As a result, social media has become an essential instrument for business growth, supporting marketing communication, customer engagement, professional connections, and the collection of market insights.

Many entrepreneurs rely on social media as a key source of real-time information and customer feedback. Elements such as user comments, online reviews, and engagement metrics offer valuable data that help assess business performance and inform strategic planning. However, the effectiveness of social media use largely depends on an entrepreneur's ability

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to analyze and apply digital information appropriately. This capability is known as social media literacy.

Social media literacy extends well beyond basic familiarity with digital platforms. It includes the ability to judge the credibility of online information, understand how digital algorithms operate, create ethical and compelling content, and manage online interactions professionally. For entrepreneurs, these skills are vital when making decisions related to marketing strategies, product development, customer relationship management, and handling online crises. A lack of social media literacy can leave businesses vulnerable to misinformation, harm brand reputation, and lead to poor decision-making.

This research explores the influence of social media literacy on entrepreneurial decision-making, highlighting both its benefits and limitations, and underscores the importance of strong digital competence for sustaining long-term business success.

Literature Review :

Developments in digital technology have significantly reshaped the context in which entrepreneurial activities take place. Kaplan and Haenlein note that social networking tools have evolved from basic communication channels into strategic assets that influence consumer behavior and organizational decision-making. Platforms such as Facebook, Instagram, LinkedIn, X (formerly Twitter), and YouTube have become powerful environments where entrepreneurs can monitor industry trends, identify shifting customer needs, and modify their strategies to align with market dynamics. Kietzmann and colleagues further explain that these platforms support entrepreneurs by enhancing brand exposure, encouraging interaction with stakeholders, strengthening professional networks, and enabling the gathering of valuable market intelligence.

An expanding body of literature shows that entrepreneurs increasingly rely on social media for real-time information and customer feedback. According to Tuten and Solomon, metrics such as audience engagement, user comments, and online reviews serve as important indicators for assessing business performance and informing strategic decisions. However, the value of this information is closely tied to the entrepreneur's ability to correctly analyze and apply digital data, a competence widely referred to as social media literacy.

Social media literacy is a complex skill set that extends beyond basic use of digital platforms. Research by Nguyen et al. indicates that it involves evaluating the credibility of online information, understanding how algorithms influence content visibility, creating responsible and ethical digital content, and effectively managing online relationships. These skills are

essential for entrepreneurs when making decisions about marketing strategies, innovation processes, customer engagement, and safeguarding brand reputation. Conversely, studies by Allcott and Gentzkow warn that low levels of digital literacy can heighten vulnerability to misinformation, undermine brand trust, and result in flawed strategic decisions.

This study examines the influence of social media literacy on entrepreneurial decision-making by synthesizing insights from existing academic research, while also assessing its advantages and potential drawbacks, highlighting the critical role of digital competence in achieving long-term entrepreneurial sustainability.

Objectives :

The primary objectives of this research are:

1. To understand the concept of social media literacy in an entrepreneurial context.
2. To examine the role of social media literacy in entrepreneurial decision-making.
3. To analyze the advantages (pros) of social media literacy for entrepreneurs.
4. To identify the challenges and disadvantages (cons) associated with social media usage.
5. To assess how informed social media use contributes to sustainable business growth.

Social Media Literacy :

Social media literacy in the entrepreneurial context refers to the ability to use digital networking platforms effectively to collect, evaluate, and utilize information for sound business decision making. It goes far beyond basic familiarity with platforms such as Facebook, Instagram, LinkedIn, X (Twitter), and YouTube, encompassing analytical thinking, strategic insight, and ethical online conduct.

Entrepreneurs who possess strong social media literacy are capable of tracking industry developments, recognizing customer needs, and uncovering business opportunities through careful interpretation of online information. They are also able to judge the credibility of digital content, analyze levels of audience interaction, and understand how algorithms influence the reach and visibility of posts. Furthermore, this literacy includes producing professional and responsible digital content, managing relationships with various stakeholders, and protecting the organization's online image.

These capabilities enable entrepreneurs to make well-informed choices related to marketing strategies, product innovation, customer relationships, and crisis response. In the absence of such skills, businesses face greater risks of misinformation, ineffective planning, and damage to

their reputation, highlighting social media literacy as an essential competence for entrepreneurial success in the digital age.

Entrepreneurship :

Entrepreneurship is the act of establishing, organizing, and expanding a business with the aim of creating value, satisfying market demands, and earning profit. It involves identifying opportunities, accepting measured risks, and integrating resources such as finance, expertise, and technology to produce innovative products, services, or solutions. Entrepreneurs are the individuals who lead this process by making informed strategic choices, guiding teams, and adapting creatively to changes in the marketplace. In addition to launching new enterprises, entrepreneurship also includes enhancing existing organizations and encouraging continuous innovation. It is a key driver of economic development, employment generation, and competitiveness, and in the digital era, it increasingly depends on tools such as social media for market insight and effective decision-making.

Decision Making

Decision-making refers to the act of choosing the most suitable option among several alternatives in order to accomplish defined objectives. The process typically includes recognizing a challenge or opportunity, collecting relevant information, evaluating possible choices, considering associated risks and benefits, and selecting the most appropriate response. Strong decision-making relies on critical analysis, sound judgment, and, in some cases, intuition, depending on the nature and complexity of the situation. In the fields of business and entrepreneurship, it is a vital capability that shapes strategic direction, daily operations, and long-term performance. Ineffective decisions may result in financial setbacks or lost opportunities, whereas well-informed and timely choices contribute to improved efficiency, competitive advantage, and sustainable growth.

Digital Marketing :

Digital marketing refers to the promotion of products, services, or brands through online channels and digital technologies. It makes use of platforms such as social media, search engines, email, websites, and mobile apps to connect with and engage specific audiences. This approach enables businesses to track consumer behavior, evaluate the performance of marketing campaigns, and modify strategies instantly. Methods including content creation, search engine optimization (SEO), pay-per-click advertising, and influencer partnerships support organizations in increasing brand visibility, attracting potential customers, and boosting sales. In today's business landscape, digital marketing is a crucial tool for expanding reach, strengthening customer relationships, and achieving a competitive advantage.

Business Strategy :

Business strategy is a structured plan that organizations adopt to accomplish long-term objectives, build a competitive position, and generate lasting value. In contemporary entrepreneurship, it combines market evaluation, efficient use of resources, and informed decision-making to direct business activities. Social media and digital marketing now play a central role in strategic planning, allowing entrepreneurs to analyze customer behavior, track competitors, and spot new opportunities as they emerge.

An effective business strategy balances internal strengths with external market conditions, enabling entrepreneurs to make sound decisions about product innovation, brand positioning, and customer interaction. Social media literacy strengthens this approach by helping business owners accurately interpret online insights, assess the performance of digital initiatives, and protect their brand image. By integrating traditional strategic frameworks with data obtained from digital platforms, entrepreneurs can create flexible, evidence-based strategies that enhance market adaptability, encourage innovation, and sustain long-term business success.

Concept Of Social Media Literacy :

Social media literacy extends far beyond simply knowing how to operate digital platforms. It encompasses:

- Comprehending how platform algorithms influence content visibility and user interactions
- Assessing the trustworthiness and accuracy of information shared online
- Analyzing metrics that reflect audience engagement and response
- Creating digital content that is both ethical and strategically effective
- Maintaining and protecting a professional online image and brand reputation.

For entrepreneurs, possessing social media literacy allows them to convert online data and interactions into practical insights that guide business strategies, marketing decisions, and customer engagement efforts. It equips business owners with the skills to navigate digital environments strategically, make informed choices, and enhance their overall competitiveness in the market.

Influence of Social Media Literacy on Entrepreneurial Decision Making :

Entrepreneurial decision-making involves recognizing opportunities, evaluating risks, allocating resources efficiently, and adapting to changes in the market. Social media literacy significantly shapes these processes in several ways:

1. Market Insights: Entrepreneurs can monitor emerging trends, understand customer behaviors, and observe competitor strategies to make informed business choices.

2. Customer Interaction: Feedback from comments, reviews, and online discussions provides valuable guidance for refining products, services, and overall customer experience.

3. Strategic Marketing : Knowledge of social media analytics enables entrepreneurs to choose effective platforms, design suitable content, and implement targeted advertising campaigns.

4. Managing Challenges: Entrepreneurs with strong social media skills can detect negative sentiment or misinformation early, allowing timely and effective responses to protect brand reputation.

By leveraging social media literacy, entrepreneurs can make decisions that are more data-driven and strategic, reducing uncertainty and enhancing the likelihood of business success in dynamic markets.

Advantages of Social Media Literacy in Entrepreneurship :

1. Better Decision-Making: Entrepreneurs can utilize real-time information from social media to make well-informed and strategic business choices

2. Affordable Marketing : Social media platforms offer cost-efficient promotional opportunities, reducing the need for expensive traditional advertising campaigns.

3. Stronger Customer Connections : Direct engagement with customers through comments, messages, and reviews helps build trust, loyalty, and long-term relationships.

4. Market Responsiveness : Entrepreneurs who are skilled in social media can quickly adapt their strategies to shifting market trends and emerging opportunities.

5. Fostering Innovation : Exposure to global conversations, ideas, and best practices encourages creativity and the development of innovative products or services.

Overall, social media literacy provides entrepreneurs with the tools to make smarter decisions, connect with audiences effectively, and maintain a competitive edge while fostering continuous innovation.

Disadvantages of Social Media Literacy in Entrepreneurship :

1. Data Overload: The abundance of information available on social media can overwhelm entrepreneurs, potentially leading to confusion and suboptimal decision-making.

2. Unreliable Content: Depending on inaccurate or misleading information may result in flawed strategies or misguided business actions.

3. Time-Intensive Management : Maintaining an active presence across multiple social platforms can consume significant time, diverting attention from essential business operations.

4. Reputational Vulnerabilities : Mishandling content, negative feedback, or inappropriate responses can harm the company's brand image and public perception.

5. Ethical and Privacy Concerns : Mismanagement or misuse of customer information may create ethical dilemmas and legal liabilities.

While social media literacy offers valuable insights and strategic advantages, entrepreneurs must be cautious and deliberate in managing online content and interactions to minimize risks and maintain credibility.

Discussion :

Social media literacy offers entrepreneurs a wide range of benefits, including access to real-time market insights, direct interaction with customers, and cost-effective brand promotion. However, the effectiveness of social media use is determined by the extent to which it is applied thoughtfully and strategically. Entrepreneurs who lack the ability to critically evaluate digital information may be swayed by misleading trends, overstated success narratives, or inaccurate content, which can result in poor decisions and operational challenges.

Moreover, the continuous stream of online information can become distracting, pulling attention away from core business priorities. Inappropriate handling of customer communication or the sharing of unsuitable content can harm a firm's reputation, while improper use of personal or customer data may lead to ethical issues and legal consequences.

To maximize the advantages of social media literacy, entrepreneurs must combine technical platform knowledge with strong analytical skills and ethical responsibility. Digital literacy initiatives, professional development programs, and targeted training workshops can equip business owners with the ability to assess online information critically, create responsible digital content, and manage online interactions effectively.

When social media is used in a purposeful and ethical manner, entrepreneurs can transform digital insights into practical strategies, improve the quality of their decisions, and sustain a competitive position. Ultimately, the careful and informed application of social media literacy plays a vital role in achieving long-term entrepreneurial success in the digital economy.

Methodology :

This study adopts a qualitative research design to examine the influence of social media literacy on entrepreneurial decision-making. The research relies exclusively on secondary data sources, including peer-reviewed journals, books, and credible online publications, to explore

theoretical frameworks and empirical findings related to social media literacy, digital marketing, and entrepreneurial practices.

A systematic literature review was conducted to identify patterns, trends, and relationships between social media literacy and decision-making processes among entrepreneurs. The collected literature was analyzed thematically to synthesize key insights regarding the benefits, challenges, and practical applications of social media in strategic business contexts.

This approach allows for an in-depth understanding of how digital competencies shape entrepreneurial choices without direct fieldwork. Ethical standards were maintained by ensuring that all sources were properly cited and accurately represented. By relying on scholarly evidence, this methodology provides a robust foundation for discussing the role of social media literacy in contemporary entrepreneurial decision-making.

Conclusion :

In the modern, technology-centered economy, social media literacy has emerged as a critical competency for entrepreneurs. It empowers business owners to effectively collect, analyze, and utilize digital information, allowing them to make informed, timely, and customer-focused decisions. Through a solid understanding of online platforms, entrepreneurs can follow market trends, observe competitor behavior, and gain valuable insights into consumer needs, leading to more effective planning and improved operational performance.

However, the advantages of social media literacy rely heavily on the ability to evaluate online content thoughtfully. Without critical assessment, dependence on digital information can lead to poor strategic choices, the spread of inaccurate information, or damage to business reputation. Ethical and responsible handling of online data is also essential to prevent privacy breaches and potential legal issues.

Building strong social media literacy involves continuous learning, hands-on practice, and adherence to ethical standards. When used wisely, it allows entrepreneurs to transform digital insights into practical strategies, adapt swiftly to changing market conditions, and encourage innovation. Ultimately, social media literacy extends beyond technical know-how; it serves as a strategic asset that improves decision-making, enhances competitive positioning, and supports long-term entrepreneurial success in an ever-changing digital environment.

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Impact of Green Marketing on Consumer Buying Behavior in The Cosmetics Industry : A Comprehensive Analysis

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Abstract

Green marketing has gained considerable importance in recent years due to rising environmental concerns and increasing consumer preference for sustainable products. The present study examines consumer awareness of green marketing practices, their impact on buying behavior, the role of trust and green brand image, and the barriers influencing green purchase decisions in the cosmetic sector. The study is based on primary data collected from 400 respondents using a structured questionnaire measured on a five-point Likert scale. Descriptive statistics and one-sample t-test were used for data analysis. The findings reveal that consumers possess a high level of awareness regarding eco-friendly and cruelty-free cosmetics and show a strong preference for brands adopting green practices. Green marketing significantly influences buying behavior, while trust and green brand image positively affect purchase intention. However, high prices, doubts regarding the authenticity of green claims, and concerns about product effectiveness emerge as major barriers to green purchases. The study highlights the need for transparent communication, credible certification, and affordable pricing strategies to promote the adoption of green cosmetic products.

Keywords: Green Marketing, Consumer Awareness, Buying Behavior, Green Brand Image, Trust, Green Cosmetics

1. Introduction

Environmental sustainability has become a critical concern across industries, compelling businesses to adopt eco-friendly practices and responsible marketing strategies. In this context, green marketing refers to the promotion of products that are environmentally safe, ethically produced, and socially responsible. The cosmetic industry, in particular, has witnessed a growing shift toward green marketing due to increasing awareness of health, environmental protection, and ethical consumption among consumers.

Consumers today are more informed and conscious about the ingredients used in cosmetic products, their impact on health, and the environmental consequences of production and packaging. As a result, concepts such as eco-friendly cosmetics, cruelty-free products, recyclable

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packaging, and green certifications have gained significant attention. Green marketing not only enhances brand reputation but also influences consumer attitudes and purchase decisions by aligning business practices with environmental values.

Despite increasing awareness, the adoption of green cosmetic products is not free from challenges. Issues related to high prices, lack of trust in green claims, and concerns about product effectiveness continue to affect consumer purchase intentions. Trust and green brand image play a crucial role in reducing consumer skepticism and strengthening confidence in green products. Therefore, understanding consumer awareness, buying behavior, trust factors, and perceived barriers is essential for marketers aiming to promote sustainable consumption.

The present study attempts to analyze these aspects by focusing on consumer perceptions of green marketing practices in the cosmetic industry. By examining awareness levels, buying behavior, trust and brand image, and barriers to green purchase, the study provides valuable insights for marketers, policymakers, and researchers interested in sustainable marketing strategies.

2. Literature Review :

Research on green marketing and consumer behavior has evolved significantly in recent years, especially concerning eco-friendly and sustainable cosmetic products. Limbu et al. (2021) found that consumer awareness of green cosmetic products directly influences purchasing behavior, with environmental knowledge acting as a significant antecedent to positive purchase intentions. Their work highlights how shifting consumer values toward sustainability shape buying behaviour in the cosmetic sector.

A comprehensive review by Dwivedi, Gupta &Sayal (2025) shows that favorable attitudes toward green cosmetics are widespread, but actual purchase behavior often lags behind intention due to psychological and behavioral factors. The study underscores the existence of a persistent "green purchasing gap," where consumers' stated preferences do not always translate into buying decisions, emphasizing the need to understand underlying motivational dynamics.

Upadhyaya (2024) applied the Theory of Planned Behavior to examine Indian consumers' intentions to buy green cosmetics, finding that environmental concern and environmental knowledge significantly predict purchase intentions. This research underscores the importance of psychological constructs like attitude and perceived behavioral control in shaping green purchase decisions in emerging markets.

Investigating regional consumer segments, Dlamini (2024) explored green cosmetic purchase behaviour among female consumers in South Africa

and identified environmental consciousness, product effectiveness, and health considerations as key determinants of purchase decisions. The study supports the global trend that green cosmetics are appealing when products align with both environmental and personal health values.

Research by Echchad and Ghaith (2022) in Hungary examined female student consumers and found that perceived product quality and environmental concern significantly influence attitudes toward green cosmetics, which in turn affect purchase intention. Their work also confirmed that subjective norms (social influences) play a meaningful role in green shopping behavior.

Earlier foundational studies support these trends. Quoquab, Jaini& Mohammad (2020) observed that culture moderates green purchase behavior in Asian markets, affecting how consumers respond to green marketing efforts. Likewise, Sadiq, Adil& Paul (2021) applied innovation resistance theory to show that product novelty and consumer resistance can dampen adoption of eco-friendly cosmetics, particularly when consumers perceive risk or unfamiliarity.

In relation to barriers and trust, research indicates that skepticism about green claims and unclear certifications reduce consumer confidence. Systematic reviews suggest that trust and transparent communication are crucial for effective green marketing, while misleading or non-verified environmental claims may lead to consumer backlash and decreased adoption of green products. Studies on green marketing strategies confirm that transparent, authentic communication enhances trust, while greenwashing practices undermine consumer confidence and purchase intention.

Finally, science-based reviews of sustainability in the cosmetics industry (e.g., scientific reviews published in Sustainability and other journals) have reinforced that sustainability practices must extend beyond marketing to include credible certifications, life-cycle accountability, and consumer education to influence long-term purchase behavior.

3. Objectives of the Study :

The present study aims to achieve the following objectives:

1. To study the level of consumer awareness regarding green marketingpractices in the cosmetic industry, particularly eco-friendly, cruelty-free products and green certifications.
2. To examine the impact of green marketing practices on consumer buying behavior with reference to cosmetic products.
3. To analyze the role of trust and green brand image in shaping consumers' purchase intentions towards green cosmetic brands.
4. To identify the major barriers influencing consumers' green purchase decisions, such as price sensitivity, authenticity concerns, and perceived

effectiveness of green cosmetics.

4. Research Hypotheses :

Based on the objectives and review of literature, the following hypotheses are formulated:

● **HO1 :** Consumers do not have a significant level of awareness regarding green marketing practices in cosmetic products.

● **HO2 :** Green marketing practices do not have a significant impact on consumer buying behavior.

● **HO3 :** Trust and green brand image do not significantly influence consumers' purchase intentions.

● **HO4 :** Price, authenticity concerns, and product effectiveness do not act as significant barriers to purchasing green cosmetics.

5. Research Methodology :

The present study adopts a descriptive and analytical research design to examine consumer awareness, buying behavior, trust, and barriers related to green marketing practices in the cosmetic industry. The descriptive design helps in understanding consumers' perceptions, while the analytical approach is used to test the proposed hypotheses statistically.The study was conducted in Ayodhyadistrict of Uttar Pradesh, which was selected due to its growing consumer market and increasing awareness of eco-friendly and sustainable products. Ayodhya represents a mix of urban and semi-urban consumers, making it suitable for studying green cosmetic buying behavior.The population of the study comprises consumers who regularly purchase cosmetic products in Ayodhya district. A total sample of 400 respondents was selected using the simple random sampling techniqueto ensure fair representation and reduce sampling bias.Primary data were collected through a structured questionnairebased on afive-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1). The questionnaire covered four dimensions: awareness of green marketing practices, impact of green marketing on buying behavior, trust and green brand image, and barriers to green purchase. Secondary data were collected from journals, books, reports, and online sources related to green marketing and consumer behavior.

The collected data were analyzed using SPSS software. Descriptive statistics such as mean and standard deviation were used to summarize the data, while a one-sample t-test was applied to test the hypotheses at a 5 percent level of significance, taking the test value as 3.00 (neutral point of the Likert scale).

Ethical considerations were duly followed, ensuring voluntary participation, confidentiality of responses, and use of data strictly for academic purposes.

6. Data Analysis and Interpretation

Table 1: Awareness of Green Marketing Practices

Statement	Mean	S.D.
Awareness of eco-friendly cosmetics	4.21	0.89
Knowledge of green labels and certifications	3.78	1.02
Awareness of cruelty-free products	4.09	0.94

Table 1 presents the level of consumer awareness regarding green marketing practices in the cosmetic sector. The mean score for awareness of eco-friendly cosmetics (Mean = 4.21, S.D. = 0.89) indicates a very high level of familiarity among consumers. Similarly, awareness of cruelty-free products also records a strong mean value (Mean = 4.09, S.D. = 0.94), suggesting that ethical considerations related to animal welfare are well recognized by respondents. Although knowledge of green labels and certifications shows a comparatively lower mean score (Mean = 3.78, S.D. = 1.02), it still remains above the neutral point, reflecting a moderate to high level of awareness. Overall, the findings reveal that consumers possess substantial awareness of green marketing concepts, particularly those directly linked to environmental protection and ethical consumption.

Table 2: Impact of Green Marketing on Buying Behavior

Attribute	Mean	S.D.
Green marketing influences my purchase decision	4.02	0.96
Green packaging attracts me	3.85	1.01
I prefer brands with eco-friendly practices	4.17	0.88

Table 2 examines the influence of green marketing practices on consumer buying behavior. The mean score for the statement "green marketing influences my purchase decision" (Mean = 4.02, S.D. = 0.96) clearly indicates that environmental considerations play an important role in shaping purchasing choices. The attractiveness of green packaging (Mean =3.85, S.D.= 1.01) suggests that eco-friendly packaging positively affects consumer attention, though individual perceptions may vary. Furthermore, the highest mean score is observed for preference towards brands adopting eco-friendly practices (Mean=4.17, S.D.=0.88), highlighting a strong inclination towards sustainable brands. These results collectively demonstrate that green marketing strategies significantly affect consumer buying behavior and encourage environmentally responsible purchasing decisions.

Table 3: Role of Trust and Green Brand Image

Attribute	Mean	S.D.
I trust green cosmetic brands	3.62	1.10
Green brand image improves my confidence	4.11	0.92

Table 3 highlights the importance of trust and green brand image in influencing consumer purchase intention. The mean value for trust in green

cosmetic brands (Mean = 3.62, S.D. = 1.10) reflects a moderate level of trust, indicating that while consumers are inclined towards green products, some degree of skepticism still exists. In contrast, the statement regarding green brand image improving consumer confidence shows a high mean score (Mean = 4.11, S.D.=0.92), emphasizing the positive role of brand image in strengthening consumer assurance. The findings suggest that a strong and credible green brand image enhances consumer confidence, which in turn positively influences purchase intention.

Table 4: Barriers to Green Purchase

Barrier	Mean	S.D.
High price of green cosmetics	4.08	1.04
Doubts about authenticity of green claims	3.94	1.06
Product effectiveness concerns	3.67	1.12

Table 4 identifies the major barriers faced by consumers while purchasing green cosmetic products. The high mean score for the high price of green cosmetics (Mean = 4.08, S.D. = 1.04) indicates that cost is a significant obstacle for many consumers. Doubts regarding the authenticity of green claims (Mean = 3.94, S.D. = 1.06) further highlight consumer skepticism towards misleading or unverified environmental claims. Additionally, concerns related to product effectiveness (Mean=3.67, S.D. = 1.12) suggest that some consumers question whether green cosmetics deliver results comparable to conventional products. Overall, the results reveal that price sensitivity and trust-related issues remain major challenges in the adoption of green cosmetics.

Table 5: One-Sample Statistics

Variable	N	Mean	Std. Deviation
Awareness of Green Marketing Practices	400	4.03	0.95
Impact of Green Marketing on Buying Behavior	400	4.01	0.95
Trust and Green Brand Image	400	3.87	1.01
Barriers to Green Purchase	400	3.90	1.07

Table 5 provides a summary of descriptive statistics for the major study variables. The mean values for awareness of green marketing practices (Mean = 4.03), impact of green marketing on buying behavior (Mean = 4.01), trust and green brand image (Mean = 3.87), and barriers to green purchase (Mean = 3.90) are all above the neutral value of 3.00. This indicates a generally positive inclination of consumers towards green marketing practices, along with a strong perception of existing barriers. The relatively low standard deviation values suggest consistency in respondents' opinions across the sample.

Table 6 : One-Sample Test

Hypothesis	Variable	Test Value	t-value	df	Sig. (2-tailed)	Decision
H₀₁	Awareness of Green Marketing Practices	3.00	21.15	399	0.000	Rejected
H₀₂	Impact of Green Marketing on Buying Behavior	3.00	20.84	399	0.000	Rejected
H₀₃	Trust and Green Brand Image	3.00	3.82	399	0.000	Rejected
H₀₄	Barriers to Green Purchase	3.00	16.95	399	0.000	Rejected

Table 6 presents the results of hypothesis testing using the one-sample t-test. For all four variables, the calculated t-values are significant at the 5 percent level, with p-values less than 0.05. Consequently, all null hypotheses are rejected. These results confirm that consumers possess a significantly high level of awareness of green marketing practices, green marketing significantly influences buying behavior, trust and green brand image play an important role in shaping purchase intention, and perceived barriers such as price and authenticity concerns significantly affect green purchase decisions.

The analysis reveals that consumers are well aware of green marketing practices and are positively influenced by eco-friendly branding and packaging in their buying decisions. Trust and green brand image strengthen consumer confidence and purchase intention, while high prices and doubts regarding green claims act as major constraints. The findings emphasize the need for marketers to focus on transparent communication, affordable pricing, and credible certification to enhance the adoption of green cosmetic products.

7. Findings of the Study :

Based on the analysis and interpretation of data, the major findings of the study are as follows:

1. The study reveals that consumers have a high level of awareness regarding green marketing practices in the cosmetic sector. Awareness about eco-friendly cosmetics and cruelty-free products is particularly strong, indicating growing environmental and ethical consciousness among consumers.

2. Knowledge related to green labels and certifications, although comparatively lower than other awareness indicators, is still above the neutral level, suggesting scope for further consumer education.

3. Green marketing practices have a significant influence on consumer buying behavior. Consumers show a strong preference for brands that adopt eco-friendly practices and environmentally responsible packaging.

4. The findings indicate that green packaging acts as an important visual

and psychological cue, positively affecting consumer attention and purchase decisions.

5. Trust in green cosmetic brands is found to be moderate, suggesting that while consumers are inclined toward green products, skepticism regarding green claims still exists.

6. A strong green brand image significantly enhances consumer confidence, thereby positively influencing purchase intention.

7. The study identifies high prices of green cosmetics as the most significant barrier to green purchase decisions.

8. Doubts about the authenticity of green claims and concerns regarding product effectiveness further restrict the widespread adoption of green cosmetic products.

9. The results of the one-sample t-test show that all calculated t-values are significant at the 5 percent level, leading to the rejection of all null hypotheses.

10. Overall, the findings confirm that awareness, green marketing practices, trust, and brand image positively influence buying behavior, while perceived barriers significantly affect green purchase decisions.

8. Conclusion :

The study concludes that green marketing has emerged as a powerful factor influencing consumer behavior in the cosmetic industry. Consumers demonstrate a high level of awareness regarding eco-friendly and cruelty-free products and show a clear preference for brands that adopt sustainable and environmentally responsible practices. Green marketing strategies, particularly eco-friendly packaging and ethical branding, significantly shape consumer buying decisions.

Trust and green brand image play a crucial role in strengthening consumer confidence and purchase intention. However, despite positive attitudes toward green cosmetics, several challenges continue to hinder their widespread adoption. High prices, skepticism regarding the authenticity of green claims, and concerns about product effectiveness act as major barriers. The rejection of all null hypotheses statistically validates the significance of these factors.

The study highlights that while consumer awareness and positive attitudes toward green cosmetics are increasing, addressing trust-related issues and affordability concerns is essential for the long-term success of green marketing initiatives in the cosmetic sector.

9. Suggestions :

1. Cosmetic companies should focus on transparent communication and credible certification to reduce consumer skepticism regarding green claims.

2. Greater efforts should be made to educate consumers about green labels and certifications through advertisements, packaging information, and digital platforms.

3. Manufacturers should work toward reducing the price gap between green and conventional cosmetics by optimizing production and supply chain efficiencies.

4. Companies should emphasize product effectiveness along with environmental benefits to strengthen consumer trust and confidence.

5. Strengthening green brand image through consistent ethical practices and sustainability reporting can further enhance purchase intention.

6. Government agencies and regulatory bodies should introduce strict guidelines and monitoring mechanisms to prevent misleading green claims and greenwashing.

7. Marketers should design targeted awareness campaigns highlighting long-term health and environmental benefits of green cosmetics.

8. Future research may include comparative studies across different regions or product categories to gain deeper insights into green consumer behavior.

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Rural Economic Empowerment in India: Key Challenges, Gaps, and Strategic Interventions

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Abstract

India's rural economy is at the heart of the nation's socio-economic development, yet it continues to grapple with significant challenges such as poverty, inadequate infrastructure, gender inequality, and limited access to technology. Despite governmental interventions aimed at uplifting rural communities, gaps remain that hinder sustainable economic empowerment. This paper reviews the current literature on rural development, identifies gaps in existing research and practice, and provides strategic recommendations to address these challenges. It concludes with discussion sonpolicy interventions, suggesting a comprehensive framework for achieving sustainable rural development. Rural economic empowerment plays a vital role in sustainable development in India, where many people depend on agriculture and related sectors. This paper examines the main challenges to rural economic advancement, such as limited credit access, poor infrastructure, and weak market connections. It also addresses policy implementation gaps and the necessity for skill development to improve job opportunities. The study advocates for strategic interventions like promoting cooperative models, utilizing technology for enhanced market access, and encouraging public-private partnerships. By tackling these challenges, the paper seeks to create a pathway for strengthening economic resilience and empowerment in rural India, ultimately supporting inclusive growth and reducing poverty.

1. Introduction

Rural development is critical to India's economic growth, with over 60% of the population depending on agriculture and related activities for their livelihood. However, rural regions continue to face numerous challenges, including lack of infrastructure, poor healthcare, inadequate educational opportunities, and significant gender disparities (Verma & Kumar, 2019). The economic empowermen to frural communitie siscentral to addressing these issues and ensuring inclusive growth.

Over the years, the Indian government has implement edseveral policies to driverural development, suchasthe Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Pradhan Mantri Gram Sadak Yojana (PMGSY), and Pradhan Mantri Awas Yojana (PMAY). These

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scheme shaveun doubtedly contributed to poverty alleviationand employment generation, but several key challenges persist, such as regional disparities and the limited scalability of successful programs (Mishra & Reddy, 2022).

This paper explores the current state of rural economic empowerment, reviews the literature on the subject, identifies gaps in research and policy, and suggests strategies to address these issues. By focusing on the gaps between policy intentions and outcomes, this paper aims to provide amore comprehensive under standing of rural economic challenges and offerpractical solutions for policymakers and development professionals.

2. Literature Review :

Rural development has been a subject of research for decades, with scholars and policymakers examining various drivers such as microfinance, infrastructure, digital technologies, and sustainable agricultural practices.

Micro finance and Women's Empowerment :

One of the most studied aspects of rural development is microfinance, particularly in the context of women's empowerment. Research shows that Self- Help Groups (SHGs) have been successful in enhancing financial inclusion and enabling women to participate more actively in economic activities (Nair, 2021). However, the scalability of micro finance models remains a significant challenge, as most SHGs are limited to small loans, making it difficult for women to expand their businesses (Agarwal, 2022).

Infrastructure Development :

Infrastructure is another critical driver of rural economic development. Improved transportation, access to electricity, and enhanced telecommunication services have been shown to increase agricultural productivity and facilitatenon- agricultural employment (Singh & Sinha, 2021). However, many rural areas still suffer from inadequate infrastructure, particularly in remote regions, which hampers their ability to integrate with national markets (Raj, 2021).

Government Policies :

Government schemes such as MGNREGA and PMAY have played a key role in providing employment and improving living conditions in rural areas. While these policies have been effective in reducing short-term poverty, they have not been as successful in fostering longterm economic empowerment (Mishra & Reddy, 2022). Critics argue that these policies often focus on immediate relief rather than addressing structural issues, such as land ownership and gender inequality (Verma & Kumar, 2019).

Summary of Government Policies Supporting Rural Development

Policy Name	Year Introduced	Objective	Key Achievements	Challenges
Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)	2005	Provide guaranteed employment to rural households	Increased income security, poverty alleviation	Implementation delays, wage payment issues
Pradhan Mantri Awas Yojana (PMAY)	2015	Affordable housing for all	Improved housing infrastructure in rural areas	High construction costs, land availability
Pradhan Mantri Gram Sadak Yojana (PMGSY)	2000	Improve rural road connectivity	Enhanced access to markets and services	Maintenance issues, incomplete road networks
National Rural Livelihood Mission (NRLM)	2011	Promote selfemployment and organization of SHGs	Strengthened women's economic participation	Limited credit access for SHGs

Gender Disparities :

Gender disparities remain a major barrier to rural economic empowerment. Women in rural areas often lack access to land, education, and credit, which limits their participation in the economy (Kaur & Singh, 2021). Moreover, social norms often restrict women's ability to engage in decision-making processes, both at the household and community levels (Agarwal, 2022). Addressing these disparities is crucial for achieving inclusive rural development.

3. Gaps Identified :

While significant progress has been made in rural development, several gaps remain that hinder the full realization of rural economic empowerment in India.

Inadequate Integration of Digital Technologies

Digital technologies have the potential to revolutionize rural economies by improving access to financial services, markets, and education. However, many rural areas still lack the digital infrastructure needed to take advantage of these opportunities. Furthermore, digital literacy remains a significant challenge, particularly for older and marginalized populations (Kaur & Singh, 2021). There is a clear need for policies that promote digital inclusion and provide training in digital skills.

Limited Focus on Sustainability :

Although sustainable agricultural practices have been widely promoted, their adoption remains low. Farmers often lack the financial resources and technical knowledge required to implement sustainable practices, such as organic farming and water conservation (Kumar, 2021).

Additionally, existing policies tend to prioritize short-term gains over long-term sustainability, which undermines efforts to create a resilient rural economy.

Gender Inequality in Policy Implementation

While many government policies aim to empower rural women, their impact has been limited due to systemic barriers. Land ownership remains heavily skewed in favor of men, and women often have limited access to credit and entrepreneurial opportunities. Gender-sensitive policies need to be integrated more effectively in to rural development programs to ensure that women can fully participate in the economy (Agarwal, 2022).

Gaps in Rural Economic Empowerment

Area	Identified Gaps	Explanation
Digital Inclusion	Lack of digital infrastructure and literacy	Rural areas have limited access to digital tools and services
Area	**Identified Gaps**	**Explanation**
Gender Equality	Unequal access to land ownership and credit	Women face systemic barriers in accessing land and finance
Sustainable Agriculture	Low adoption of sustainable farming practices	Farmers lack training and resources to adopt eco-friendly methods
Microfinance Scalability	Limited access to larger loans and entrepreneurial support	SHGs often only qualify for small loans, limiting business growth

4. Suggestions to Fulfill the Gaps

To address the gaps identified, several strategic interventions are recommended:

Promoting Digital Inclusion

The government must prioritize digital infrastructure development in rural areas,particularly in remote and underdeveloped regions. In addition, training programs should be implemented to improve digital literacy, especially among marginalized groups. Public-private partnerships could play a crucial role in expanding digital services to rural communities (Kaur & Singh, 2021). Moreover, the integration of digital platforms with traditional agricultural market scan enhance farmers' access to real-time market information and improve income levels.

Encouraging Sustainable Agricultural Practices :

Sustainable agricultural practices should be promoted through financial incentives and training programs. Farmers should be provided with access to low-cost technologies that improve water use efficiency and soil health. Additionally, government policies should focus on long-term sustainability by encouraging the use of renewable energy in farming and reducing the reliance on chemical fertilizers (Kumar, 2021). Establishing

local knowledge-sharing platforms can help disseminate information about best practices.

Addressing Gender Inequality

To address gender disparities, land reform policies must ensure that women have equalrights to land ownership. In addition, microfinance programs should be expanded to provide larger loans to women entrepreneurs, accompanied by business training and mentorship opportunities. Government schemes should incorporate gender-sensitive frameworks to ensure that women are not left behind in rural economic development (Agarwal, 2022).

Suggested Interventions to Address Identified Gaps

Gap Area	Suggested Intervention	Expected Outcome
Digital Inclusion	Improve rural digital infrastructure and offer digital literacy programs	Greater access to financial services, education, and markets
Gender Equality	Implement land reforms and expand microfinance for women entrepreneurs	Increased economic participation of rural women
Sustainable Agriculture	Provide subsidies and training for sustainable farming	Improved agricultural productivity and environmental sustainability
Microfinance Scalability	Increase loan sizes and provide business mentoring for SHGs	Enhanced business growth and poverty reduction

5. Conclusion and Discussion :

Rural economic empowerment is essential for achieving inclusive growth in India.Although significant strides have been made through microfinance, infrastructure development, and government policies, several gaps remain that need urgent attention. Digital inclusion, sustainability, and gender equality are key areas where further progress is required.

This paper proposes that addressing these gaps will require a multi-pronged approach that integrates digital technologies, promotes sustainable agricultural practices, and ensures gender equality. Future research should focus on evaluating the long-term impact of rural development programs and identifying innovative solutions that can be scaled across different regions of India.

By adopting an integrated and inclusive strategy, India can ensure that its rural populationis not only economically empowered but also contributes meaningfully to the country's overall economic growth.

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A Statistical Analysis of CSR in Strengthening Economic Growth and Reducing Poverty in India

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Abstract

India has a number of social issues, including poverty and inequality. Despite the economy's rapid expansion, millions of people still live in poverty and income inequality persists. CSR has emerged as a crucial tool for achieving the SDGs in India, by the introduction of Section 135 of the Companies Act (2013) in India, CSR has mandatory for nationwide. The study uses data from secondary sources from 2014-2015 to 2022-2023, the source of CSR exp. is National CSR portal and data of economic growth is taken from WDI. Using a quantitative approach, the paper employs regression analysis to analyze the relation between CSR expenditure and macroeconomic performance, measured through GDP. The results show a statistically significant and positive relation between CSR spending and GDP in India. This work provides helpful knowledge into how businesses may contribute significantly to inclusive growth through an examination of policy frameworks and actual data. The report also examines the difficulties and potential of implementing CSR that contribute to the economic growth.

Keywords : CSR, Inequality, Poverty, Sustainable Development.

Introduction :

The fundamental tenet of CSR is that companies have a social obligation to the public,stakeholders, and themselves. CSR is a crucial word that has developed throughout time to satisfy corporations' social obligations. essential component of contemporary corporate strategyacross the globe (Carroll & Shabana, 2010).

A major turning point for CSR in India wasthe Co. Act of 2013, which mandated that firms with a net worth of at least INR 500 crore, revenue of at least INR 1000 crore, or a net profit of at least INR 5 crore or more must allocate at least 2% of their yearly average net income to CSR initiatives during the three fiscal years prior.

According to the UN, eradicating poverty from people and society is a top goal. The UN consistently urges its member states to remove the disease from society. The 1948 adoption of the Universal Declaration of Human Rights (UDHR) strengthened the focus on eradicating hunger and poverty. The United nation's MDG, which was drafted in 1990, outlines its goal of halving poverty in 25 years. In order to eradicate poverty, UNO

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proposed a multipronged strategy and requested that agencies and international aid org. provide financial and technical help through the development of private sector capacity, entrepreneurial opportunities and skills, and industries that will increase PCI and create jobs.

Managing human resources, such as motivating staff to improve environmental performance by lowering pollutants and adhering to more stringent emission standards set by the government, isone aspect of modern CSR practices. Rural development and poverty eradication through community development. 70% of the impoverished reside in rural areas and are dependent on agriculture, according to World Bank data. Even after years of freedom, half of India's population still relies on agriculture and related industries. In high-poverty areas, 80% of the population makes their livelihood from agriculture or agriculturally linked businesses.

Before advent of CSR, it was up to the people to contribute towards social requirements or not. It was totally philanthropic undertaking. In India, CSR has emerged as central approach for business concerns as Companies Act of 2013, mandate for business units which are qualified under the CSR criteria have to spends 2% of their NP on CSR programs so that their +ve impact can enhance socio-economic condition and hence lead to the economic growth. In this section the CSR spending is analysed. The Economic Survey 2023-24 highlighted the fact that there is increase of 53% in CSR activities and within 8 years the CSR expenditure has increased to 1.53 Lakh Crore. Data shows that total amount of 29986.92 (INR Cr.) has been spent on CSR covering the 14 development sectors in 40 states and union territories in financial year 2022-23.

Year	Total CSR (crores)	Government organizations' contribution (in crores)	Non-govt organizations' contribution (in crores)	Number of organizations contributing CSR from 50 lakh to 1 crore	Number of CSR projects
2014-2015	9,565	2816	7249	662	9352
2015-2016	13,828	4214	10,302	1155	18,423
2016-2017	14,344	3295	11,033	1170	23,008
2017-2018	17098.58	2553	11,070	1072	23,489

The above table is taken from national CSR portal showing data for CSR projects and expenditure by government and non-government organizations. Table also representing the contribution range from 50 lakh to 1 crore.

Years	Total no. of companies	Total amount spent on CSR	States and UTs covered	Total no. of CSR projects	Development sectors
2018-19	25,181	20,217.65	39	32,071	14
2019-20	22,985	24,965.82	38	35,290	14
2020-21	20,840	26,210.95	39	39,324	14
2021-22	19,888	26,579.78	40	44,425	14
2022-23	24,392	29,986.92	40	51966	14

Source: (National Portal for CSR) CSR expenditures from 2018-2023
Figure: CSR Expenditure
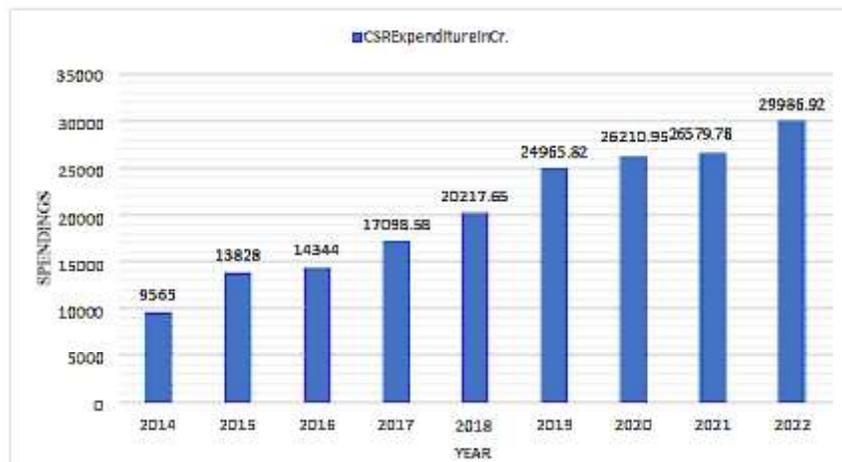
Literature review :

Birbhu Prasadand Mohanty (2012) madeastudyon" Sustainable Development Vis-à-vis Actual CSR". Acco. to the findings, businesses now spend a lot of money on things like food, education, ground water, child labor, and soon, but they are unaware of the common basic needs of the under privileged. According to there port,while making a profit is a given for businesses,CSR goes beyond these obligations, by the study's findings, sustainable development is the balanced growth of both society and the business.

Bardy R, Drew S and Kennedy T F (2012) study explored the FDI and its contribution in development of economic and their connection with CSR and ethics. Study explored the Sub-Saharan Africa region especially the poverty-stricken region.

Maheshwari H, Kumar V, (2019), research was done with aim to promote and the CSR activitiesby other sectors too by ensuring sustainable development. Study also showed CSR contribution different companies towards development sectors such as education promotion, inequality and

(99)

poverty reduction etc. By helping in different sectors, it also inculcates SDGs.

Niloufar Fallah Shayan, et.al (2022) Both a new CSR drivers' model and a comprehensive CSR model are presented in this study. The benefits of SDGs and CSR are then highlighted. The suggested framework gives a roadmap with more quantifiable results, meets present and future demands, and benefits from both CSR and SDGs. The suggested approach gives a better path with more quantifiable results, meets present and future needs, and benefits from both CSR and SDGs.

Rashed & Shah (2020) This work was carried out to examine the role that private sector businesses play in achieving the SDGs. It also highlighted the difficulties and obstacles that the private sector may encounter while pursuing the SDGs. Additionally, it was determined that the circular economy, CSR, and environmental initiatives are the three main support systems needed for the implementation of the SDGs.

Wirba A V, (2023), social responsibility is not the responsibility of corporates only, govt. should also take important initiatives in promoting CSR activities along with corporate sectors. In developing nation, management of resources should be transparent and good governance practices should be shared and welcomed so that it could be utilized.

Research objective :

- To analyze the current role of CSR initiatives in addressing poverty in India.
- To assess the impact of CSR expenditure on economic growth.
- To recommend policy measures for fostering CSR practices that contribute to inclusive and equitable growth in India.

Research Hypotheses :

H0: There is no significant impact of CSR expenditure on economic growth.

H1: There is significant impact of CSR expenditure on economic growth.

Research Methodology :

Current work is based on descriptive analysis and analytical in nature. The relevant data is collected from Secondary sources only. Data for CSR expenditure is taken from National CSR portaland for economic grow this taken from WDI. Data is collected from 2014-2015 to 2022-2023 time frame. For the analysis regression is used.

Result and Discussions :

Table: Spending on Poverty under CSR

Year	Spending(incr)
2014-2015	274.7
2015-2016	1252.08
2016-2017	614.65
2017-2018	811.2
2018-2019	1195.78
2019-2020	1159.71
2020-2021	1407.58
2021-2022	1894.08
2022-2023	1232.62

Source : Natinoal CSR portal
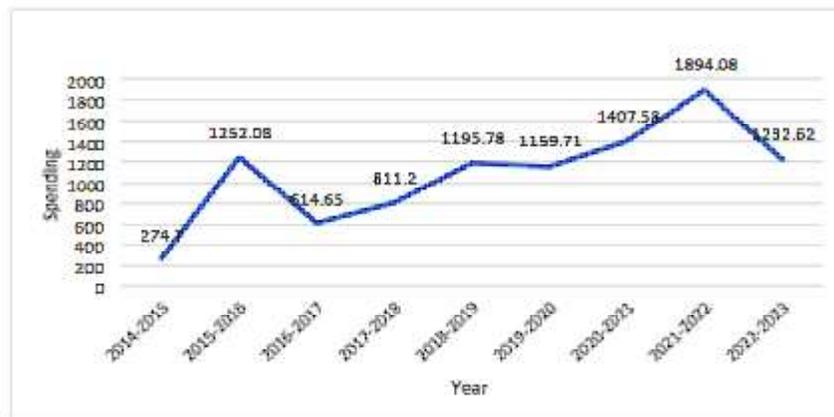
Sources: Authors own compilation

From 2014-2015 to 2022-2023, the data illustrates the patterns in CSR spending on poverty alleviation, demonstrating no table fluctuations over time. From Rs. 274.7 crore in 2014-2015 to Rs.1252.08 crore in 2015-2016, investment first increased dramatically, indicating a greater level of corporate commitment following the introduction of CSR rules in the Co. Act (2013). In 2016-2017, spending decreased to Rs.614.65 crore, butit then gradually in creased, reachinga high of Rs.1195.78 crore in 2018-2019. During 2019-2020, spending remained relatively stable at Rs.1159.71 crore. Spending increases to Rs.1407.58 crore during the COVID-19 pandemic in 2020-2021, as businesses set poverty all eviationasa top priority.

This increasing pattern persisted, peakingat Rs.1894.08 crore in 2021-2022.

Regression analysis :

$$\ln (gdpt) = \alpha + \beta \ \ln (CSR \ exp) + Et$$

α = intercept

β measures the impact of CSR expenditureon GDP.

Sr. No.	Independent Variable	ln(gdp$_t$)= α+βln(CSRexp)+E$_t$		
		coefficient	t-statistics	probability
1.	Constant	1.64	10.33	4.8
2.	ln (CSRexp)	4189	5.91	0.001042
3.	R-squared	0.853		
4.	Adjusted R-squared	0.829		
5.	S.E. of regression	1.15		
6.	F-statistic	34.95		

Sources: Authors own compilation

The result can be interpreted as there is + ve relation between CSR exp. and GDP. With the surge in CSR exp. the share of GDP also increases. There is +ve impact of CSR exp. on the indicator of eco growth that is GDP. Hence, rejecting the null hypothesis and accepting the alternate hypothesis. There is significant impact of CSR exp. on economic growth thatis GDP.

Research limitation :

There are several restrictions on the study. Since it only relies on secondary data from the World Development Indicators and the National CSR Portal, any errors in the data could have an impacton the conclusions. The analysis's narrow time frame (2014-2015 to 2022-2023) limits its abilityto bring light on CSR's long-term effects. Regional and sectoral differences in CSR results may be obscured by the use of aggregate national-level data. Due to data limitations, poverty all eviation is only discussed in qualitative terms, where as economic progress is only quantified by GDP,which does not completely reflect inclusive development. The results show association rather than clear causality because the regression model does not account for other macro economic variables, which could result in omitted variable bias.

Conclusion :

The research paper highlights the potential of Corporate CSR as a transformative tool for achieving SDGs in India by addressing critical socio-economic challenges like poverty and in equality.The regression analysis

demonstrates a significant and + ve relation between CSRexp. and GDP, with a high adjusted R-squared value (0.829). This shows that investment of CSR contributed meaningfully to India's economic growth. The null hypothesis (H0) is rejected, confirming that CSR exp. positively impacts GDP. The qualitative insights tells that CSR initiatives in poverty alleviation play an imp. role during crises, such as during the COVID-19 pandemic. CSR expenditure in India has shown +ve growth since the implementation of the Co. Act, 2013. Total CSR spending across all sectors increased substantially, with a remarkable surge during the pandemic, reflecting a responsive and need-based approach by businesses. Despite the growth in CSR expenditure, challenges such as uneven distribution of resources, lack of targeted strategies, and limited focus on poverty-specific programs hinder the full power of CSR in addressing inequalities. There is an opportunity for firms to align their CSR initiatives more effectively with the United Nations' SDGs to foster equitable and inclusive growth. To maximize the impact of CSR on poverty and inequality, the paper suggests that encouraging businesses to use a strategic approach to CSR, merging their initiatives with national priorities and SDGs, enhancing accountability & transparency in CSR spending to ensure effective utilization of resources, developing policies that incentivize businesses to invest in underprivileged areas and focus on poverty reduction.

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India-Singapore Trade Relations: An Exploratory Study

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Abstract

The paper's main objective is to emphasize the significance of bilateral trade among the two nations. The Trade Complementarity Index (TCI), Hirschman Herfindahl Product Index (HHI), trade intensity index and revealed comparative advantage were estimated from 2010 to 2021and hypotheses were also constructed for statistical testing to meet this goal. Bilateral relationships among India and Singapore have grown gradually over time and India is one of the Singapore's biggest trade partners, with two-sided trade involving the two countries totalling to USD 30.11 billion in 2021-22. Following the end of CECA, Bilateral trade expanded reaching US\$27.85 billion in 2018-19 from US\$6.7 billion in Fiscal Year 2004-05. Singapore is now ranked first among ASEAN nations and sixth among India's top trading partners for the years 2021-2022.

According to trade indexes, India has stronger trade with Singapore than it does with the remainder of the globe, and its trade balance stands positive with Singapore. However, beginning in 2017-18, India's trade balance with Singapore became negative, indicating that currency is flowing outward to pay for imports, indicating that the country is overly reliant on foreign goods, and so India should concentrate on exporting more items so that the trade balance would improve. Moreover, India also benefits from comparative advantages in certain goods with the same nation.

Keywords : Bilateral trade, Trade relations. Trade Complementarity Index (TCI), Hirschman Herfindahl Product Index (HHI), Revealed Comparative Advantage, Trade Intensity Index.

1. Introduction :

Over the years, international trade has become a major force, and more crucially, a means for boosting living standards around the world. This is true, considering that international trade accounts for the majority of overall economic activity in nations around the globe. Trade allows nations to utilize sufficient raw materials. Along with comparative advantage theory, nations should focus more on things with little opportunity costs, resulting in higher efficiency through specialization and economies of scale. It gives consumers a broader and more diverse range of choices. It also mends, if not dramatically, the transferral and movement of technology from technologically advanced to underdeveloped countries. India began

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implementing pro-free trade external sector policies in the early 1990s by lowering tariffs and removing restrictions. Both the amount and composition of trading have been significantly impacted by these regulations [Panagariya, A., 2004] 6.

The longstanding and historical friendship between India and Singapore has grown into a strong relationship over the years, making both nations trustworthy business partners with shared goals for trade, business, technical collaboration, and energy security. Economically, there is a developing synergy between India and Singapore in trading, information technology, and certain manufacturing. With an eye on the greater Asia-Pacific market, several of India's major software brands, including Satyam, Infosys, WIPRO, and TCS, have been operating from Singapore [India-Singapore Bilateral Trade & Investment] 5.

In recent years, trade amongst India and Singapore has greatly expanded. The value of India's exports to Singapore rose from US$ 9,066.23 million in 2009-10 to US$10,650.09 million in 2020-21. However, its share has fallen from 4.24% in 2009-10 to 2.97% in 2020-21. In addition, India's imports from Singapore have climbed from US$7,263.14 million in 2009-10 to US$18,201.53 million in 2020-21. As a result, its share has climbed from 2.23% to 3.37% over the last ten years. Total bilateral trade has scaled from US$ 16,329.37 million in 2009-10 to US$ 28,851.62 million in 2020-21. The balance of trade between India and Singapore is positive. However, beginning in 2017-18, India's balance of trade with Singapore became negative, indicating that currency is flowing outward to pay for imports, indicating that the country is overly reliant on foreign goods, and as a result, India should concentrate on exporting more of such products, which will improve the trade balance [India-Singapore Relation, 2022].[4]

Table 1 : India's trade with Singapore (USD Million)

	Export	Growth (%)	India's total Exports	Growth (%)	Share (%)	Import	Growth (%)	India's total Imports	Growth (%)	Share (%)	Total Trade	Trade Balance
2009-10	9,066.23				4.24	7,263.14				2.23	16,329.37	
2010-11												
2011-12												
2012-13												
2013-14												
2014-15											18,201.06	
2015-16												
2016-17												
2017-18												
2018-19												
2019-20											20,601.77	
2020-21	10,650.09				2.97	18,201.53				3.37	28,851.62	

Source: UN COMTRADE Database & "Export Import Data Bank. Ministry of Commerce and Industry, Government of India", 2022.

"Mineral oils, mineral fuels and products of their distillation", "Ships, boats, and floating structures", "Machinery and mechanical appliances, boilers, nuclear reactors; parts thereof", "organic chemicals" and "electrical machinery and equipment" are main supplies traded by India to Singapore.

Table 2 : "India's major Export items to Singapore"
(USD Million)

HS Code	Commodity name	2020-21	2019-20	2018-19	2017-18	2016-17
27	"Mineral fuels, mineral oils and products of their distillation"	5,608	3,989	4,600	6,393	6,845
89	"Ships, boats, and floating structures"	847	1,143	2,388	607	1,376
84	"Machinery and mechanical appliances, boilers, nuclear reactors; parts thereof"	865	686	834	703	489
29	"Organic chemicals"	452	315	369	341	357
85	"Electrical machinery and equipment"	304	278	319	248	235
76	"Aluminum and articles thereof"	109	198	164	48	93
90	"Optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus"	191	190	239	206	154
71	"Natural, cultured Pearls; precious, semi-precious stones; precious metals; metals clad with precious metal"	659	280	639	666	530
87	"Vehicles; other than railway"	30	19	46	37	53
88	"Aircraft, spacecraft, and parts thereof"	91	118	170	244	242
62	"Apparel and clothing accessories"	16	17	25	24	32
39	"Plastics and articles thereof"	102	70	39	34	31

Source: UN COMTRADE Database.

Electrical machinery and equipment, "machinery and mechanical appliances, boilers, nuclear reactors; parts thereof", "Mineral fuels, mineral oils and products of their distillation", ships, boats, and floating structures, organic chemicals, "plastics and articles thereof" and "optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus" are major commodities imported from Singapore to India.

Table 3 : "India's Major Import items from Singapore"
(USD Million)

HS Code	Commodity name	2020-21	2019-20	2018-19	2017-18	2016-17
85	Electrical machinery and equipment	2,963	2,488	2,913	2,685	1,189
84	"Machinery and mechanical appliances, boilers, nuclear reactors; parts thereof"	2,979	2,242	2,758	2,333	1,110
27	"Mineral fuels, mineral oils and products of their distillation"	2,304	1,114	1,563	1,473	491
89	"Ships, boats, and floating structures"	1,046	1,145	743	741	356
29	Organic chemicals	1,429	938	1,274	1,867	1,380
39	Plastics and articles thereof	1,277	812	1,133	1,157	827
90	"Optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus"	975	732	899	729	424
71	"Natural, cultured Pearls; precious, semi-precious stones; precious metals; metals clad with precious metal"	1,822	512	415	512	506
38	Chemical products n.e.c.	420	342	317	308	206
72	Iron and steel	474	288	445	410	173
15	"Animal, vegetable or microbial fats and oils and their cleavage products"	437	223	251	207	2
87	"Vehicles; other than railway or tramway rolling stock"	228	138	218	224	2

Source: UN COMTRADE Database.

2. Objectives And Methodology :

This paper's main objective is to focus the significance of bilateral trade among these two nations. The following aims are central to the research:

- To analyze the structure and pattern of trading among India and Singapore.
- To examine the trade complementarity Index (TCI) amongst India and Singapore.
- To analyze India-Singapore Hirschman Herfindahl Product Index (HHI).

- To determine the India-Singapore trade-intensity index.
- To determine revealed comparative advantage (RCA) among India and Singapore.

The Trade Complementarity Index (TCI), Hirschman Herfindahl Product Index (HHI), Revealed Comparative Advantage (RCA) and Trade Intensity Index (TII) among the two nations have been computed in order to meet these objectives. For the index calculation, records from the WITS and UN COMTRADE database were used from 2010 to 2021. HS 1996 was used for commodity classification with two digits. Data on trade composition was obtained from the "Export-Import Data Bank of the Ministry of Commerce and Industry of the Government of India". The hypotheses were tested and secondary data was analysed using SPSS software. Various statistical tools are used to analyze the work with SPSS software. Simple Linear Regression Analysis and the Independent t-test are used to calculate the results of hypothesis testing.

2.1 Trade Complementarity Index (TCI)

The trade complementarity index (TCI), which measures how well a nation's import and export structures fit, might offer valuable insights about intraregional trade prospects. Stated differently, the Trade Complementarity Index (TCI) illustrates how Singapore's import demand is met by India's export baskets. This is a helpful indicator for understanding a nation's export prospects in relation to other nations' import baskets. In this case as well, we will be attempting to determine whether India's supply and demand for imports match, whether there is a complementarity, and whether there are prospects for India to export to Singapore. If there is a disparity, it suggests that there is no complementarity and that India's export prospects to Singapore are limited. The counts of TCI can be anywhere between 0 to 100. The zero value of TCI shows no export and import takes place between the countries whereas TCI will be 100 when export profile of a country is exactly match with the import profile of partner country. A high value of TCI indicates favourable trade prospects between the countries [WITS, 2023][10]. The formula to calculate TCI is:

$$\text{TCij} = 100 \left(1 - Sum\right)\left(\left|miK - xij\right| / 2\right)$$

Where,
TCij is trade Complementarity Index amongst two nations i and j.
Mik is the country's k portion of good i in its total imports from world.

Xij is the Country's j portion of good i in total exports to world. [WITS, 2023][10].

India's Trade Complementarity Index (TCI) with Singapore:

The numbers of India's Trade Complementarity Index with Singapore are shown in the table above. India's exports are not exactly matching Singapore's imports. India and Singapore have trade complementarity values of about 50, indicating that India's export basket matches partially with Singapore's import basket, representing the average trade prospects between the two countries. India will not benefit significantly from increased trade with Singapore.

Table 2.1 :India's Trade Complementarity Index (TCI) with Singapore

Years	India's Trade Complementarity Index (TCI) with Singapore
2009-10	47.65
2010-11	49.39
2011-12	51.74
2012-13	53.11
2013-14	50.27
2014-15	50.07
2015-16	48.94
2016-17	48.66
2017-18	50.39
2018-19	52.19
2019-20	52.89
2020-21	50.60

Source: World Integrated Trade Solution (WITS), World Bank.

2.2 Hirschman Herfindahl Product Index (HHI)

The degree of production concentration or dispersion in a market is indicated by this indicator. It is determined by squaring each producer's market share and comparing the total to a scale. It is the total of each product's squared shares in total exports. An index near 0 indicates a nation with a properly diversified export portfolio, and it is said to be less diversified if the value of HHI is close to one. HH Index can be calculated with the help of the following formula:

$h = \sum S_i^2$

Where,

h= value of HH Index of a country.

$\sum Si^2$ = aggregate value of a square share of the product in the trade basket of a nation.

In this paper, the HH Index was calculated using HS-1996 commodity codes at the 2-digit level. The Hirschman-Herfindahl Index (HHI) is used to analyse a nation's export portfolio with a cooperating nation [WITS, 2023][10].

India-Singapore Hirschman Herfindahl Product Index (HHI):

The table below shows that India's HH Index values are very close to zero. As a result, India has a very diverse export profile with Singapore. The number of Indian products exported to Singapore is also increasing over time. It was 2713 in 2009-10 and increased to 3091 in 2016-17, with the number of exported products increasing since then due to the launch of CECA's third review between the two nations in 2018. However, due to the global covid-19 pandemic, fewer products were exported to Singapore in 2020. In the fiscal year 2020-21, India has 3115 products in its export basket with Singapore.

Table 2.2 : India's HH Index with Singapore

Years	India's HHI Product Index	No. of Products exported by India to Singapore
2009-10	0.4845	2713
2010-11	0.5678	2787
2011-12	0.5161	2908
2012-13	0.4282	2896
2013-14	0.4101	2889
2014-15	0.2652	3076
2015-16	0.2429	3079
2016-17	0.3301	3091
2017-18	0.2956	3122
2018-19	0.1879	3056
2019-20	0.1721	2979
2020-21	0.1747	3115

Source: World Integrated Trade Solution (WITS), World Bank.

2.3 Trade Intensity Index (TII) :

The "trade intensity index" is created to assess when the size of trade among the nations who are trading is in line with expectations, below expectations, or else surpasses expectations. Alternately, this ratio can be broken down into two components: the "export intensity index" (EII) and the "import intensity index" (III). The Trade Intensity Index is based on actual bilateral trade flow observations and assesses the intimacy of any two countries' trading relationships. The more our export potential, the higher the Trade Intensity Index, and hence an exporter should choose countries with high TII values. The trade intensity index is calculated by dividing a nation's exports to a partner by the proportion of its imports from the rest of

the globe that partner receives [P.M.I., 2023][9].

Export Intensity Index (EII) among India and Singapore:

XIIijt = [Xij / Xi] / [Mj / (Mw- Mi)] * 100

Where,

XIIijt = "Export intensity index of India's trade with Singapore", Xij = "Exports of India to Singapore", Xi = "Total Exports of India", Mj = "Total Imports of Singapore", Mw = "Total World Imports", Mi = "Total Imports of   India" and t = 2009-10 to 2020-21.

Import Intensity Index (III) between India and the Singapore: MIIijt = [Mij / Mi] / [Xj / (Xw- Xi)] * 100

Where,

MIIijt = "Import intensity index of India's trade with Singapore", Mij = "Imports of India from Singapore", Mi = "Total Imports of India", Xj = "Total Exports of Singapore", Xw = "Total World Exports", Xi = "Total Exports of India" and t = 2009-10 to 2020-21.

Trade Intensity Index (TII) ranges in value from 0 to 1. When multiplied by 100, 0 to 100, there is no commercial link between the two countries if the value is 0. Strong commercial relations are indicated if the value is 1. If the "import intensity index" is higher (or lower) than 100, it means India is trade in from Singapore far more (or lesser) than would be predicted based on Singapore's percentage of global trade. A value of 0 indicates that there is no export relationship among these two countries, a value near 100 indicates that performance is noteworthy, and a count more than 100 specifies that India transfers more to Singapore than could be projected given Singapore's share of global trade [Raj, P. S., & Ambrose, D., 2014][7].

India-Singapore Trade Intensity Index :

The subsequent figures mentioned in the table illustrate the value of trade intensity among these two countries; India's trade intensity nearly always exceeds 100 from 2010 to 2021. Singapore is experiencing the same problem. Simply put, it indicates that India's trade with Singapore is more vigorous than its trading with throughout the globe. Similar to this, Singapore's trade indices with India usually have a value greater than 100. This indicates that Singapore's trade with India is more dynamic than its trade with throughout the globe.

Table 2.3 : "Trade Intensity Index between India and Singapore"

Years	XIIijt	MIIijt	XIIjit	MIIjit
2009-10	239.44	117.85	194.23	269.67
2010-11	295.69	105.04	163.86	298.66
2011-12	200.64	75.58	102.15	215.45
2012-13	217.79	70.11	99.99	160.00
2013-14	146.82	77.14	111.27	141.43
2014-15	128.78	82.12	109.11	107.06
2015-16	147.92	90.49	120.67	133.09
2016-17	220.51	96.46	132.87	153.09
2017-18	175.36	157.85	122.00	134.65
2018-19	164.39	150.53	104.30	108.65
2019-20	134.89	131.29	87.31	94.84
2020-21	238.82	222.47	185.93	135.71

Source: Calculations done by the researcher and Data retrieved from World Integrated Trade Solution (WITS) and UN COMTRADE Database.

Here,

XIIijt = "India's Export Intensity Index with respect to Singapore"; MIIijt = "India's Import Intensity Index with respect to Singapore"; XIIjit = "Singapore's Export Intensity Index with respect to India"; MIIjit = "Singapore's Import Intensity Index with respect to India"; i = India; j = Singapore; t= 2009-10 to 2020-21.

2.4 Revealed Comparative Advantage (RCA) :

[Balassa, 1965]1 created the RCA index. The RCA Index emphasises "how competitive a product is in a country's export compared to the product's share of global trade." A commodity with a high RCA that is economical is capable of being exported to nations having a low RCA.

"RCAij = (Xij / Xit) / (Xwj / Xwt)"

Where,

"Xij- values of country i's exports of product j",

"Xwj- world exports of product j", "Xit- country i's total exports",

"Xwt- world total exports."

A nation's comparative disadvantage in the product is evident when the RCA value is less than one. In a similar vein, if value is more than 1, it suggests that nation has demonstrated to have a comparative advantage in that particular product [Serin, V., & Civan, A., 2008][8].

2.4.1 India's Revealed Comparative Advantage (RCA):

The subsequent data below presents the results of the "revealed comparative advantage" of India over Singapore from 2010 to 2021 for main products alone. An increasing RCA value over the reference period implies that a certain product's exports are expanding faster than world exports. The RCA calculation approach of [Balassa, 1977][2] was applied in this investigation. There are just a few products with RCA values larger than one. These products are "Mineral fuels, mineral oils and products of

their distillation; bituminous substances; mineral waxes" (HS 27), "Organic Chemicals" (HS 29) and "Natural, cultured Pearls; precious, semi-precious stones; precious metals; metals clad with precious metal, and articles thereof; imitation jewellery; coin" (HS 71). These are the goods where India held a comparative advantage over Singapore.

Table 2.4.1 : Calculation of RCA of India over Singapore

Years	HS Code 27	HS Code 29	HS Code 39	HS Code 71	HS Code 84	HS Code 85	HS Code 87	HS Code 90
2009-10	2.08	1.67	0.16	1.52	0.27	0.11	0.93	0.78
2010-11	1.67	1.15	0.30	0.99	0.24	0.10	1.23	0.68
2011-12	1.88	2.57	0.34	1.12	0.21	0.07	1.80	0.72
2012-13	1.92	1.72	0.17	0.74	0.27	0.07	0.52	0.46
2013-14	1.72	1.39	0.18	0.91	0.36	0.09	0.48	0.58
2014-15	1.81	1.97	0.21	0.67	0.34	0.10	0.77	0.63
2015-16	2.71	2.36	0.18	0.97	0.37	0.10	0.26	0.60
2016-17	2.68	1.63	0.13	0.75	0.31	0.07	0.30	0.39
2017-18	2.58	1.74	0.16	1.16	0.47	0.09	0.24	0.60
2018-19	2.04	1.71	0.28	1.13	0.48	0.11	0.29	0.64
2019-20	3.22	1.76	0.56	0.49	0.51	0.10	0.20	0.59
2020-21	2.84	1.92	0.33	1.17	0.55	0.08	0.25	0.49

Source: Researchers calculation founded on UNCOMTRADE database.

2.4.2 Singapore's Revealed Comparative Advantage (RCA):

The data below reveals the Singapore's RCA value over India from 2010 to 2021. Singapore possesses comparative advantage in most of the goods equated with India like in "Organic Chemicals" (HS 29), "Plastics and articles thereof" (HS 39), "Machinery and mechanical appliances, boilers, nuclear reactors; parts thereof" (HS 84), "Electrical machinery and equipment and parts thereof" (HS 85) and "Optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus; parts and accessories" (HS 90).

Table 2.4.2 : Calculation of RCA of Singapore over India

Years	HS Code 27	HS Code 29	HS Code 39	HS Code 71	HS Code 84	HS Code 85	HS Code 87	HS Code 90
2009-10	0.56	1.96	1.17	0.03	1.00	1.08	0.20	1.43
2010-11	0.51	2.09	1.53	0.10	0.95	1.29	0.19	1.68
2011-12	0.26	2.79	2.00	0.37	1.12	1.58	0.12	2.13
2012-13	0.13	3.85	2.37	0.14	1.25	1.41	0.04	1.76
2013-14	0.14	3.37	2.90	0.24	1.40	1.10	0.03	1.82
2014-15	0.27	2.80	2.39	0.10	1.32	1.08	0.02	1.66
2015-16	0.24	2.52	2.18	0.25	1.21	1.07	0.01	1.69
2016-17	0.16	3.10	2.56	0.27	1.24	1.02	0.01	2.02
2017-18	0.36	3.40	3.14	0.32	2.22	2.11	1.48	3.17

2018-19	0.43	2.60	3.24	0.29	2.60	2.40	1.70	3.96
2019-20	0.43	2.07	2.72	0.50	2.56	2.33	1.28	3.58
2020-21	0.61	2.37	3.00	0.93	2.78	2.36	1.61	3.90

Source: Researchers own calculation founded on UNCOMTRADE data base.

3. Hypotheses Testing

To achieve the paper's goal, the following hypotheses were constructed for statistical testing:

Ho: There is no significant difference between Export Intensity Index of India's trade with Singapore and Export Intensity Index of Singapore's trade with India.

Ha: There is significant difference between Export Intensity Index of India's trade with Singapore and Export Intensity Index of Singapore's trade with India.

Table 3.1 : Group Statistics of Export Trade Intensity

Group Statistics				
Export Trade Intensity	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Export Intensity Index of India's Trade with Singapore	12	192.5875	51.36725	14.82845
Export Intensity Index of Singapore's Trade with India	12	127.8075	34.96506	10.09354

Source: Computed by the Researcher using SPSS Software.

Table 3.1 displays the amount of years, the export intensity index mean count, the standard error & the standard deviation for the tested variable or variables in the classifications that the grouping variable defines, such as Singapore's export intensity index with India and India's export intensity index with Singapore. The mean value of India's export intensity index with Singapore is 192.5875, with a standard deviation of 51.36725, while Singapore's export intensity index with India have a mean value of 127.8075 and a standard deviation of 34.96506. The mean value of India's export intensity index with Singapore exceeds the mean value of Singapore's export intensity index with India, indicating that India exports to Singapore with a greater intensity than Singapore to India.

Table 3.2 : T value and Significant value of Export Trade Intensity

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	2.742	.112	3.611	22	.002	64.78000	17.93774
Equal variances not assumed			3.611	19.392	.002	64.78000	17.93774

Source: Computed by the Researcher using SPSS Software.

To determine whether there is significant variation between the "export intensity index" of Singapore's trade with India and that of India's trade with Singapore, an independent t-test is employed at the 5% level of significance. The average difference between the export intensity index of Singapore's trade with India and that of India's trade with Singapore is 64.78000. When the Levene test's significance value (P) is greater than 0.05 (95% CI), or 0.112, it specifies that the differences are not considerably diverse from one another (i.e., "the homogeneity assumption of the variance is met)", allowing for the assumption of equal variances. The null hypothesis is overruled at significance level of 0.05 because the value of "t" is 3.611 & the Sig value (P) is 0.002, that is less than 0.05. This suggests that here is a substantial variance among the export intensity index of Singapore's trade with India and that of India's trade with Singapore.

Ho: There is no significant difference between Import Intensity Index of India's trade with Singapore and Import Intensity Index of Singapore's trade with India.

Ha: There is significant difference between Import Intensity Index of India's trade with Singapore and Import Intensity Index of Singapore's trade with India.

Table 3.3 : Group Statistics of Import Trade Intensity

Import Trade Intensity	N	Mean	Std. Deviation	Std. Error Mean
Import Intensity Index of India's Trade with Singapore	12	114.7442	44.77032	12.92408
Import Intensity Index of Singapore's Trade with India	12	162.6917	64.86106	18.72377

Source: Computed by the Researcher using SPSS Software.

The amount of years, import intensity index mean value, standard error & standard deviation for the tested variables in classification distinct by the group variable, i.e. India's import intensity index with Singapore and Singapore's import intensity index with India, are shown in table 3.3. India import intensity index with Singapore have a mean value of 114.7442 and a standard deviation of 44.77032, while import intensity index of Singapore with India have a mean value of 162.6917 and a standard deviation of 64.86106. The mean value of India's import intensity index with Singapore is less than the mean value of import intensity index of Singapore with India, indicating that Singapore imports from India with a greater intensity than India from Singapore.

Table 3.4 : T value and Significant value of Import Trade Intensity

	Independent Samples Test						
	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**
Equal variances assumed	1.173	.290	-2.107	22	.047	-47.94750	22.75108
Equal variances not assumed			-2.107	19.543	.048	-47.94750	22.75108

Source: Computed by the Researcher using SPSS Software.

To determine whether there is a substantial disparity between the import intensity index of Singapore's trading with India and that of India's trading with Singapore, an independent t-test is employed at the 5% level of significance. The import intensity index of Singapore's trade with India and the import intensity index of India's trade with Singapore diverge by an average of -47.94750. When the Levene test's significance value (P) is greater than 0.05 (95% CI), or 0.290, it shows that the discrepancies are not considerably diverse from one another (i.e., "the homogeneity assumption of the variance is met)", allowing for the assumption of equal variances. The null hypothesis is overruled at the 0.05 significance level as the value of "t" is -2.107 and the "Sig. value" (P) is 0.047, that is less than 0.05. This suggests that here is a substantial variance among the "import intensity index" of Singapore's trading with India and that of India's trade with Singapore.

4. Conclusions And Recommendations

Two-sided trade among India and Singapore is increasing, with total trade between the two nations reaching US$ 28,851.62 million in 2020-2021, up from US$ 16,329.37 million in 2009-2010. Growth rate of Singapore's share in total exports of India augmented to 28.53% in 2021-2022, up from - 10.10% in 2009-10. Likewise, Growth rate of Singapore's share in India's total imports improved to 42.52% in 2021-22, up from - 15.68% in 2009-10.

India's Trade Complementarity Index with Singapore show that India's exports are not exactly matching with Singapore's imports. The values of India's trade complementarity with Singapore are around 50, indicating that India's export basket matches partially with Singapore's import basket, representing the average trade prospects between the two countries. Whereas, India's Hirschman-Herfindahl Index (HHI) with Singapore shows that India's HH Index values are very close to zero. As a result, India has a very diverse export profile with Singapore. The number of Indian products exported to Singapore is also increasing over time.

By analysing the results of hypotheses testing it has been seen that there is significant difference between Export Intensity Index of India's Trade with Singapore and Export Intensity Index of Singapore's trade with India because the results of the data analyzed by employing Independent t- test at significance level of 5% shows that the value of "t" is 3.611 and Significance value (P) is 0.002 that is lesser than 0.05 (95% CI), that specifies that Ho hypothesis is overruled at 0.05 significance level and it indicates that there is major difference between Export Intensity Index of India's Trade with Singapore and Export Intensity Index of Singapore's Trade with India.

Further it has been seen that there is a significant difference between Import Intensity Index of India's Trade with Singapore and Import Intensity Index of Singapore's Trade with India because the results of the data analyzed by employing Independent sample t-test at significant level of 5% shows that the "t" value is -2.107 and Significance value (P) is 0.047 that is lesser than 0.05 (95% confidence level), that illustrates that Ho is overruled at the significance level of 0.05 and it simply indicates that there is a substantial difference between Import Intensity Index of India's Trade with Singapore and Import Intensity Index of Singapore's Trade with India.

Trade intensity Index too illustrates that India's trade with Singapore is more penetrating and active than its trading with the remainder of the globe. India had a positive trade balance with Singapore during 2009-10 to 2016-17, suggesting that a country's producers had an active international market. After creating enough goods to meet local need, there is enough

demand from clients abroad to keep local producers occupied. A country with a positive trade balance is a net exporter, selling more items than it buys. However, starting in 2017-18, India's trade balance became negative; suggesting that cash is moving outward to pay for imports, signalling that the country is overly reliant on foreign commodities. India likewise relishes a comparative advantage with the same country in numerous goods. As a result, India should focus on exporting more items in the coming years, and the trade balance would improve. Another conclusion that may be drawn is that both countries gain from having a varied trading framework. As a result of this variation in trade structure, their trading potential is increased.

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From Financial Inclusion to Capability Expansion: Applying Sen's Capability Approach to Cooperative Banking in Uttar Pradesh

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Abstract

Cooperative banks in Uttar Pradesh play a pivotal role in delivering affordable credit, mobilizing rural savings, and supporting micro and small enterprises. However, policy discussions and performance evaluations often emphasize financial inclusion metrics—such as number of accounts opened or loan disbursement volumes—while neglecting the question of whether these services translate into genuine improvements in people's lives. This paper applies Amartya Sen's Capability Approach (CA) to reframe the evaluation of cooperative banking from mere financial access to the expansion of individuals' real freedoms and opportunities. Using a theoretical and conceptual methodology, the study develops a model linking cooperative banking services with capability conversion factors—personal (skills, education), social (gender norms, community support), and environmental (infrastructure, markets)—that mediate the transformation of financial resources into valued outcomes. The paper proposes three testable propositions highlighting the role of governance, non-financial support, and enabling conditions in maximizing developmental impact. The framework provides both a theoretical contribution—integrating CA into cooperative banking literature—and a practical roadmap for policymakers to incorporate capability-based indicators in assessing cooperative banks' performance in Uttar Pradesh.

Keywords: Cooperative Banks; Capability Approach; Financial Inclusion; Uttar Pradesh; Rural Development; Amartya Sen; Social Empowerment.

1. Introduction

1.1 Context and Background

Cooperative banks have long been entrenched in Uttar Pradesh's socio-economic fabric, serving as a vital conduit for rural credit, savings mobilization, and community-level finance. The Uttar Pradesh Cooperative Bank Limited (UPCB)—the state-level apex cooperative bank headquartered in Lucknow—serves alongside 50 District Central Cooperative Banks (DCCBs) and numerous Urban Cooperative Banks (UCBs) spread across the state Press Information BureauSearch IFSC. As of early 2025, UPCB's loan disbursements rose from Rs. 9,190 crore in

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2017 to Rs. 23,061 crore, while its net profit more than tripled, exceeding Rs.100 crore The Times of India+1. The total business of DCCBs expanded to Rs.41,234 crore, with combined profits climbing from Rs.36 crore to Rs.162 crore over the same period The Times of India+1.

1.2 Problem Statement :

Despite these quantitative strides, most of the performance discourse around cooperative banks is heavily anchored in traditional financial inclusion metrics—such as loan volume, deposit growth, branch expansion, and profit margins. While undoubtedly important, these metrics underrepresent whether such financial access translates into genuine improvements in individuals' capabilities and freedoms. Put simply, do cooperative banks enable people— notably small farmers, micro entrepreneurs, and low-income households— to convert financial services into meaningful opportunities in life?

1.3 Research Gap :

There is a clear gap in the literature regarding the qualitative transformation of financial inclusion into real human development when it comes to cooperative banking in U.P. Although the rising scale of operations is well documented, little theoretical work—especially using transformative development frameworks—explores how and under what conditions these services foster real empowerment and expanded capabilities among members.

1.4 Aim and Scope :

This paper seeks to conceptually apply Amartya Sen's Capability Approach (CA)—a well-established normative framework in development studies—to the context of cooperative banking in Uttar Pradesh. Rather than focusing solely on financial metrics, the goal is to theorize how cooperative bank services (credit, savings, advisory, etc.) interact with various conversion factors (personal, social, environmental) to enhance individuals' capabilities—their substantive freedoms to achieve valued life outcomes.

1.5 Key Concepts :

Financial Inclusion: Traditionally measured through access to formal banking services (e.g. account ownership, credit access), but here critically re-examined for its capacity to contribute to developmental outcomes.

- Capability Approach (CA): Developed by Amartya Sen, CA distinguishes between:
- Functioning (valued achievements, like entrepreneurial income or educational attainment),
- Capabilities (the real freedoms or opportunities to achieve those functioning),
- Conversion Factors (factors that affect how financial services are

translated into real opportunity—e.g., education, infrastructure, gender norms).

●   Cooperative Banking Services: Encompasses UPCB and DCCBs' services such as loans, savings, insurance, and capacity-building efforts, including recent modernization and cyber security initiatives The Times of India+1.

1.6 Research Questions :

1.   **RQ1:** In what ways can cooperative banking services in Uttar Pradesh be conceptualized as instruments of capability expansion beyond mere financial inclusion?

2.   **RQ2:** What personal, social, and environmental conversion factors influence whether these banking services translate into meaningful freedoms and outcomes?

1.7 Significance

●   **Theoretical Contribution:** This paper introduces a novel integration of Sen's CA to cooperative banking literature, shifting evaluation beyond financial metrics toward capability-oriented development.

●   **Policy Implications:** Encourages policymakers and cooperative institutions to incorporate capability-focused indicators—such as enhanced entrepreneurial autonomy or educational access—into performance assessment frameworks.

●   **Practical Relevance:** Offers a framework for cooperative banks to design products and services that embed capacity-building and socio-economic empowerment.

2. Literature Review :

1. Capability approach as the analytical lens :

Amartya Sen's capability approach reframes development as the expansion of people's substantive freedoms—what they are able to be and do—rather than as mere income growth (Sen, 1999). The framework distinguishes capabilities (opportunities/freedoms) from functionings (achieved beings/doings) and has become a foundational perspective for policy evaluation and human development (Robeyns, 2016). In public policy, it underpins multidimensional assessment of wellbeing and distributional concerns (Anand, P., 2020). Applications to finance and inclusion argue that access to appropriate financial services can enlarge capability sets— e.g., smoothing consumption risks, enabling investment in health, education, or enterprises—provided institutional design aligns with users' conversion factors (Kuriakose, Francis and Iyer, K., Deepa, 2015; Saha, D., & Alam, R. (2023)

2. Cooperative banking in India: structure, mandate, and role

India's short-term cooperative credit structure (STCCS) is three-

tiered in most states: Primary Agricultural Credit Societies (PACS) at village level, District Central Cooperative Banks (DCCBs) at district level, and State Cooperative Banks (StCBs) at the apex. The system's statutory anchoring and developmental mandate are documented in the Government of India's Ministry of Cooperation Annual Report 2023–24, which also details ongoing reforms to strengthen PACS, DCCBs, and StCBs (Ministry of Cooperation, 2024). NABARD—tasked with supervision and capacity-building—reports continued outreach of cooperative RFIs and dedicates a theme chapter to cooperatives in its Annual Report 2023–24 (NABARD, 2024a). A complementary policy brief outlines NABARD's role in empowering rural financial institutions, including cooperative banks (NABARD, 2024b).

Regulatory oversight of cooperative banks that conduct banking business is with the Reserve Bank of India (RBI). RBI master circulars and directions for Primary (Urban) Cooperative Banks (UCBs), and branch authorization/reporting frameworks for cooperative banks, codify prudential and conduct norms (RBI, 2013a; 2013b; 2019). The RBI Ombudsman Scheme (2021) extends to most UCBs, reflecting an emphasis on consumer protection (RBI, 2021).

3. Uttar Pradesh context: institutional footprint :

Uttar Pradesh (UP) features one State Cooperative Bank (Uttar Pradesh State Cooperative Bank Ltd., UPSCB) and multiple DCCBs. The National Cooperative Database lists the state's DCCBs and provides the official registry backbone for cooperative entities (Ministry of Cooperation, n.d.-a). UPSCB's own disclosures evidence active district level lending/ recovery monitoring (UPSCB, n.d.). NABARD's Key Statistics of Cooperative Banks (FY 2021–22) offers state-wise snapshots (including UP) of StCB/DCCB performance indicators—membership, branch outreach, assets, profitability, and recovery—useful for baseline comparisons and trend analysis (NABARD, 2023).

4. Cooperative banking, financial inclusion, and capabilities :

Empirical literature on financial inclusion in India consistently highlights geographic penetration of formal finance and credit availability as core levers (Sarma & Pais, 2013). From a capability perspective, financial inclusion is not an end in itself but a means to expand agency (Robeyns, 2016; Bache & Reardon, 2020). Studies connecting inclusion with human development outcomes in India find that improvements in inclusion correlate with better socio economic indicators when access is reliable, affordable, and appropriate (Saha, D., & Alam, R. (2023)Reviews of fintech enabled inclusion underscore opportunities for outreach but also warn of new exclusion risks unless institutions

(including cooperatives) adapt processes, governance, and literacy support to users' conversion constraints (Sharma et al., 2024).

The cooperative model—member ownership, local information advantages, and proximity—has long been posited to reduce transaction costs and mitigate information asymmetries in rural credit markets. NABARD's reports emphasize the last-mile role of PACS/DCCBs for smallholders and rural micro-enterprises, including channelization of agricultural credit and government schemes (NABARD, 2024a, 2024b). Ministry of Cooperation documentation similarly positions cooperatives as instruments for inclusive growth and rural livelihoods (Ministry of Cooperation, 2024).

5. Governance, prudential health, and consumer protection :

International and Indian evidence shows that cooperative banks' member-centric governance can deliver local accountability but is vulnerable to governance lapses without strong prudential oversight. RBI's consolidated guidance for UCBs—covering deposit account management, advances, branch authorization, and reporting obligations— reflects lessons from past stress episodes (RBI, 2013a; 2013b; 2019). Strengthening audit, IT governance, and grievance redress through the Integrated Ombudsman Scheme is part of a system-wide push to align inclusion with safety and soundness (RBI, 2021). Recent Government and NABARD initiatives focus on PACS computerization and process modernization to improve transparency and credit delivery quality (Ministry of Cooperation, 2024; NABARD, 2024a).

6. Evidence gaps specific to Uttar Pradesh :

Authoritative national sources provide state-wise financial snapshots, but rigorous impact evaluations linking UP cooperative banking to capability expansion (e.g., education, health, enterprise diversification) remain scarce in peer reviewed literature. Most publicly available UP-specific analyses are descriptive or use financial-ratio approaches (e.g., CAMEL), with limited welfare outcomes. This underscores the originality and value of your proposed study: integrating administrative performance data (UPSCB/DCCBs; NABARD) with household-level indicators of capabilities to test how cooperative credit/use of services translates into functionings in rural UP.

3. Theoretical Framework :

3.1 Rationale for Using the Capability Approach (CA) :

The Capability Approach (Sen, 1999) shifts the focus of development evaluation from means (income, credit) to ends (what people can actually do or be). In the context of cooperative banking, this means moving beyond measuring financial access to examining how such access expands people's

substantive freedoms.

Unlike traditional welfare economics, which may use per capita income or consumption as proxies for wellbeing, CA emphasizes that equal financial inputs can yield very different outcomes depending on the individual's ability to convert those resources into valuable functionings (Robeyns, 2016). This makes it particularly relevant for rural Uttar Pradesh, where gender norms, literacy levels, and infrastructural deficits strongly mediate the benefits of financial services.

3.2 Key CA Components in the Cooperative Banking Context

CA Element	Definition	Application in Cooperative Banking (U.P.)
Functionings	Achieved beings/doings people value	Owning a small enterprise, educating children, securing nutritious food, investing in better housing
Capabilities	The set of real opportunities to achieve valued functionings	Having the *choice* to start a business, send children to school, or invest in farm mechanization
Means	Resources/services available	Cooperative bank loans, savings facilities, crop insurance, skill development programs
Conversion Factors	Conditions affecting transformation of means into capabilities	*Personal*: literacy, health status; *Social*: caste/gender norms, trust in banks; *Environmental*: road connectivity, market access

3.3 Integrating CA into Cooperative Banking Theory

Applying CA to cooperative banking aligns with financial intermediation theory, but goes beyond credit allocation efficiency to assess agency and empowerment.

- Financial Intermediation Theory explains how banks channel savings into productive uses, but assumes equal ability to utilize credit.
- Capability Approach questions this assumption, recognizing that two borrowers with identical loans may have different outcomes due to conversion factors.

3.4 The Uttar Pradesh Case for CA Application
U.P. exhibits :

- Wide rural-urban disparities in literacy and infrastructure (Government of Uttar Pradesh, Economic Survey 2024–25).
- Persistent gender gaps in entrepreneurship, with women constituting less than 20% of formal borrowers in rural districts (NABARD, 2023).
- Dominance of agriculture-linked livelihoods, where seasonal risks and market access constraints shape credit utility.

These conditions create a strong case for a capability-focused evaluation of cooperative banking, as financial inputs alone cannot explain developmental impact.

3.5 Theoretical Proposition Links

- **P1:** Cooperative banking services enhance members' economic capabilities when embedded in supportive social and infrastructural contexts.
- **P2:** Member-owned governance structures improve alignment between financial services and community valued functionings.
- **P3:** Supplementary non-financial support (e.g., training, market linkages) strengthens the conversion of financial inclusion into capability expansion.

4. Conceptual Model

4.1 Model Overview

Building on the Capability Approach (Sen, 1999) and cooperative banking literature, the proposed conceptual model illustrates how financial services provided by cooperative banks in Uttar Pradesh can lead to capability expansion and enhanced functionings, mediated by conversion factors.

4.2 Model Components :

Cooperative Banking Services (Means) :

- Credit products (crop loans, MSME loans, SHG financing)
- Savings instruments (fixed deposits, recurring deposits)
- Risk mitigation (crop insurance, personal accident cover)
- Non-financial services (financial literacy, skill training)

Conversion Factors :

- Personal: literacy, entrepreneurial skills, health status
- Social: caste and gender norms, social networks, trust in institutions
- Environmental: market access, infrastructure, climate risks

Capabilities :

- Economic freedom (choice of livelihood)
- Educational access (ability to send children to school)
- Health security (ability to afford treatment)
- Social participation (agency in community decisions)

Functionings

- Running a profitable microenterprise
- Improved household nutrition and housing quality
- Reduced debt dependency on informal lenders
- Greater resilience to income shocks
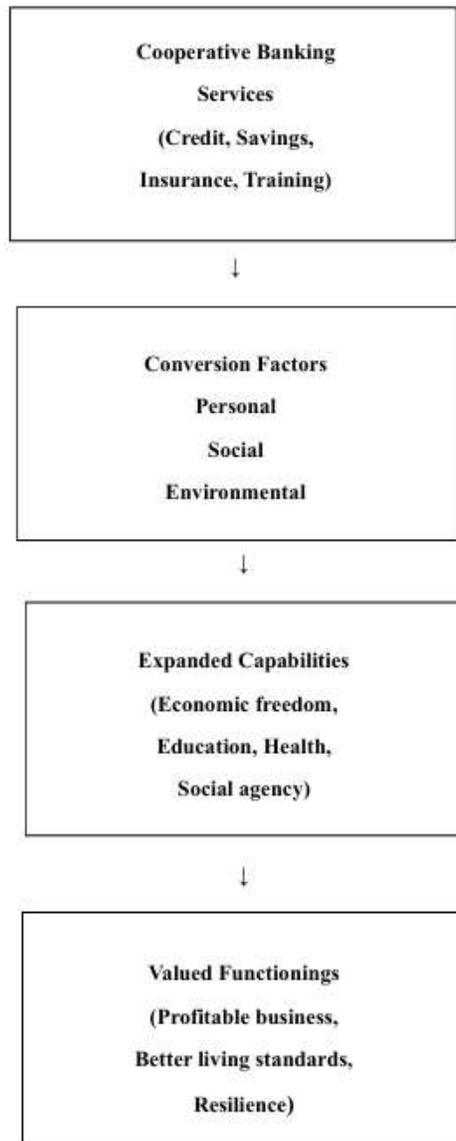
Source: Author's own Concept Model

Theoretical Flow

This model shows that financial access alone does not guarantee development outcomes. Cooperative banking services act as the means, but actual wellbeing improvements depend on whether individuals can convert these means into capabilities—determined by their personal, social, and environmental context.

5. Theoretical Propositions

Since this is a theoretical paper, the research output takes the form of propositions rather than hypotheses. Each proposition emerges logically from the Capability Approach framework and the cooperative banking context in Uttar Pradesh.

P1 – Financial Inclusion Alone Is Not Sufficient for Development

Cooperative banking services positively influence members' economic and social capabilities only when supported by personal, social, and environmental conversion factors.

Rationale: Even identical loan products can yield different outcomes depending on the borrower's literacy, mobility,

and market access (Robeyns, 2016; Bhatia & Singh, 2023).

P2 – Member-Owned Governance Enhances Capability Alignment

Member-based governance structures in cooperative banks increase alignment between financial services and community-valued functionings by incorporating local priorities into product design.

Rationale: Local boards often understand members' needs better than commercial bank management, allowing tailored services (NABARD, 2024a; Ministry of Cooperation, 2024).

P3 – Supplementary Non-Financial Support Strengthens Outcomes

Non-financial interventions—such as financial literacy training, entrepreneurship mentoring, and market linkage facilitation—enhance the conversion of financial inclusion into capability expansion.

Rationale: Capability Approach literature emphasizes that resources must be accompanied by support systems to be effective (Sen, 1999; Kandpal, 2015).

P4 – Socio-Cultural Barriers Limit Capability Realization

Persistent gender norms, caste hierarchies, and trust deficits moderate the relationship between financial services and expansion in rural Uttar Pradesh.

Rationale: Social conversion factors can restrict the freedom to use resources effectively, particularly for women and marginalized communities (Robeyns, 2016).

P5 – Digital Modernization Can Either Expand or Constrain Capabilities

Adoption of digital banking systems in cooperative banks can expand capabilities by reducing transaction costs, but exclude those lacking digital literacy or access.

Rationale: Fintech inclusion studies show mixed effects when digital access gaps exist (Sharma et al., 2024).

6. Methodology

6.1 Research Design

This study adopts a conceptual–theoretical research design, focusing on synthesizing existing literature, policy documents, and statistical reports to develop a framework explaining the role of cooperative banks in expanding capabilities in Uttar Pradesh.

The approach is exploratory in nature, aimed at refining theory rather than testing hypotheses.

6.2 Nature of Study :

- **Type :** Theoretical / Conceptual
- **Purpose:** To build a capability-based framework for understanding how cooperative banks influence socio economic development in Uttar Pradesh.
- **Data Type:** Secondary data (authentic and government-sourced).

6.3 Data Sources

The study relies exclusively on authentic, publicly available sources:

1. Government Reports

- National Bank for Agriculture and Rural Development (NABARD) Annual Reports (2020–2024)
- Ministry of Cooperation, Government of India (2023–2024)
- Uttar Pradesh State Cooperative Bank performance data

2. International & National Databases

- Reserve Bank of India (RBI) cooperative banking statistics
- World Bank financial inclusion indicators

3. Academic Literature

- Peer-reviewed journal articles on cooperative banking, capability approach, and rural finance in India
- Theoretical works by Sen (1999) and Robeyns (2016) on capability theory

6.4 Analytical Approach

The methodology follows integrated thematic synthesis:

1. **Concept Clarification:** Key terms such as cooperative banks, capabilities, functionings, and conversion factors were defined based on established literature.
2. **Literature Mapping:** Relevant academic and policy literature was classified into themes — financial inclusion, governance in cooperatives, social barriers, and non-financial interventions.
3. **Theoretical Integration:** Using the Capability Approach as the lens, themes were integrated into a conceptual model linking cooperative banking services to development outcomes.

4.   **Propositional Derivation:** Logical propositions were drawn to guide future empirical research.

6.5 Limitations of Methodology

● As a theoretical study, no primary data collection was conducted; propositions are untested.

● Outcomes are context-specific to Uttar Pradesh, though the model may be adaptable to other states.

● Relies on data availability and accuracy in government sources.

7. Implications :

The conceptual model developed in this paper offers several implications at theoretical, policy, and practical levels.

These implications are critical for researchers, policymakers, and practitioners working with cooperative banks in Uttar Pradesh.

7.1 Theoretical Implications :

1. Advancing Capability Approach in Banking Research

● The study demonstrates how Amartya Sen's Capability Approach can be operationalized in the domain of cooperative banking.

● Moves beyond narrow financial inclusion metrics (e.g., number of accounts opened) toward evaluating real freedoms and choices created by banking access.

2. Propositional Contribution

● Provides a set of testable propositions that future empirical studies can validate, helping bridge the gap between conceptual theory and measurable field data.

3. Integration of Governance and Social Factors

● Highlights the interaction of member-owned governance with social and cultural conversion factors, enriching the literature on inclusive financial institutions.

7.2 Policy Implications

1. Targeted Capability Expansion

● Government and NABARD schemes should prioritize non-financial support (training, market access, literacy programs) alongside credit provision to maximize real outcomes.

2. Addressing Socio-Cultural Barriers

● Special policies are required for women, marginalized caste groups, and digitally excluded populations to ensure equitable benefit from cooperative banking.

3. Digital Inclusion Safeguards :

● Digital modernization policies in cooperative banks must include offline support options to avoid excluding those with low digital literacy.

4. Performance Evaluation Metrics :

- Policymakers should incorporate capability-based indicators (such as income diversification, education access, and community participation) into cooperative bank evaluation frameworks.

7.3 Practical Implications :

1. Bank Management Strategy

- Cooperative bank boards can use this framework to design products tailored to local needs, ensuring services match community-valued outcomes.

2. Capacity-Building Initiatives :

- Field-level training for members in financial planning, entrepreneurship, and technology use can increase the impact of credit and savings products.

3. Community Engagement Models

- Encouraging participatory decision-making can strengthen trust, leading to higher repayment rates and sustained membership growth.

8. Conclusion :

Cooperative banks in Uttar Pradesh have historically been a cornerstone of rural finance, providing accessible credit, mobilizing local savings, and enabling community-based governance of financial resources. However, conventional assessments—focused primarily on outreach numbers, loan disbursement volumes, or repayment rates—fail to fully capture the extent to which these institutions contribute to actual improvements in people's lives.

This paper has proposed a capability-based framework for rethinking the role of cooperative banks, inspired by Amartya Sen's Capability Approach. By reframing evaluation metrics from financial access to freedom expansion, the study underscores the importance of conversion factors—personal (skills, education), social (gender norms, community structures), and environmental (infrastructure, markets)—in shaping whether access to financial services
leads to valued outcomes.

Three central propositions emerged from the conceptual model:

1. Governance quality within cooperative banks significantly influences their capability-enhancing potential.
2. Non-financial services (training, advisory support) are as crucial as credit in achieving development goals.
3. Socio-cultural and infrastructural factors determine the extent to which financial access translates into real empowerment.

While the study is theoretical in nature, it lays a strong foundation for future empirical research. Testing these propositions using mixed-method approaches across diverse districts of Uttar Pradesh would yield actionable

insights for both policy and practice.

Ultimately, integrating capability-based indicators into cooperative bank evaluation can help ensure that these institutions not only expand financial access but also meaningfully enhance the quality of life for rural populations.

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The Impact of Cyber Crimes on User Trust and Adoption of Digital Payment Systems: An Empirical Study in Lucknow

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Abstract

The adoption of digital payment technologies has surged globally, offering unparalleled convenience in financial transactions. But this has additionally culminated in a rise in cybercrimes, posing a danger to the safety and reliability of the services offered by digital payment applications. Therefore, the study aims to evaluate the influence of cyber scams on the reliability of digital payment applications, focusing on users in Lucknow, India .Users' intentions and use of digital technology are significantly influenced by safety and trust. Many people fall for the charming and persuasive words of hackers and lose their money which decrease the use of digital payment apps. This study investigated how cyber scams affect users' experiences with digital payment apps, their exposure to cybercrimes, especially digital payment scams, and the trustworthiness of digital payment applications in light of the rise in cybercrime activities. The primary objectives of the study were to determine which digital payment apps are most popular based on user preferences and usage frequency, as well as to examine how being exposed to cyber frauds affects trust and behavior toward digital platforms.The study has adopted a quantitative approach and convenience sampling method was used. An online questionnaire was distributed, and data from 90 respondents were thoroughly examined using bar graphs and pie charts. The study's findings show that rising cybercrimes negavitely impact trust and the adoption of digital payments. Google Pay was the most used app, followed by PhonePe and Paytm, where as WhatsApp Pay and BHIM were the least popular. Cyber fraud increases the risk associated with payments. The findings emphasize the significance of cyber security awareness and how users interact with digital payment systems. This research concludes that despite the widespread use of digital payments concerns about cyber threats still influence user behaviour and perceptions of platform reliability.

Key Words- Cyber Crimes , Digital Payments, Consumer Trust

Introduction :

Since the demonetization policy and the COVID-19 pandemic, the digital payment landscape in India has witnessed exponential growth. These

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platforms have transformed the financial behavior by enabling seamless, branchless transactions for services ranging from utility bill payments to peer-to-peer transfers. The world has changed significantly throughout the era of digital innovation and ICT, with business transactions moving from cash to digital once (Muhamad, Haroon, & Najiran, 2009). Platforms used to conduct financial transactions for a variety of products or services bought online are referred to as digital payments (Roy and Sinha 2014). Plastic cards, UPI, mobile wallets, internet banking, and mobile banking are just a few of the digital platforms or applications that are used in digital payments. The most used digital payment method is UPI.The National Payments Corporation of India created the Unified Payments Interface (UPI), an instantaneous real-time payment system that makes interbank transactions easier. The Reserve Bank of India oversees the interface, which transfer money between two bank accounts on a mobile platform quickly (Bijin Philip, 2019). To simplify and offer a single interface for all systems, the National Payments Corporation of India (NPCI), which oversees all retail payment systems in India, has launched a new effort called the Unified Payment Interface. On August 25, 2016, banks began uploading their UPI-capable apps to the Google Play store (Kratika and Arpita, 2016).

Nonetheless, this surge in digital financial services poses a potential threat to the people of India. Today, even as of 2026, a major chunk of the people in India remains at risk of facing cyber threats. Cyber criminals nowadays tend to employ advanced social engineering techniques to trick individuals into divulging sensitive information such as OTPs. Trust in online payment systems is shaped by several factors, including perceived security, ease of use, and the reputation of the payment service provider (Javed & Wu, 2020) .Secure payment systems protect customers' sensitive information, thereby minimizing the possibility of fraud and identity theft, which are major concerns in the digital marketplace (Miao et al., 2019). Moreover, the reputation of the payment service provider plays a important role in trust formation, as customers are more likely to trust well-known and reputable providers (Mahadin et al., 2020). Mortimer et al. (2020) suggest that customers prefer payment systems that are straightforward, fast, and require minimal effort. Various online transactions have transformed the modern digital economy, and the use of digital payment systems in cybercrimes has increased. These occurrences have presented a serious barrier to trust, which is essential for developing a digital payment system, in addition to the substantial economic ramifications. The sustainability of digital payment systems is seriously threatened by ongoing threats and instances of cyber crime. The purpose of this study is to examine the nature of cyber scams in the digital payment system and analyze potential strategies for bolstering a

digital system to rebuild trust. This paper aims to bridge the gap in existing literature by analyzing the user perspective on how cyber fraud exposure influences trust and behavioural intentions toward digital payment systems. There is a dearth of study on the effect of rising cybercrimes on users' confidence in these systems, Despite the fact that a number of research have examined the growth and usage of digital payment platforms. Very few studies examined the effect of cyber scams on the trustworthiness of digital payment systems, while the majority of research concentrated on the impact of cyber fraud on e-commerce systems on purchase intentions. This study attempts to fill this gap by looking at how cyber crime affects people's trust in digital payment systems, focusing on the users' point of view.

Research Objectives :

The primary objectives of the research were:

- To determine and analyze the most pertinent digital payment applications based on user preferences and usage frequency.
- To determine and examine users' experiences with cybercrimes.
- To examine how users' trust for digital platforms and subsequent usage behavior are affected by cyber frauds.
- To identify common types of cyber scams associated with digital payment systems.
- To identify the effect of cyber security awareness on trust and the adoption of digital payment apps.

Commonly Used Cyber Scams In India :

● **Phishing Scams**

Fake emails, messages, or websites that trick you into sharing personal information like passwords, OTPs, or bank details.

● **Vishing (Voice Phishing)**

Phone calls from scammers pretending to be bank officials or government employees to get your sensitive information.

● **Smishing (SMS Phishing)**

Fraudulent messages that contain harmful links or ask for personal or financial information.

● **Online Job Scams**

Fake job offers that ask you to pay registration fees or share documents, often leading to financial loss.

● **Lottery and Prize Scams**

Messages or calls claiming you've won a lottery or prize, but ask for fees or taxes to "claim" it.

● **Fake UPI Payment Scams**

Scammers trick people into scanning QR codes or clicking on payment links that result in money being stolen.

● **SIM Swap Fraud**

Criminals gain control of your mobile number and use it to access OTPs and hack your bank or payment app accounts..

● **Online Shopping Scams**

Fake websites or social media ads sell products that are never delivered or are different from what was promised.
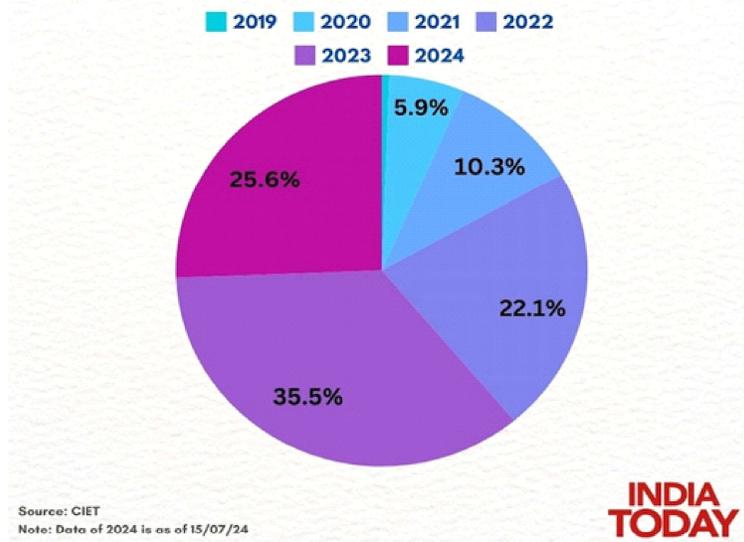
● **Fake App Scams**

Fraudulent apps that look real but are designed to steal your data or money once installed.

In 2025 ,The Indian Cyber Crime Coordination Centre (I4C) reported a massive surge in cyber crime , with financial frauds amounting to 36.45 .National Cyber Crime Reporting Portal received 6,000 complaints every day. People get trapped like a Veeraboina Sai Raj, a Hyderabadi resident, was tricked by these cybercriminals and persuaded to send Rs 3,57,998 to their bank accounts. Claiming to be a Mumbai-based Head Constable, the accused had contacted Raj and told him that a case complaint was filed against him. Raj was then told to move the funds to the accused's account so that they could be verified. The Indian central government has taken a number of significant actions to counter the growing threat of cyber frauds.

Cyber scam trend in India

Rise in cyber scams from 2019 to 2024

■ 2019 ■ 2020 ■ 2021 ■ 2022
■ 2023 ■ 2024

5.9%
10.3%
22.1%
35.5%
25.6%

Source: CIET
Note: Data of 2024 is as of 15/07/24

INDIA TODAY

An important step is the National Cyber Crime Reporting Portal (www.cybercrime.gov.in), which makes it easy for citizens to report cybercrimes, especially financial frauds. The government also created the Indian Cyber Crime Coordination Centre (I4C) within the Ministry of Home Affairs to oversee cybercrime investigation, coordination, and awareness across the country. Governments have created dedicated cyber police stations and cyber cells to better handle these issues. In an effort to increase public awareness, initiatives like Cyber Swachhta Kendra and Digital India inform people about online frauds and promote safe digital behaviour. In order to assist victims of digital payment fraud in promptly reporting scams often allowing authorities to freeze or recover the funds, the government has also established the helpline number 1930. In addition, the Reserve Bank of India (RBI) works closely with banks and digital payment providers to guarantee that strong cyber security solutions are in place and frequently publishes guidelines to enhance its digital infrastructure. The Information Technology (IT) Act, 2000, along with relevant sections of the Indian Penal Code (IPC), provides the legal foundation to punish cybercriminals. Additionally, CERT-In (Computer Emergency Response Team - India) monitors threats and issues security advisories nationwide. Together, these initiatives reflect the government's commitment to reducing cyber scams and making digital payments safer for all users.

Literature Review :

Due to its speed, convenience, and advantages for both individuals and organizations, people have been pushed to switch from paper and coins to digital payment systems due to digitization (Premchand & Choudhury, 2015). The term "digital payment" refers to a platform that facilitates financial transactions for a variety of products or services that are bought online (Roy and Sinha 2014). According to Slozko & Pelo (2015), digital or e-payments are very significant form of payment used by the population. They are a very safe, quick, and convenient to make any kind of payment via the internet, and they also present a chance for an economy to flourish and advance technologically in the global economy. The research work carried out by Ramaiya et al.(2024) is focused on examining various cyber security aspects within virtual payment system infrastructure, such as domestic fraud and aspects regarding user trust. The research work points out that proper cyber security norms need to be incorporated, and hence, financial organizations need to promote proper security norms for fostering trust among different classes of people, thus enabling wider acceptance. Furthermore, the research work carried out by Ben Krishna et al. (2025) on examining different aspects within cyber security, it has been found that aspects regarding national cyber security, such as performance and

responsiveness, play an important role within trusting scenarios. Moreover, it has been reiterated within the research work carried out by Hossain et al.(2023) that safety, convenience, and transparent aspects play an extremely important role within scenarios concerning cyber trust. According to (Shin, 2009), perceived utility, perceived ease of use, perceived risk , and trust all have an impact on customers' acceptance of mobile payments. Risk vanishes as trust emerges (Grazioli & Jarvenpaa, 2000; Salam et al., 2003; Warkentin et al., 2002). Additional research by Wolfinbarger and Gilly (2003) shows that over time, trust and loyalty are strengthened by regular favorable encounters with online payment systems. Additionally, in order to protect sensitive data and prevent cybercrime, secure payment methods that employ broader encryption must be included. In addition, research on cyber fraud has shown that it influences users' intentions to make purchases. For instance, Rofiq (2012) asserts that Indonesian consumers' views of cyber-fraud have a detrimental impact on their e-commerce purchasing intentions , the more information on or the more experience with cyber-fraud incidents customers have, the more likely they will not commit transactions in e-commerce. The study by Afzal et al. (2014) about the significance of awareness related to cyber security solutions to raise awareness about digital financial inclusion, particularly among consumers from areas such as rural India. The findings revealed that cyber fraud harms trust and payment banking adoption. Cyber security awareness, facilitating conditions, and trust positively affect payment banking adoption, ultimately enhancing digital financial inclusiveness in rural India. Research by Zhu et al. (2019) highlights that simplified transaction processes and quick payment confirmations boost customer confidence and satisfaction. Even though digital payments are very convenient and have many advantages, there is still a lot of concern about security. ICT professionals are working to mitigate this fear, which is the only issue that users have with this payment system (Khairun & Yasmin, 2010).

Furthermore, the studies on cyber security conducted by Adejumo et al. (2025) highlight a strong inverse relationship between cyber security spending and cyber fraud incidents, with an estimated 62% decline in financial fraud cases by 2028, provided institutions continue to adopt advanced security framework and Kim et al. (2010) have attempted to provide a conceptual model that delineates the determinants of consumers' perceived security and perceived trust, also the effects of perceived security and perceived trust on the use of electronic payment systems. In the area of mobile payments, Joseph et al. (2023) reveal the alarming increase of cybercrimes in mobile money transactions, thus emphasizing the challenge of the ever-evolving nature of cybercriminal activities. On another aspect, Fan (2019) presents an analysis of the adverse effects of cyber fraud in relation to

consumer trust, considering the area of online shopping, in which fraudulent practices have resulted in substantial monetary losses, thus resulting in reduced trust in such a form of commerce in a nation such as Ghana. With respect to the effects of cybercrimes in relation to aspects of consumer trust in the area of e-commerce, Apau et al. (2019) reveal aspects of consumer perception, in which trust in internet mediums and attitudes toward behavioral aspects of the internet significantly determine purchasing intentions, in contrast to aspects of consumer perception of cybercrimes, which do not reflect in aspects of trust in an aspect of e Commerce.

Research Methodology :

Research Design :

In this research the quantitative approach was used. A thorough investigation of the impact of cybercrimes on the perceived trustworthiness of digital payment systems was made attainable by this approach.

Data Collection :

A structured questionnaire in English was used to gather the primary data. To understand more about customers' experiences with digital payment apps and cyber frauds, the questionnaire had both multiple-choice and open-ended questions. To reach the respondents, the questionnaire was distributed via a number of digital platforms, including Google Forms, and shared via social media, email, and WhatsApp. Respondents were made aware of the study's objectives and given the assurance that their answers would be kept confidential and utilized exclusively for research. The data collection process was completed over a specific period, during which 90 valid responses were received and analyzed for the study.

Sampling Method :

A convenience sampling method was adopted so that only respondents who truly use digital payment systems for data collection are contacted. Participants were chosen according to their willingness and availability to participate in the study. The majority of the sample consisted of people who used digital payment apps and could be easily contacted online or in person. This approach was selected because it was efficient, rapid, and enabled the researcher to collect replies in a limited span of time.

Ethical Consideration

To safeguard the rights and privacy of all participants, this study was conducted in an honest and respectful manner. All participants were made aware of the study's goal prior to answering any questions, and participation was entirely voluntary. All answers were kept confidential and utilized exclusively for this study, no personal information was gathered. Participants' information was kept private and confidential. To ensure that no one felt uncomfortable or under pressure, the questions were asked in a

respectful way. The study followed basic ethical rules to ensure fairness and trust throughout the research process.

Data Analysis And Interpretation :

Demographic profile results

Gender :

A total of 90 completed questionnaires were selected from the study population. The demographic profile of the respondents is shown in Table 1; the demographic data showed that 50% of the respondents were male, and 50% of the respondents were female.

Age :

The majority of the respondents were between the ages of 18 and 24 years (47.8%) while 37.8% of respondents were between 25 and 34 years of age, around 7.8% of respondents were aged between 35 and 44 years,6.7 % of respondents were aged between 45 and 54. The results show that the majority of respondents are young, between the ages of 18 and 35 years, i.e. around 85% of the total sample size; that seems the usage of digital payment apps was primarily on millennial.

Occupation :

Majority of respondents were students (68.9%). Another 13.3% respondents were Government employee ,however (12.2%) of respondents were corporate employee and rest 5.6% of the respondents were businessman.

Table 1 Represents the Summary of Demographics of the Respondents.

DEMOGRAPHIC	VALUE	FREQUENCY	PERCENTAGE
SEX	MALE	45	50%
	FEMALE	45	50%
AGE	BELOW 25	43	47.8%
	25 -45	41	45.5%
	ABOVE 45	6	6.7%
OCCUPATION	STUDENTS	62	68.9%
	GOVT. EMPLOYEE	12	13.3%
	CORPORATE	11	12.2%
	EMPLOYEE	5	5.6%
	BUSINESSMAN		

Usage Of Digital Payment Application :

The study also seeks to uncover the most prevalent digital payment apps hence, respondents' usage of digital payment apps were also analysed. The results reveal that whatsapp pay was least prevalent with none of the respondents using this app to do any digital payments. However, GOOGLE PAY was the most common among respondents with about 61.1% using

this app. This was followed by PHONEPE where about 37.7% users reported their experience with this application. And third famous app among respondents were PAYTM (30%)respondents having transactions with this app . BHIM app was not such popular only 6.7% of the respondents use this application. Figure 1 presents a graphical representation of respondents usage of digital payment applications.
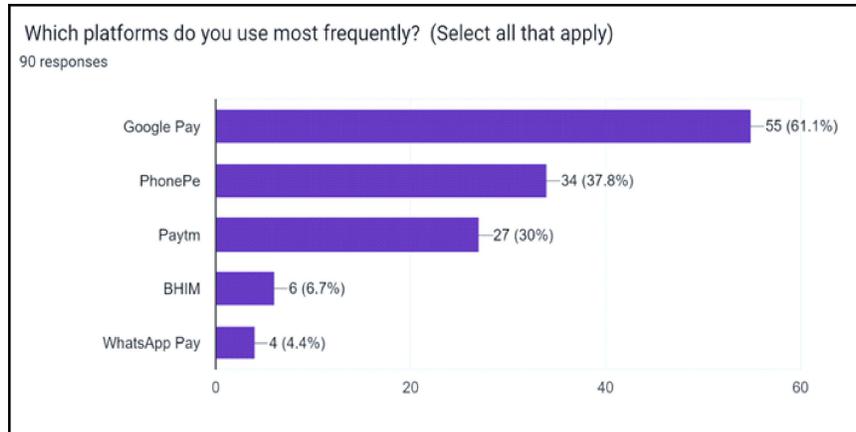

Figure 1- Usage of digital payment apps

Cyber Scam Experience :

The study also examines individuals' exposure to digital payment scams by exploring whether respondents have experienced or nearly fallen victim to such schemes. The results reveal that 52.2% respondents were never fallen for a digital payment scam however 38.9% of the respondents fallen but somehow they manage to escape from the hackers and 8.9% of the respondents actually scammed. Figure 2 shows the graphical representation of respondents nearly fallen for a digital payment scam .
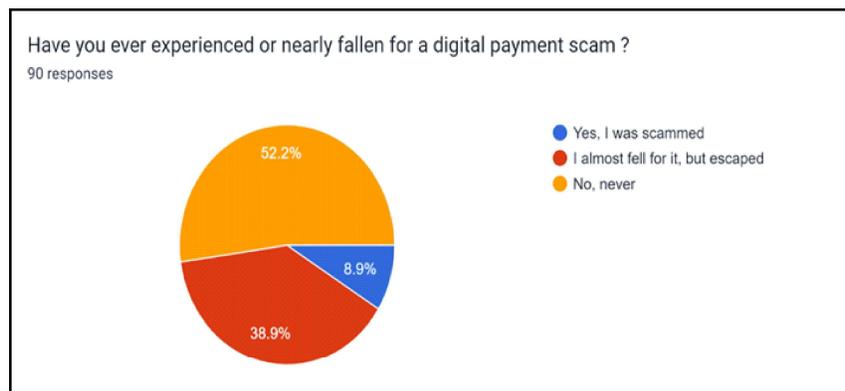

Figure 2- cyber scams experience

Type of Scams :

The study also aims to identify the most prevalent forms of cyber-crime by analyzing respondents' personal experiences. The analysis demonstrates that phishing was the most commonly reported cyber-crime, affecting 53.8% of respondents. This was followed by fraudulent UPI requests, experienced by 34.6% of participants. Additionally, 17.3% of respondents reported encountering QR code scams, 15.4% experienced digital arrest scams, and 1.9% reported falling victim to other types of scams.
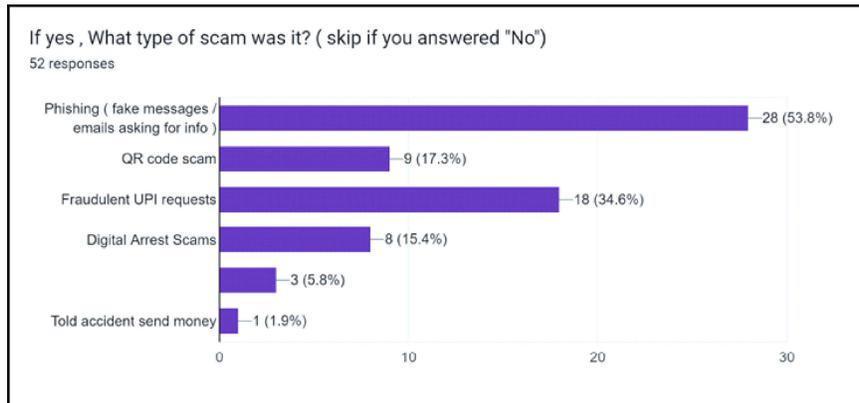

Figure 3- types of scams

Impact Of Scam Experience On Trust In Digital Payments :

The findings reveal a varied impact of scam experiences on respondents' trust in digital payment systems. Approximately 23.2% of participants reported that their trust was significantly affected, while 22.0% indicated a moderate decline in trust. In contrast, 26.8% stated that their trust in digital payments remained unchanged despite their experiences. Notably, 28.0% of respondents reported having no experience with digital payment scams, and thus their trust levels were unaffected.
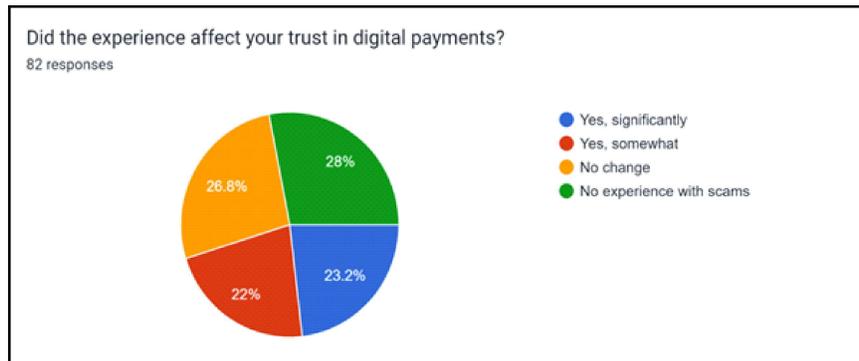

Figure 4- level of trust

Perceived Security In Using Digital Payment Systems :

When asked about their sense of security while using digital payment systems, 29.5% of respondents reported feeling very secure, while 35.2% felt somewhat secure. Meanwhile, 27.3% maintained a neutral stance, neither secure nor insecure. A smaller proportion, 6.8%, indicated feeling somewhat insecure when using digital payment methods. These findings suggest that while a majority of users feel at least moderately secure, a notable portion remains uncertain or concerned.
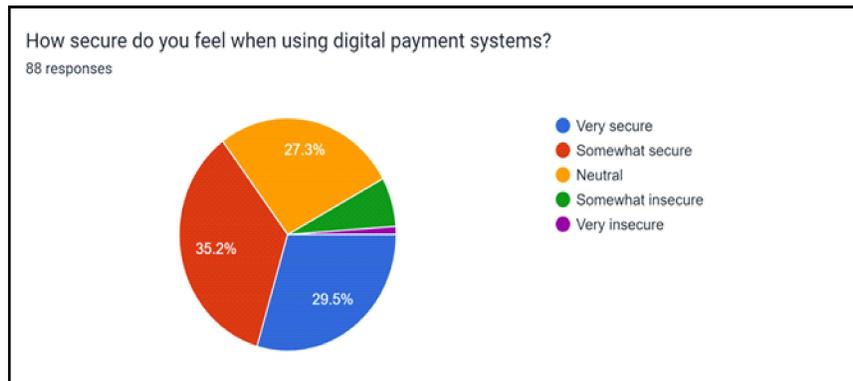

Figure 5- perceived security

Findings :

The main objective of this paper is to analyze the impact of cyber scams on user's trust and usage behaviour.For this purpose , questionnaire-based survey was carried out .

The study used factors including cyber fraud, cyber trust, and cyber security awareness along with their recommendations to accomplish the research goal and determined the effect of cyber scams on the reliability of Lucknow city's digital payment system.

The First Objective of the study aimed to identify and analyze the most relevant digital payment applications based on user preferences and usage frequency. The analysis revealed a clear variation in the popularity and adoption of different digital payment platforms among users. Among the various applications examined, Google Pay was found to be the most popular digital payment app among the many apps that were looked at. Its user-friendly layout, easy connectivity with bank accounts, and regular promotional offers are all factors in its popularity and probably contribute to its large user base. Additionally, PhonePe was widely used by respondents, demonstrating its robust market presence and dependability in enabling routine transactions. Paytm was the next most popular app, indicating that customers still appreciate its usefulness for things like bill payment and cellphone recharges and retail purchases. The BHIM app, on the other hand,

demonstrated low uptake, suggesting that it could not be the first option for the majority of consumers. This could be because it lacks advanced features or uses less aggressive marketing than rivals. It's interesting to note that out of all the applications mentioned, WhatsApp Pay was the least used; no respondents reported using it for any transactions. This lack of participation could be the result of low awareness, problems with trust, or the idea that WhatsApp is more of a messaging app than a payment platform.

The Second Objective of the study aimed to determine and examine consumers' experiences with cybercrimes, with an emphasis on digital payment scams. The findings reveal varied levels of exposure to such threats among respondents, offering insight into how users. A significant number of respondents stated that they had never fallen for a digital payment scam, suggesting that a substantial proportion of users are generally aware of and cautious. This may reflect effective use of digital literacy, secure payment habits, or prior knowledge of scam tactics. Nonetheless, a sizable portion of respondents said they have experienced scam attempts but were able to avoid becoming victims by either spotting the warning signals or acting immediately. These near-miss incidents imply that, despite the prevalence of threats, many users are become more skilled at spotting and handling suspicious activities. A smaller but significant portion of respondents said they had been scammed. This demonstrates the continuous weaknesses and enduring nature of cyber threats in the digital payment industry. In order to protect users from future instances, it highlights the necessity of more robust preventive measures, user education, and platform-level safeguards.

The Third Objective of the study aimed to find out the impact of cyber scams on trustworthiness of digital payment system . The results of the study depict that increasing cyber scams has a negative effect on trust and digital payment adoption. Cyber scams increases the risk associated with digital platforms. It negatively affects transactions as there is the possibility of suspicious activities done by cybercriminals. Risks associated with digital platforms negatively affect the trust and adoption of particular systems. Thus, the results indicate that cyber scams give a negative impact on the trustworthiness and adoption intention of digital payment system.

With the help of our Fourth Objective we find out the common types of cyber scams associated with digital payment systems. Phishing emerged as the most frequently reported scam, followed by fraudulent UPI requests. QR code scams and digital arrest scams were also reported, though less commonly. A small number of respondents encountered other types of scams.

The Fifth Objective of the study examine the effect of cyber security awareness on trust and the adoption of digital payment apps. The results revealed that cyber security awareness has a significant positive effect on trust. cyber security awareness enhances the trust and adoption of new technology. Hence, digital payment applications must provide and engage in cyber security awareness programs to develop the trust of customers. To safeguard consumers, providers should carefully develop and implement security measures like firewalls, encryption, biometrics, digital certification verification, and stringent cyber laws.

Cyber security awareness will help to increase user trust in the face of rising cybercrime events on digital financial services platforms, which will ultimately impact current and potential users' adoption behaviour.

Conclusion :

The research sought to examine the cyber scams and their impact on trustworthiness on digital payment system in Lucknow ,India . According to the data, users find it challenging to trust digital platforms due to the sharp rise in cybercrime. Due to user reluctance, financial losses, and the erosion of Trust cyber fraud has been found to seriously hinder the digital financial system. User trust and adoption were positively impacted by cyber security awareness. This study has explored the growing concern of cyber scams and their influence on the perceived trustworthiness of digital payment systems. The results show that many consumers have experienced several types of cyber fraud, with phishing and fake UPI requests being the most prevalent. These experiences have had a clear negative impact on user trust, with many respondents reporting reduced confidence in the security and reliability of digital payment platforms. Despite these worries, a sizable percentage of customers still report feeling secure when utilizing digital payment methods, demonstrating some adaptability and resilience. However, the presence of users who feel neutral or insecure highlights ongoing challenges in maintaining user confidence. In order to create a more safe and reliable digital payment environment, the research ultimately emphasizes the significance of bolstering digital security measures, raising public awareness, and encouraging user education. If these problems are not resolved, persistent anxieties and lower user engagement could jeopardize the uptake and long-term viability of digital financial systems.

Limitations and Future Scope :

There are some limitations associated with the current study. Firstly, the current study had a limited number of participants, i.e., 90, due to the constraints of time. Secondly, the current study analysed the findings with the help of pie charts and bar graphs, the future study needs to consider a large population to validate the current study, that can be done through

advance tools like Structural Equation Modeling (SEM). Thirdly, the data was only gathered from Lucknow; in order to obtain more precise results, future research must also gather data from other cities.

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Sustainable Development as a Strategic Imperative in Commerce and Economic Systems

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Abstract

Sustainable development has emerged as a central concern in contemporary commerce and economic systems due to increasing environmental challenges, social inequalities, and resource constraints. This study examines the concept of sustainable development and its growing importance within trade, business practices, and economic frameworks. Based on secondary data collected from books, journals, policy reports, and credible published sources, the paper analyzes how sustainability has evolved in economic thought and how it is now viewed as a strategic imperative for long-term growth.

The study highlights the integration of sustainability in areas such as corporate sustainability, corporate social responsibility (CSR), sustainable supply chain management, green marketing, and ethical consumerism. It also explores the role of different economic systems, including capitalist and mixed economies, in promoting sustainable practices through circular economy models, inclusive growth, and efficient resource utilization.

The findings reveal that while sustainability offers significant opportunities for commerce and industry-such as competitive advantage, innovation, and market expansion-several challenges persist, particularly in developing economies. Financial constraints, implementation gaps, and lack of awareness remain key obstacles. The study concludes that effective policy frameworks, corporate commitment, education, and capacity building are essential to successfully integrate sustainability into economic strategies. Overall, sustainable development is not only an environmental or social concern but a vital foundation for resilient and inclusive economic growth in the modern era.

Keywords: Sustainable Development, Commerce, Economic Systems, Corporate Sustainability, Circular Economy, Sustainable Development Goals

1. Introduction

Sustainable development has become an important issue in today's

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economic and business world. Growth is no longer judged only by profit or output. It is also judged by how it affects people and the environment. Many economies have grown fast in the past, but this growth often came at a cost. Natural resources were overused. Pollution increased. Social gaps widened.

Because of this, the old idea of growth is being questioned. There is a clear need to think beyond short-term gains. Economic systems now face pressure to grow in a way that is stable and fair. Sustainable development offers a way to do this. It connects economic progress with social responsibility and environmental care. That's why it has become central to discussions in commerce and economics today.

1.1 Concept of Sustainable Development :

Sustainable development means meeting today's needs without harming the ability of future generations to meet theirs. It is a simple idea, but a serious one. It asks us to think long term. Not just about growth now, but about stability later.

The concept rests on three basic pillars. The first is economic growth that is steady and realistic. The second is protection of the environment. The third is social well-being and fairness. If one pillar is ignored, development becomes weak.

In commerce and economic systems, sustainable development encourages responsible use of resources. It supports ethical business practices and fair treatment of people. It also pushes decision-makers to consider the long-term impact of their actions. In this way, sustainable development is not an obstacle to growth. It is a condition for lasting and meaningful growth.

1.2 Evolution of Sustainability in Economic Thought :

Early economic thinking focused mainly on growth and production. Classical economists believed that natural resources were abundant and that markets would take care of shortages on their own. The main concern was how to increase output, trade, and wealth. Environmental limits were rarely discussed, and social costs were mostly ignored.

Things began to change with industrialization. Rapid growth brought pollution, resource depletion, and uneven development. Economists started to notice that unchecked growth created long-term problems. This led to the rise of environmental economics, which looked at issues like pollution costs and resource management. Later, ecological economics went a step further. It treated the environment as a core part of the economic system, not an external factor.

Over time, sustainability became part of mainstream economic thinking. Development was no longer seen as growth at any cost. Instead, it

was linked to balance, inclusion, and long-term stability. Today, economic thought accepts that healthy economies depend on healthy ecosystems and stable societies. Sustainability is no longer optional. It is a necessary part of how modern economic systems are understood and designed.

1.4 Commerce and Economic Systems in the Contemporary Era :

Commerce today works in a very different setting than it did a few decades ago. Markets are more connected, technology moves fast, and information spreads quickly. Businesses now operate across borders, and their actions affect people and environments far beyond local areas. Because of this, economic decisions carry wider responsibilities.

Modern economic systems are also under pressure. Climate change, resource shortages, and social inequality have made it clear that old business models are not enough. Profit still matters, but it is no longer the only measure of success. Companies are expected to show how they treat workers, manage resources, and reduce harm to the environment.

At the same time, governments and institutions are shaping rules that support responsible commerce. Ideas like green finance, circular economy, and inclusive growth are becoming more common. In this contemporary era, commerce is closely tied to sustainability. Economic systems now need to support growth that is stable, fair, and able to last over time.

2. Objectives of the Study

The present study is undertaken with the following objectives:

1. To examine the concept of sustainable development in the context of commerce and economic systems.
2. To understand the evolution of sustainability within economic thought and policy discussions.
3. To analyze the role of sustainable development as a strategic requirement in modern commerce.
4. To explore how contemporary economic systems are responding to sustainability challenges.
5. To identify key issues and opportunities related to the integration of sustainability in economic and commercial practices.

3. Research Methodology :

This study is based entirely on secondary data. No primary survey or fieldwork has been conducted. The focus is on analyzing existing information to understand the role of sustainable development in commerce and economic systems.

Secondary data have been collected from reliable sources such as academic journals, books, government reports, policy documents, and publications of international organizations. These sources provide theoretical

insights, empirical findings, and policy perspectives related to sustainability and economic development.

The study follows a descriptive and analytical research design. Collected data have been reviewed, compared, and interpreted to identify key patterns and arguments. Simple qualitative analysis has been used to draw meaningful conclusions. This approach helps in developing a clear understanding of the subject while keeping the analysis focused and consistent.

The scope of the study is limited to available secondary sources. As a result, findings depend on the accuracy and relevance of existing literature. Despite this limitation, the methodology is suitable for examining broad trends and conceptual issues related to sustainable development in contemporary commerce and economic systems.

4. Sustainable Development and Commerce :

Sustainable development has become closely linked with modern commerce. Businesses are no longer seen only as profit-making units. They are also expected to act responsibly toward society and the environment. Commercial activities now influence climate, resource use, and social conditions. Because of this, sustainability is shaping how trade, production, and business decisions are made.

Incorporating sustainable development into commerce helps reduce long-term risks and builds trust with customers and communities. It also supports stable growth. When businesses align their goals with sustainability, they move toward practices that are practical, responsible, and future-focused.

4.1 Sustainability in Trade and Business Practices :

Trade and business practices are changing to reflect sustainability concerns. Companies are paying more attention to how goods are produced, transported, and sold. Fair trade, responsible sourcing, and reduced waste are becoming common goals. These practices aim to lower environmental harm and improve working conditions.

Sustainable trade also supports long-term economic stability. It encourages efficiency, reduces dependency on scarce resources, and promotes ethical standards. While these practices may require adjustment, they help businesses remain competitive in a market that values responsibility.

4.2 Corporate Sustainability and CSR :

Corporate sustainability focuses on running businesses in a way that balances profit with social and environmental responsibility. It goes beyond short-term gains and looks at long-term impact. Corporate Social Responsibility (CSR) is one of the main tools used to achieve this balance.

Through CSR activities, companies invest in community development,

education, health, and environmental protection. These efforts help build positive relationships with stakeholders. When done sincerely, CSR strengthens a company's credibility and supports sustainable economic growth rather than acting as a mere compliance requirement.

4.3 Sustainable Supply Chain Management :

Supply chains play a major role in determining a company's sustainability impact. From raw material sourcing to final delivery, each stage affects the environment and society. Sustainable supply chain management focuses on reducing waste, saving energy, and ensuring fair labor practices.

Businesses are increasingly working with suppliers who follow ethical and environmental standards. This approach improves transparency and reduces risks related to resource shortages and regulatory changes. A sustainable supply chain supports efficiency and makes commercial operations more resilient.

4.4 Green Marketing and Ethical Consumerism :

Green marketing refers to promoting products and services that cause less harm to the environment. It includes honest communication about product impact, eco-friendly packaging, and responsible advertising. The aim is not to exaggerate claims but to provide clear information.

At the same time, consumers are becoming more aware of how their choices affect the world around them. Ethical consumerism reflects this shift. People increasingly prefer products made through fair and sustainable practices. This change in consumer behavior pushes businesses to act responsibly and align their marketing with real sustainability efforts.

5. Sustainable Development in Economic Systems :

Economic systems shape how resources are produced, distributed, and used. In the past, most systems focused mainly on growth and efficiency. Over time, it became clear that growth without limits creates serious problems. Environmental damage, inequality, and economic instability are some of the results. Because of this, sustainable development is now being linked directly to how economic systems function.

Sustainability within economic systems aims to balance growth with responsibility. It encourages smarter use of resources, fair distribution of benefits, and long-term planning. This shift is changing both policy thinking and economic practice across the world.

5.1 Sustainability in Capitalist and Mixed Economies :

Capitalist economies are driven by markets, private ownership, and competition. These features can support innovation and efficiency. But without checks, they can also lead to overuse of resources and social inequality. Sustainability in capitalist systems requires clear regulations, ethical

business conduct, and accountability.

Mixed economies combine market forces with government intervention. This structure makes it easier to promote sustainability through policies, subsidies, and social programs. Governments can guide markets toward cleaner production, social welfare, and long-term goals. In both systems, sustainability depends on how economic incentives and regulations are designed and enforced.

5.2 Circular Economy and Resource Optimization :

The circular economy challenges the traditional "use and discard" model. Instead of wasting resources, it focuses on reuse, recycling, and repair. The goal is to keep materials in use for as long as possible. This approach reduces waste and lowers pressure on natural resources.

Resource optimization is a key part of this model. It encourages efficient production and responsible consumption. By using fewer inputs and reducing losses, economies can grow without increasing environmental damage. The circular economy supports sustainability by linking economic activity with resource conservation.

5.3 Inclusive Growth and Sustainable Economic Development :

Sustainable development is incomplete without inclusion. Economic growth that benefits only a small section of society creates instability. Inclusive growth aims to ensure that the benefits of development reach all groups, including the poor and marginalized.

This approach focuses on employment, access to basic services, and equal opportunities. When people are included in the growth process, economies become stronger and more stable. Inclusive growth supports social harmony and makes development more sustainable in the long run.

5.4 Role of Technology and Innovation :

Technology and innovation play an important role in supporting sustainable economic systems. Clean energy, digital tools, and efficient production methods help reduce environmental impact. Innovation allows economies to grow while using fewer resources.

Technology also improves transparency and decision-making. Data-driven systems help monitor resource use and environmental effects. When used responsibly, innovation supports sustainability by making economic systems more efficient, adaptable, and resilient.

6. Strategic Integration of Sustainability :

Sustainability is no longer treated as a separate or optional concern. It is now part of core economic and business strategy. When sustainability is built into planning and decision-making, it helps organizations and economies manage risks and prepare for the future. This strategic integration ensures that growth remains stable and responsible over time.

Rather than reacting to problems after they occur, strategic sustainability focuses on prevention and long-term value. It aligns economic goals with social and environmental responsibilities, making systems more resilient and balanced.

6.1 Sustainability as a Source of Competitive Advantage :

Sustainability can strengthen a firm's competitive position. Businesses that use resources efficiently often reduce costs and waste. Responsible practices also improve brand trust and customer loyalty. Many consumers prefer companies that show concern for people and the environment.

In addition, sustainable businesses are better prepared for regulatory changes and market shifts. They face lower risks related to environmental damage or social backlash. Over time, this stability becomes an advantage, not a burden.

6.2 Policy Frameworks and Regulatory Mechanisms :

Policies and regulations play a key role in promoting sustainability. Governments use laws, standards, and incentives to guide economic behavior. Environmental regulations, tax benefits, and reporting requirements encourage businesses to act responsibly.

Clear and consistent policy frameworks help create a level playing field. They reduce uncertainty and support long-term planning. When regulations are well-designed, they push markets toward sustainable practices without slowing economic growth.

6.3 Role of Government and International Institutions :

Governments are central to the integration of sustainability into economic systems. They design policies, invest in public goods, and support social welfare. Through public spending and regulation, governments can guide economies toward sustainable paths.

International institutions also play an important role. Organizations such as the United Nations and the World Bank promote global cooperation on sustainability issues. They provide guidelines, funding, and technical support, especially for developing economies. Their efforts help align national strategies with global sustainability goals.

6.4 Sustainable Development Goals (SDGs) and Economic Strategy:

The Sustainable Development Goals provide a shared framework for linking sustainability with economic strategy. These goals cover areas such as poverty reduction, clean energy, decent work, and environmental protection. They help governments and businesses set clear priorities.

By aligning economic strategies with the SDGs, countries can balance growth with social and environmental needs. The SDGs encourage long-term thinking and cooperation across sectors. They serve as a practical guide for integrating sustainability into economic planning and development

efforts.

7. Challenges and Opportunities :

The shift toward sustainable development brings both difficulties and new possibilities. While the idea is widely accepted, putting it into practice is not always easy. Economic pressures, limited resources, and structural issues often slow down progress. At the same time, sustainability opens new paths for growth, innovation, and long-term stability.

Understanding these challenges and opportunities helps businesses and policymakers make better choices. It also highlights where efforts need to be focused to ensure sustainable outcomes.

7.1 Economic and Financial Constraints

One of the main challenges is cost. Sustainable technologies, clean energy systems, and eco-friendly processes often require high initial investment. For many businesses, especially small firms, these costs can be hard to manage. Short-term financial pressures may discourage long-term planning.

Limited access to finance also creates barriers. In some regions, green funding options are still underdeveloped. Without proper financial support, sustainability efforts may remain slow or uneven across sectors.

7.2 Implementation Challenges in Developing Economies :

Developing economies face specific challenges in adopting sustainable practices. Issues such as poverty, unemployment, and weak infrastructure often take priority. Limited technical capacity and lack of awareness can also affect implementation.

Policy enforcement is another concern. Even when sustainability policies exist, weak institutions may struggle to enforce them. Balancing economic growth with environmental protection becomes difficult when basic development needs are still unmet.

7.3 Emerging Opportunities for Commerce and Industry :

Despite the challenges, sustainability creates new opportunities for commerce and industry. Demand for green products, renewable energy, and responsible services is growing. Businesses that adapt early can enter new markets and build long-term customer trust.

Sustainable practices also improve efficiency. Reducing waste and saving energy lowers costs over time. Innovation driven by sustainability can lead to new business models and stronger competitiveness.

7.4 Future Trends in Sustainable Development :

Sustainable development is likely to shape future economic systems more deeply. Digital tools, clean technologies, and data-based decision-making will support better resource management. Transparency and accountability will also increase through reporting and monitoring systems.

Consumer awareness is expected to rise further, pushing businesses toward ethical practices. In the long run, sustainability will move from being a challenge to becoming a standard part of economic and commercial activity.

8. Findings and Discussion :

The study shows that sustainable development has moved from being a theoretical idea to a practical requirement in commerce and economic systems. Economic growth based only on profit and output is no longer sufficient. Long-term stability now depends on how well economic activities balance growth, social responsibility, and environmental protection.

One key finding is that sustainability is becoming part of core business strategy. Companies that adopt responsible practices tend to manage risks better and build stronger relationships with stakeholders. Sustainable trade, ethical sourcing, and efficient resource use are not only environmentally sound but also economically sensible over time.

The analysis also highlights the role of economic systems in shaping sustainability outcomes. Capitalist and mixed economies respond differently, but both require clear policies and accountability. Government intervention, regulatory frameworks, and international cooperation play a crucial role in guiding markets toward sustainable practices.

Another important finding relates to developing economies. While sustainability offers long-term benefits, implementation remains uneven due to financial constraints, limited infrastructure, and policy gaps. However, growing awareness, technological support, and global initiatives are creating new opportunities for progress.

Overall, the discussion suggests that sustainable development strengthens economic resilience. When integrated strategically, it supports inclusive growth, encourages innovation, and reduces long-term risks. Sustainability is not a barrier to development. It is a necessary condition for meaningful and lasting economic progress.

9. Suggestions and Policy Implications :

Based on the findings of the study, it is clear that sustainable development requires coordinated action from businesses, policymakers, and society. Sustainability works best when it is planned, supported, and practiced consistently. The following suggestions focus on practical steps that can strengthen the integration of sustainability into commerce and economic systems.

9.1 Strategic Recommendations for Businesses :

Businesses should treat sustainability as part of their core strategy, not as an added activity. Long-term planning should include responsible use of resources, ethical sourcing, and fair treatment of workers. Simple steps such as reducing waste, saving energy, and improving transparency can

create lasting benefits.

Firms should also invest in sustainable technologies where possible. Working closely with suppliers and stakeholders can help build reliable and responsible value chains. Clear reporting on environmental and social performance will further improve trust and accountability.

9.2 Policy-Level Interventions :

Governments should design clear and stable policies that support sustainable practices. Financial incentives, tax benefits, and access to green finance can encourage businesses to invest in sustainable solutions. At the same time, regulations should be enforced fairly to prevent environmental damage and social exploitation.

Policy coordination across sectors is essential. Sustainability goals should be aligned with economic planning, industrial policy, and development programs. Strong institutions and transparent governance will make policy interventions more effective.

9.3 Role of Education, Awareness, and Capacity Building :

Education plays a critical role in supporting sustainable development. Awareness programs can help businesses, consumers, and policymakers understand the long-term value of sustainability. When people are informed, they are more likely to support responsible practices.

Capacity building is equally important. Training programs, skill development, and technical support can help organizations adopt sustainable methods. By strengthening knowledge and capabilities, education creates a strong foundation for sustainable economic and commercial growth.

10. Conclusion :

This study highlights that sustainable development is no longer a choice but a necessity for modern commerce and economic systems. Traditional growth models, which focus mainly on short-term gains, are proving inadequate in addressing environmental damage, resource scarcity, and social imbalance. Sustainability offers a more balanced approach that supports long-term economic stability.

The analysis shows that when sustainability is integrated into business strategy and economic policy, it strengthens resilience and reduces risk. Responsible trade practices, inclusive growth, and efficient use of resources help create economic systems that can adapt to changing conditions. While challenges remain, especially in developing economies, the long-term benefits of sustainability are clear.

Sustainable development also encourages cooperation among businesses, governments, and institutions. It aligns economic objectives with social needs and environmental limits. In conclusion, meaningful and lasting economic progress depends on how effectively sustainability is embedded

into commerce and economic systems. Without this integration, growth remains fragile and uneven.

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वस्तु एवं सेवा कर (जीएसटी) का क्रियान्वयन : खुदरा व्यापारियों की धारणा का अध्ययन

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सारांश–

वस्तु एवं सेवा कर (जीएसटी) भारत की अप्रत्यक्ष कर प्रणाली में किया गया एक ऐतिहासिक एवं व्यापक सुधार है, जिसे 1 जुलाई 2017 से लागू किया गया। जीएसटी का प्रमुख उद्देश्य विभिन्न अप्रत्यक्ष करों को समाप्त कर एक एकीकृत, सरल एवं पारदर्शी कर प्रणाली स्थापित करना है। प्रस्तुत शोध पत्र में जीएसटी के क्रियान्वयन के पश्चात खुदरा व्यापारियों की धारणा का अध्ययन किया गया है। यह अध्ययन वर्णनात्मक प्रकृति का है तथा इसके लिए प्राथमिक आँकड़े प्रश्नावली के माध्यम से एक चयनित जिले के खुदरा व्यापारियों से एकत्र किए गए। अध्ययन से यह ज्ञात होता है कि जीएसटी ने कर प्रणाली में पारदर्शिता और कर आधार के विस्तार में महत्वपूर्ण योगदान दिया है, किंतु इसके प्रारंभिक चरण में खुदरा व्यापारियों को तकनीकी समस्याओं, अनुपालन जटिलताओं तथा जानकारी के अभाव जैसी कठिनाइयों का सामना करना पड़ा। जीएसटी को समझने और अपनाने में कर सलाहकारों की भूमिका अत्यंत महत्वपूर्ण पाई गई। कुल मिलाकर, यह अध्ययन दर्शाता है कि उचित प्रशिक्षण, जागरूकता एवं तकनीकी सहयोग के माध्यम से GST प्रणाली को खुदरा व्यापारियों के लिए अधिक प्रभावी और लाभकारी बनाया जा सकता है।

मुख्य शब्द: वस्तु एवं सेवा कर (जीएसटी), अप्रत्यक्ष कर, खुदरा व्यापारी, कर सुधार, व्यापारियों की धारणा।

प्रस्तावना :

कर व्यवस्था किसी भी देश की आर्थिक संरचना का महत्वपूर्ण आधार होती है, जिसके माध्यम से सरकार सार्वजनिक व्यय, विकास योजनाओं तथा सामाजिक कल्याण कार्यक्रमों को संचालित करती है। भारत में करों को मुख्यतः दो वर्गों– प्रत्यक्ष कर और अप्रत्यक्ष कर– में विभाजित किया गया है। लंबे समय तक भारत की कर प्रणाली अप्रत्यक्ष करों पर अधिक निर्भर रही, जिसके परिणामस्वरूप करों का दोहराव तथा जटिलता बनी रहती थी।

वस्तु एवं सेवा कर (जीएसटी) भारत की अप्रत्यक्ष कर प्रणाली में एक ऐतिहासिक एवं व्यापक सुधार के रूप में 1 जुलाई 2017 से लागू किया गया। जीएसटी का उद्देश्य विभिन्न केंद्र और राज्य स्तरीय अप्रत्यक्ष करों को समाहित कर एक सरल, पारदर्शी, एकी त तथा व्यवसाय–अनुकूल कर संरचना प्रदान

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करना है। इससे कराधान प्रणाली में एकरूपता, पारदर्शिता तथा अनुपालन की सुगमता सुनिश्चित करने का प्रयास किया गया है।

खुदरा क्षेत्र भारतीय अर्थव्यवस्था का एक महत्वपूर्ण हिस्सा है, जो न केवल रोजगार सृजन का प्रमुख स्रोत है बल्कि उपभोक्ता बाजार से प्रत्यक्ष रूप से जुड़ा हुआ है। जीएसटी के कार्यान्वयन का सीधा प्रभाव इस क्षेत्र पर देखा जाना स्वाभाविक है। प्रारंभिक चरण में खुदरा व्यापारियों को तकनीकी चुनौतियों, रिटर्न फाइलिंग और अनुपालन प्रक्रिया की जटिलता का सामना करना पड़ा, जबकि समय के साथ जीएसटी प्रणाली को समझने और अपनाने में सहजता विकसित हुई।

अतः प्रस्तुत अध्ययन का उद्देश्य जीएसटी के क्रियान्वयन के प्रति खुदरा व्यापारियों की धारणा का विश्लेषण करना तथा यह आकलन करना है कि जीएसटी ने उनके व्यवसाय संचालन, कर अनुपालन और व्यापारिक दक्षता पर किस प्रकार का प्रभाव डाला है। यह शोध जीएसटी के व्यावहारिक प्रभावों की समझ विकसित करने में सहायक सिद्ध होगा।

साहित्य समीक्षा :

वस्तु एवं सेवा कर (जीएसटी) के क्रियान्वयन के पश्चात इसके आर्थिक, प्रशासनिक तथा व्यावसायिक प्रभावों पर अनेक विद्वानों द्वारा अध्ययन किया गया है। विभिन्न शोधों में GST को भारत की अप्रत्यक्ष कर प्रणाली में एक संरचनात्मक सुधार के रूप में स्वीकार किया गया है, जिसने कर व्यवस्था को अधिक सरल और पारदर्शी बनाया है। कुमार (2017) ने अपने अध्ययन में यह निष्कर्ष निकाला कि GST के लागू होने से करों के दोहराव की समस्या समाप्त हुई तथा राष्ट्रीय स्तर पर एक समान कर संरचना स्थापित हुई। अध्ययन में यह भी उल्लेख किया गया कि प्रारंभिक चरण में व्यापारियों को प्रणाली को समझने में कठिनाइयों का सामना करना पड़ा। जोसेफ (2018) ने खुदरा क्षेत्र पर जीएसटी के प्रभाव का विश्लेषण करते हुए पाया कि GST से संगठित खुदरा व्यापार को लाभ हुआ, जबकि छोटे एवं असंगठित खुदरा व्यापारियों को तकनीकी एवं अनुपालन संबंधी समस्याओं का सामना करना पड़ा। अध्ययन में यह भी संकेत दिया गया कि प्रशिक्षण और जागरूकता की कमी व्यापारियों की नकारात्मक धारणा का प्रमुख कारण रही। शर्मा और वर्मा (2019) ने अपने शोध में यह पाया कि जीएसटी ने कर अनुपालन को बढ़ावा दिया है तथा कर चोरी पर नियंत्रण स्थापित करने में सहायता की है। तथापि, उन्होंने यह भी उल्लेख किया कि जीएसटी पोर्टल की तकनीकी समस्याएँ और जटिल रिटर्न प्रक्रिया छोटे व्यापारियों के लिए चुनौतीपूर्ण रही। राव (2020) के

अनुसार जीएसटी ने भारत में व्यापार करने की प्रक्रिया को सरल बनाया है तथा कर प्रणाली मे पारदर्शिता लाई है। अध्ययन में यह निष्कर्ष प्रस्तुत किया गया कि समय के साथ व्यापारियों की जीएसटी के प्रति धारणा में सकारात्मक परिवर्तन देखा गया है।

हाल के अध्ययनों से यह स्पष्ट होता है कि जीएसटी के प्रभावों को लेकर व्यापारियों की धारणा मिश्रित रही है। जहाँ एक ओर जीएसटी को एक दीर्घकालिक सुधार के रूप में देखा जा रहा है, वहीं दूसरी ओर प्रारंभिक क्रियान्वयन से जुड़ी समस्याएँ अब भी शोध का विषय बनी हुई हैं। उपलब्ध साहित्य यह संकेत देता है कि जीएसटी के व्यावहारिक प्रभावों, विशेष रूप से खुदरा व्यापारियों की धारणा पर, क्षेत्रीय स्तर पर और अधिक अध्ययन की आवश्यकता है।

शोध उद्देश्य :

प्रस्तुत शोध अध्ययन के प्रमुख उद्देश्य निम्नलिखित हैं–

● वस्तु एवं सेवा कर (जीएसटी) के प्रति खुदरा व्यापारियों की धारणा का अध्ययन करना।

● जीएसटी के क्रियान्वयन से खुदरा व्यापार पर पड़े आर्थिक एवं व्यावसायिक प्रभावों का विश्लेषण करना।

● जीएसटी को अपनाने की प्रक्रिया में खुदरा व्यापारियों द्वारा अनुभव की गई प्रमुख समस्याओं की पहचान करना।

● जीएसटी के अनुपालन एवं रिटर्न फाइलिंग में कर सलाहकारों की भूमिका का मूल्यांकन करना।

● जीएसटी प्रणाली के प्रति खुदरा व्यापारियों की संतुष्टि के स्तर का आकंलन करना।

शोध परिकल्पनाएं :

प्रस्तुत अध्ययन के उद्देश्यों के आधार पर निम्नलिखित शून्य परिकल्पनाएं निध ारित की गई हैं–

1. वस्तु एवं सेवा कर (जीएसटी) के क्रियान्वयन का खुदरा व्यापारियों के व्यवसाय संचालन पर कोई महत्वपूर्ण प्रभाव नहीं पड़ा है।

2. जीएसटी के अनुपाल एवं रिटर्न फाइलिंग में कर सलाहकारों की भूमिका महत्वपूर्ण नहीं है।

3. जीएसटी की अनुपालन प्रक्रिया खुदरा व्यापारियों के लिए सरल एवं सुगम है।

4. जीएसटी के प्रति खुदरा व्यापारियों की कुल धारणा सकारात्मक नहीं है।

शोध पद्धति :

प्रस्तुत अध्ययन वस्तु एवं सेवा कर (जीएसटी) के क्रियान्वयन के प्रति खुदरा व्यापारियों की धारणा के विश्लेषण पर आधारित है। यह अध्ययन वर्णनात्मक एवं विश्लेषणात्मक प्रकृति का है, जिसमें प्राथमिक एवं द्वितीयक दोनों प्रकार के आँकड़ों का उपयोग किया गया है।

1. आकंड़ों के स्रोत :

इस अध्ययन में प्रयुक्त आँकड़े निम्नलिखित स्रोतों से प्राप्त किए गए है–

प्राथमिक आँकड़े :

चयनित खुदरा व्यापारियों से संरचित प्रश्नावली के माध्यम से।

द्वितीयक आँकड़े:

शोध पत्रिकाएँ, पुस्तकें, सरकारी रिपोर्टें, जीएसटी नेटवर्क (जीएसटीएन) से संबंधित प्रकाशित सामग्री तथा विभिन्न शोध अध्ययन।

2. अध्ययन क्षेत्र एवं न्यादर्श चयन :

अध्ययन एक चयनित जिले के खुदरा व्यापारियों तक सीमित है। सुविधाजनक नमूना विधि के अंतर्गत कुल 60 खुदरा व्यापारियों का चयन किया गया, जो विभिन्न प्रकार के खुदरा व्यवसायों से संबंधित हैं।

3. आँकड़ा संग्रह की विधि :

प्राथमिक आँकड़े वर्ष 2018 में प्रत्यक्ष संपर्क के माध्यम से प्रश्नावली द्वारा एकत्र किए गए। प्रश्नावली में GST से संबंधित जागरूकता, अनुपालन प्रक्रिया, समस्याएँ तथा संतुष्टि स्तर से जुड़े प्रश्न सम्मिलित किए गए।

4. आँकड़ा विश्लेषण विधि :

संग्रहित आँकड़ों के विश्लेषण हेतु प्रतिशत विधि एवं तालिकीय प्रस्तुतीकरण का प्रयोग किया गया। प्राप्त परिणामों की व्याख्या अध्ययन की परिकल्पनाओं के संदर्भ में की गई।

5. अध्ययन की सीमाएँ :

● अध्ययन का क्षेत्र अम्बेडकर जिले तक सीमित है।

● न्यादर्श का आकार अपेक्षाकृत सीमित है।

● अध्ययन मुख्यतः व्यापारियों की धारणा पर आधारित है, जो व्यक्तिगत मतों से प्रभावित हो सकती है।

आंकड़ों का विश्लेषण एवं व्याख्या :

इस अध्ययन में एकत्र किए गए प्राथमिक आँकड़ों का विश्लेषण खुदरा व्यापारियों की वस्तु एवं सेवा कर (जीएसटी) के प्रति धारणा को समझने के उद्देश्य

से किया गया है। आँकड़ों का विश्लेषण मुख्यतः प्रतिशत विधि एवं तालिकीय प्रस्तुतीकरण के माध्यम से किया गया है, ताकि प्राप्त निष्कर्षों की स्पष्ट व्याख्या की जा सके।

अध्ययन से यह ज्ञात हुआ कि अधिकांश खुदरा व्यापारी जीएसटी की मूल अवधारणा से परिचित हैं। लगभग 72 प्रतिशत व्यापारियों ने स्वीकार किया कि वे जीएसटी के पंजीकरण एवं कर संरचना की सामान्य जानकारी रखते हैं, जबकि शेष व्यापारियों को अभी भी इसकी पूर्ण समझ नहीं है। इससे यह स्पष्ट होता है कि जागरूकता का स्तर मध्यम से उच्च श्रेणी में है।

जीएसटी के क्रियान्वयन की जटिलता के संबंध में यह पाया गया कि लगभग 68 प्रतिशत व्यापारियों ने प्रारंभिक चरण में जीएसटी प्रणाली को जटिल बताया। रिटर्न फाइलिंग, अ‍ॅनलाइन पोर्टल की तकनीकी समस्याएँ तथा बार–बार नियमों में परिवर्तन प्रमुख कठिनाइयों के रूप में सामने आए। तथापि, 62 प्रतिशत व्यापारियों ने यह भी माना कि समय के साथ जीएसटी अनुपालन प्रक्रिया अपेक्षाकृत सरल होती गई है।

कर सलाहकारों की भूमिका के विश्लेषण से यह स्पष्ट हुआ कि लगभग 80 प्रतिशत खुदरा व्यापारी GST से संबंधित कार्यों के लिए कर सलाहकारों या लेखाकारों पर निर्भर हैं। इससे यह संकेत मिलता है कि GST प्रणाली को प्रभावी ढंग से अपनाने में विशेषज्ञ सहायता की भूमिका अत्यंत महत्वपूर्ण है।

अध्ययन में यह भी पाया गया कि GST के प्रभाव के संबंध में व्यापारियों की धारणा मिश्रित रही है। लगभग 60 प्रतिशत व्यापारियों ने माना कि जीएसटी से व्यापार में पारदर्शिता बढ़ी है और कर चोरी पर नियंत्रण हुआ है, जबकि 40 प्रतिशत व्यापारियों ने अनुपालन लागत एवं दंड प्रावधानों को चुनौतीपूर्ण बताया।

कुल मिलाकर, आँकड़ों के विश्लेषण से यह निष्कर्ष निकलता है कि जीएसआ के प्रति खुदरा व्यापारियों की धारणा प्रारंभिक रूप से नकारात्मक रही, किंतु समय के साथ इसमें सकारात्मक परिवर्तन देखा गया है। यह परिवर्तन मुख्यतः अनुभव, जागरूकता एवं तकनीकी सहायता के बढ़ने के कारण संभव हुआ है।

निष्कर्ष :

प्रस्तुत अध्ययन के आँकड़ों के विश्लेषण के आधार पर निम्नलिखित प्रमुख निष्कर्ष प्राप्त हुए हैं–

1. अधिकांश खुदरा व्यापारी वस्तु एवं सेवा कर (जीएसटी) की मूल अवधारणा एवं संरचना से परिचित पाए गए।

2. जीएसटी के प्रारंभिक क्रियान्वयन के दौरान खुदरा व्यापारियों को तकनीकी

समस्याओं, विशेषकर अश्रनलाइन पोर्टल एवं रिटर्न फाइलिंग से संबंधित कठिनाइयों का सामना करना पड़ा।

3.   अध्ययन से यह स्पष्ट हुआ कि जीएसटी प्रणाली को समझने और अपनाने में कर सलाहकारों एवं लेखाकारों की भूमिका अत्यंत महत्वपूर्ण रही है।

4.   जीएसटी के लागू होने से कर प्रणाली में पारदर्शिता बढ़ी है तथा कर चोरी पर नियंत्रण स्थापित करने में सहायता मिली है।

5.   छोटे खुदरा व्यापारियों पर अनुपालन लागत एवं दंड प्रावधानों का प्रभाव अपेक्षाकृत अधिक पाया गया।

6.   समय के साथ जीएसटी के प्रति खुदरा व्यापारियों की धारणा में सकारात्मक परिवर्तन देखा गया है।

7.   अधिकांश व्यापारियों ने यह स्वीकार किया कि पर्याप्त प्रशिक्षण एवं जागरूकता कार्यक्रमों से जीएसटी प्रणाली और अधिक प्रभावी हो सकती है।

वस्तु एवं सेवा कर (जीएसटी) भारत की अप्रत्यक्ष कर प्रणाली में किया गया एक महत्वपूर्ण एवं व्यापक सुधार है, जिसका उद्देश्य कर संरचना को सरल, पारदर्शी और एकीकृत बनाना है। प्रस्तुत अध्ययन में जीएसटी के क्रियान्वयन के पश्चात खुदरा व्यापारियों की धारणा का विश्लेषण किया गया, जिससे यह स्पष्ट होता है कि जीएसटी ने दीर्घकाल में कर प्रणाली को अधिक संगठित और प्रभावी बनाने में योगदान दिया है।

अध्ययन के निष्कर्ष यह दर्शाते हैं कि जीएसटी के प्रारंभिक चरण में खुदरा व्यापारियों को तकनीकी समस्याओं, जटिल अनुपालन प्रक्रिया तथा पर्याप्त जानकारी के अभाव जैसी चुनौतियों का सामना करना पड़ा। विशेष रूप से छोटे और असंगठित खुदरा व्यापारियों के लिए यह प्रणाली अपेक्षाकृत अधिक कठिन सिद्ध हुई। तथापि, समय के साथ जागरूकता, अनुभव और तकनीकी सहायता के बढ़ने से व्यापारियों की जीएसटी के प्रति धारणा में सकारात्मक परिवर्तन देखने को मिला है।

कर सलाहकारों एवं लेखाकारों की भूमिका जीएसटी को प्रभावी ढंग से अपनाने में अत्यंत महत्वपूर्ण पाई गई है। अध्ययन यह निष्कर्ष निकालता है कि यदि सरकार द्वारा नियमित प्रशिक्षण कार्यक्रम, जागरूकता अभियान और तकनीकी ढांचे में सुधार किया जाए, तो जीएसटी प्रणाली खुदरा व्यापारियों के लिए अधिक सुगम, पारदर्शी और लाभकारी सिद्ध हो सकती है। कुल मिलाकर, जीएसटी को भारतीय कर व्यवस्था में एक दीर्घकालिक और सकारात्मक कर सुधार के रूप में देखा जा सकता है।

सुझाव :

प्रस्तुत अध्ययन के निष्कर्षों के आधार पर वस्तु एवं सेवा कर (जीएसटी) प्रणाली को खुदरा व्यापारियों के लिए अधिक प्रभावी एवं सुगम बनाने हेतु निम्नलिखित सुझाव प्रस्तुत किए जाते हैं–

1. छोटे एवं असंगठित खुदरा व्यापारियों के लिए सरल अनुपालन व्यवस्था विकसित की जानी चाहिए, जिससे रिटर्न फाइलिंग एवं कर भुगतान की प्रक्रिया सहज हो सके।

2. जीएसटी से संबंधित प्रशिक्षण एवं जागरूकता कार्यक्रम नियमित रूप से आयोजित किए जाने चाहिए, ताकि व्यापारियों को नियमों और प्रक्रियाओं की स्पष्ट जानकारी मिल सके।

3. GST पोर्टल को और अधिक उपयोगकर्ता–अनुकूल बनाया जाना चाहिए, जिससे तकनीकी समस्याओं में कमी लाई जा सके।

4. रिटर्न दाखिल करने की प्रक्रिया को कम जटिल एवं कम समय–साध्य बनाया जाना चाहिए, विशेषकर छोटे व्यापारियों के लिए।

5. कर सलाहकारों और व्यापार संगठनों के सहयोग से स्थानीय स्तर पर सहायता केंद्र स्थापित किए जाने चाहिए। दंड प्रावधानों में लचीलापन रखते हुए प्रारंभिक त्रुटियों के लिए सुधार का अवसर प्रदान किया जाना चाहिए।

<h2 style="text-align:center">संदर्भ</h2>

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Guidelines For The Contributors

01. Commerce & Business Studies is a biannual, bilingual research journal. It is published in the months of January and July every year. Papers are invited upto 30th November for the January issue and upto 30th May for the July issue.

02. The plagiarism in the manuscript should not exceed 10% in any case. The authors will be responsible for the same.

03. The manuscripts should normally not exceed 2500–3000 words (A4 Size) pages with a margin of 1 inch on all sides, including figures and tables, typed in 1.5 spaces and 12-point Times New Roman font for English and Kruti Dev 010 font in 14 points for Hindi.

04. The article should be submitted in a soft copy of MS Word or PageMaker 6.5 of the same through e-mail (cbs12avadh@gmail.com), followed by whatsapp-9415719286.

05. The full paper should generally consist of (i) The title of the article (Times New Roman 14, in bold). (ii) An abstract of the paper in about 500 words (Times New Roman 12-point, italics). The abstract should be in a single paragraph and indicate methodology, significant findings and conclusions in brief. (iii) Keywords: 3 to 5 words arranged alphabetically and (iv) Main text.

06. The main text should have (i) An abstract (ii) Introduction (highlighting the review of current literature, the aims, and the objectives of the study). (iii) Research Methodology (iv) Results and Discussions (v) Research limitations and implications (if any) (vi) Conclusions and Suggestions .

07. Headings and subheadings should be in 12-point font, bold-faced, and aligned left.

08. All figures (charts, diagrams, and line drawings) and papers (photographic images) should be submitted in electronic form. They should be of clear quality, in black and white, and numbered consecutively.

09. Mathematical expressions, figures and charts should be presented in a way that can be easily edited and printed. Tables and diagrams should be numbered consecutively and included in the text. Sources must be mentioned below the table. The title must be above tables, figures, and charts.

10. Please check your manuscript for clarity, grammar, spelling, punctuation and consistency of references to minimize editorial changes.

11. References should be arranged alphabetically at the end. Only references cited in the text should be presented in the list of references. For titles in a language other than English, provide an English translation in parentheses.

Note : All authors are requested not to cut and paste the diagrams and graphs given in the article from the internet, but to create them, themselves. Cut pasted diagrams and graphs do not appear clear in printing.

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