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11th REMSONS
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On

Building Atmanirbhar Bharat:
"Strategies for Sustainable Development"

02 AUGUST, 2025

Volume 11, August 2025 ISBN 978-93-5196-952-5

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Editorial Board

Editorial Committee

Published by

Knowledge Resource Centre

DurgadeviSaraf Institute of Management Studies
RSET Campus, S V Road, Malad (West),
Mumbai – 400 064, Maharashtra, India

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Chief Patron

Shri Ashok Saraf

President RSET, Chairman DSIMS & DSGS

Chief Patron of the Conference Shri Ashok Saraf, President RSET and Chairman DSIMS & DSGS, apprised the audience about the origin of Remsons Centre for Management Research (RCMR). He said that RCMR had been established with the magnanimous donation by late Remsons Group Chairman Shri Vishwaprakashji Harlalka, who had a vision to establish a Management Research Centre. He thanked Shri Krishna Kejriwal, Chairman and Managing Director Remsons Industries Ltd, for his continued support towards RCMR. He connected the dots among *Atmanirbhar Bharat* (Self Reliant India) achievable through *Education* and widely promoted by *RSET*, a pioneer in the educational activities for the last 70 years, catering education to different sections of the society. He highlighted RSET's role in shaping more than 60,000 students so far. He informed that RSET is now in the process of establishing Skill Tech University at Malad Campus. He appreciated the effort of Conference organisers for choosing this apt theme as it will serve as catalyst for transforming changes, paving the way of sustainable future for the world.

Excerpts of Keynote Speech

Mr. Krishna Kejriwal

CMD, Remsons Industries Ltd.

Chief Guest Shri Krishna Kejriwal, Chairman and Managing Director Remsons Industries Ltd, delivered an insightful inaugural speech. Based on the context of *Atmanirbhar Bharat Abhiyan* (May 2020 by PM Modi) to promote Indian goods in the global supply chain and help the country achieve self-reliance amidst Covid '19 pandemic and geopolitical crisis, he comprehended the true meaning of citizenship of a self-reliant and a confident nation. He emphasised the importance of educational institutions in imparting the understanding of the roles and responsibilities of future citizen of India. He opined that Self Reliance is not about isolationism rather to strengthen our foundations, amplifying our capabilities and becoming a contributor to the global order. He said that it's a time to innovate, to manufacture, to dream, and to deliver not just for ourselves, but for humanity at large. He shared some strategies to make this vision to be truly transformative and lasting.

He said that the Circular economy now should move from buzzword to blueprint, wherein the businesses should not only be encouraged but also to be mandated to move towards *Green Industrialisation.* As a second strategy, he talked about empowering MSMEs by giving them access to credit, technology and market. Then he talked about a few equally important strategies like- Digital Empowerment and fintech solutions, collaboration of technology incubation hubs with Research Centres, energy independence, empowering women and tribals, digital inclusion, smart, responsible and ethical governance along with citizen engagement, Atal Incubation Mission, Skill India, Defense corridor in UP and Tamil Nadu, indigenous capability for defence manufacturing, R&D, participation of private players and academic-industry collaboration for the growth of indigenous sectors etc. He concluded his speech by referring to intergenerational equity and called for innovation, sustainability and inclusivity to achieve Swatantra Bharat (Sustainable India).

Report of Remsons Centre for Management Research (RCMR)

Dr. Sumana Chaudhuri

Chief Convener, RIRC 2025

Presenting the Report of Remsons Centre for Management Research (RCMR) 2024-25, Dr. Sumana Chaudhuri mentioned that under the aegis of RCMR, the Institute faculty members have published several research articles in the Journals of National and International repute, listed in Scopus, ABS, and ABDC, indexed with a high H index and impact factor. Dr. Chaudhuri informed that RCMR has published Volume 7, Issue 1 of the Indexed Journal, 'The Management Quest', which consists of six peer-reviewed research papers. She also informed that the Centre conducts a monthly Research Review Meet to foster research culture in the Institute.

Excerpts of Keynote Speech by Guest of Honor

Dr. Harivansh Chaturvedi,

Director General, IILM Delhi

Guest of Honor Dr. Harivansh Chaturvedi, Director General, IILM Delhi and Alternate President of the Education Promotion Society for India (EPSI), presented his keynote address on *Strategies for Sustainable Development: Pathway for a Viksit and Atmanirbhar Bharat*. He talked about India's Historic Inflection Point and connected with the recent Amritkaal journey of India to attain the target of Viksit Bharat. He decoded the Triad- Sustainability, Development & Self-Reliance. To showcase the inherent capability of India, he presented a Data snapshot of India's progress though different metrics, like- Renewable Energy, Digital Economy, GDP Growth and Human Development Index (HDI). He shared the 5 Pilar Frame worked Strategic Pathway-Green Economy, Human Capital, Energy Transition, Sustainable Infrastructure and transparent and stable Policy & Governance. As a revered academician, he emphasised the role of Business Schools for nurturing the Leaders of 2047. In this context, he explained the four major focus areas- Curriculum Innovation, Thought Leadership, Fostering Entrepreneurship and Industry-Academia Collaboration. He concluded by exhibiting a Confluence of Visions. He said that Sustainable Development is not a cost but a strategic investment to achieve the twin goals of Development and Self Reliance, builds resilience, and creates an equitable society. In his concluding remark he called the fellow citizen to move forward with the conviction that what is good for the planet, is best for the economy and our people.

From Editor's Desk

Dr. Sumana Chaudhuri

In May 2020, Prime Minister, Mr. Narendra Modi launched the Self-reliant India (*Atmanirbhar Bharat Abhiyan*) mission to promote Indian goods in the global supply chains and help the country achieve self-reliance amidst the COVID-19 pandemic and geopolitical crisis.

The journey towards *Atmanirbhar Bharat* is still unfolding. With clear objectives in sight, the government initiatives are paving the way for a self-reliant India that can stand tall on its own. During the journey of becoming *Atmanirbhar*, India started dreaming of *Viksit Bharat 2047*

The precondition to achieve *Viksit Bharat* is to fulfill the requirement of *Atmanirbhar Bharat* in the sense of enabling and empowering the local manufacturing, MSMEs, women, and youth, embracing technology, nurturing the innovation ecosystem, and reducing the income inequality gap. The country needs to strategize to sustainably build a self-reliant economy and maintain the momentum to grow further.

Under the aegis of Remsons Centre for Management Research (RCMR), DSIMS and DSGS organized 11th Remsons International Research Conference (RIRC) on 02 August 2025. The conference was inaugurated by Shri Krishna Kejriwal, Chairman and Managing Director Remsons Industries Limited, and he delivered his insightful inaugural speech. Keynote Speaker Dr. Harivansh Chaturvedi, Director General, IILM Delhi, illuminated the audience with his thought-provoking speech.

The objective of this conference is to bring academicians, research scholars, and practicing professionals to deliberate and present their perspectives on the assessment of our progress towards self-reliance in various sectors of the Indian economy, gauge it in terms of sustainability yardstick and build our confidence to travel through *Amritkaal* to achieve the target of *Viksit Bharat*.

The 11th Remsons International Research Conference received good responses from academia and industry in terms of research paper contributions. After initial screening, based on merit, around 15 selected research papers by academicians, like Professors and Deans of various Management Institutes, research scholars and MBA students and by industry professionals had been presented in the Conference. The authors and participants deliberated and presented their perspectives on strategies for sustainable development and business growth to build Atmanirbhar Bharat.

As a Session Chair, Prof. Dr. Krupa A Rai discussed the future research direction in the field of business and management.

Co-Convener Mr. Maneesh Gupta has beautifully summarized the proceedings of the research papers presented at the Conference.

Based on a fair evaluation by the Session Chair and blind reviewers, two papers were chosen as the Best Paper Awardees.

Conference Co-Convener Dr. Sunita Pujar and Ms. Pooja Goswami offered the vote of thanks respectively in the plenary session and in the afternoon session.

The Conference was a grand success, attracting authors, Ph.D scholars, paper presenters, and participants from Mumbai as well as other reputed Management Institutions and Universities, as

well as industries across India. It has enabled academicians, researchers, and practicing managers to share their research findings, issues, concerns, doubts, and insights for the future vis-à-vis specific domains of knowledge and practice. We hope that the conference has not only provided a great intellectual and social interactive platform to the participants but also has given new perspectives from concrete facts. As a Chief Convener, I am deeply privileged to present the Conference Proceeding 2025 and hope that this compendium of research papers will be found useful by researchers, industry practitioners, and policymakers.

Paper Track

11th REMSONS INTERNATIONAL RESEARCH CONFERENCE
on
"Building Atmanirbhar Bharat: Strategies for Sustainable Development"

02 August 2025

11.40 AM to 1.30 PM

Session Chair - Dr. Krupa Rai **Venue: 623**

SN	TIME	AUTHOR	TITLE
1	11.40 am – 11.48 am	Mr. Sukeshraj Zallare Dr. Ashish Hattangadi	Digital Collection Challenges in Mumbai's Microfinance Sector
2	11.50 am – 11.58 am	Ms. Yogita	Green Investments and PPPs in Infrastructure: Assessing India's Progress Towards the SDGs
3	12.00 noon – 12.08 pm	Mr. Alok Hardikar Dr. Sunil Karve	Impact of Atmanirbhar Bharat on consumer satisfaction in Indian Ride-Hailing services
4	12.10 pm – 12.18 pm	Dr. Mmahek Chhabria	Go Digital: A Roadmap Towards Atmanirbhar Bharat
5	12.20 pm – 12.28 pm	Ar. Mildred Jose	The Genesis of 'Othering': Examining Public Spaces for Woman
6	12.30 pm – 12.38 pm	Dr. Mamtaa Rane	Leading with Emotional Intelligence: The Power of Catharsis in Effective Leadership
7	12.40 pm – 12.48 pm	Mrs. Rachna Kulkarni Dr. Naina Salve	A Bibliometric Analysis of Role of Women in leading Communities towards efficient waste management
8	12.50 pm – 12.58 pm	Dr. Vivekanand Pawar Ms. Ketki Vivekanand Pawar	Boosting woman's economic growth, empowerment, fostering leadership of woman, and championing gender equality
9	01.00 pm – 01.08 pm	Dr. Urvi Pillai Dr. Rajendra Patil	Building Resilient Financial Ecosystems: The Impact of Atmanirbhar Bharat on Fintech and Digital Financial Inclusion
10	01.10 pm – 01.18 pm	Bhagyashree Tripathi Dr Sanjeev Thakur	An Exploratory Study on the Apparel Buying Behavior of Women in Urban Maharashtra: Implications for Empowering the Indian Retail Sector
11	01.20 pm – 01.28 pm	Ms. Glancy Albuquerque Mr. Rajeev Kamble Dr. Sarita Vichore	Integrating Positive Risk Management into Financial Literacy Programs Impact on Financial Empowerment and Coping Behaviors in Low Power-Distance Contexts

Lunch Break – 1.30. PM to 2.30 PM

Session - II

2.30 PM to 3.10 PM

SN	TIME	AUTHOR	TITLE
12	02.30 pm– 02.38 pm	Dr. Ravindra Dey	Influence of Leadership Effectiveness on Job Satisfaction and Job Retention
13	02.40 pm – 02.48 pm	CA Gurunathan Pillai Dr. Shripad Joshi	GST and Technological Adoption in Mumbai's Restaurant Industry
14	02.50 pm – 02.58 pm	Mr. Parth Laijawala Mr. Maneesh Gupta	Forecasting Daily Potato Prices in a Mumbai Mandi Using Statistical and Machine Learning Techniques
15	3.00 pm – 3.08 pm	Ms. M Ananya Prabhu Ms. Sanika Walve Ms. Shravya Shetty Ms. Vanshita Agrawal	The Impact of Technology on Work Life Balance: A Study in Mumbai City

3.10 PM – 4.00 PM

Observation, Comments and Summarization of Research Presentations
Prize Distribution

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Digital Collection Challenges in Mumbai's Microfinance Sector

Sukeshraj Zallare
Research Scholar, Alkesh Dinesh Mody Institute for Financial & Management Studies (ADMIFMS), Mumbai

Ashish Hattangdi
Assistant Professor, Alkesh Dinesh Mody Institute for Financial & Management Studies, Mumbai

ABSTRACT

The rapid digitization of financial services has opened new pathways for financial inclusion, yet the adoption of digital collection systems within India's microfinance sector remains uneven. This study investigates the behavioral and institutional factors influencing the use of FinTech platforms for digital collections in the urban microfinance ecosystem of Mumbai. Drawing upon a synthesis of the Technology Acceptance Model (TAM), Diffusion of Innovation (DoI), and Institutional Trust Theory, the research proposes and tests a conceptual model integrating seven constructs: trust in digital systems, perceived transaction security, service quality, perceived regulatory support, digital financial confidence, FinTech use, and inclusive financial behavior.

Using data from 608 microfinance customers collected via a structured questionnaire and analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM), the study confirms that trust, security, and service quality significantly drive FinTech adoption. Digital financial confidence emerges as a critical mediator between FinTech use and inclusive behavior, while perceived regulatory support moderates this relationship. The findings advance theoretical understanding by positioning digital financial literacy as an enabler rather than an outcome of inclusion and highlighting the regulatory environment as a boundary condition.

The study offers actionable insights for policymakers, FinTech providers, and MFIs to foster user trust, enhance digital capabilities, and design inclusive digital collection strategies aligned with local realities. Implications are particularly relevant to urban financial inclusion efforts in rapidly digitizing economies.

Key Words: *FinTech, financial inclusion, digital collections, microfinance, Mumbai, digital literacy, regulatory support*

1. INTRODUCTION

Financial inclusion, the ability to access affordable and appropriate financial services, remains a pressing developmental challenge. Despite the rise of digital finance, large urban populations, including those in Mumbai, remain excluded from the formal financial ecosystem. This gap is not due to a lack of technology, but rather the layered barriers faced by underserved populations in using digital platforms (Sinha et al., 2018).

FinTech innovations such as mobile money, biometric tools, and API-based systems have expanded outreach by minimizing physical infrastructure needs (Aracil et al., 2025). Yet, digital

access alone does not ensure meaningful usage. As Sinha et al. (2018) caution, user capacity must be central to FinTech deployment, particularly in low-income and informal communities.

Mumbai exemplifies this paradox. It boasts high digital penetration but houses a microfinance clientele that struggles with low digital literacy, resistance to change, and infrastructural constraints (Shalini & Sabitha, 2024). Despite supportive policies like Digital India and UPI, digital collection adoption among MFIs has been inconsistent.

Challenges, ranging from transaction delays and fraud to limited grievance redressal, especially affect women, migrants, and daily-wage earners (Aracil et al., 2025). The COVID-19 push toward digitization often occurred without adequate user handholding, resulting in symbolic rather than substantive inclusion (Dananjayan et al., 2023).

Institutional trust is pivotal. As Morgan (2022) notes, FinTech adoption hinges on policy clarity and ecosystem trust, especially for semi-formal actors and last-mile users. This study explores digital collection challenges in Mumbai's microfinance sector by examining the intersections of infrastructure, user capability, behavioral readiness, and regulatory support.

By focusing on Mumbai, a microcosm of both digital progress and inequality, this paper seeks to highlight operational gaps, user perspectives, and policy implications for building inclusive FinTech ecosystems.

2. THEORETICAL FOUNDATION, REVIEW OF LITERATURE, AND HYPOTHESIS DEVELOPMENT

2.1 Theoretical Foundation

This study builds upon the **Technology Acceptance Model (TAM)** and **Diffusion of Innovations (DoI)** framework to understand digital collection adoption. However, to deepen our contextual grounding in the urban microfinance ecosystem of Mumbai, it is crucial to consider the **Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)**. Particularly, the dimension of **Effort Expectancy**, which refers to the ease of use perceived by the user, becomes salient for low-literacy microfinance clients often excluded from mainstream digital ecosystems. Integrating UTAUT2 allows for explaining **behavioral inertia** among digitally unskilled borrowers, especially women and older adults.

Moreover, contrasting **TAM's perceived usefulness** with **Value-based Adoption Model (VAM)**'s emphasis on net value perception offers a more holistic interpretation of FinTech value realization. While TAM focuses on cognitive evaluation of usefulness, VAM integrates **cost, risk, and effort** in evaluating adoption decisions, which is especially relevant in informal urban settlements where perceived data risk or transaction errors can disproportionately affect economically vulnerable users (Morgan, 2022).

Simultaneously, the **Diffusion of Innovation (DoI) Theory** (Rogers, 2003) helps examine the broader spread of digital collection systems across heterogeneous borrower groups. It emphasizes adopter categories, innovation characteristics (like compatibility and trialability), and the influence

of social systems. In Mumbai's microfinance landscape, early adopters of digital collection may influence neighboring borrowers through community interactions and shared experiences, but adoption also hinges on infrastructure reliability, agent behavior, and digital trust (Sinha et al., 2018).

Furthermore, the construct of **Perceived Regulatory Clarity**, adapted from institutional theory, has also been integrated. In emerging FinTech environments, user confidence is often contingent on visible, predictable regulatory protections (Morgan, 2022). For many MFI clients, particularly women and informal workers, institutional support signals that digital systems are legitimate and safe.

By integrating these perspectives, the study builds a causal path model examining how **trust**, **service quality**, and **security perceptions** influence digital collection adoption, which in turn affects **digital financial confidence** and ultimately **inclusive financial behavior**, with **policy clarity** moderating this relationship.

2.2 Trust in Digital Collection Systems

Trust reflects users' confidence in the reliability and intent of digital collection interfaces deployed by MFIs. In urban microfinance contexts, especially among borrowers with low digital exposure, trust is foundational. Users must believe that repayment amounts won't be misdirected, that the app functions reliably, and that their data are secure. Sinha et al. (2018) highlighted that in financially fragile populations, even minor tech failures can lead to long-term disengagement. Aracil et al. (2025) observed that trust, more than convenience, drives continued mobile money usage in emerging economies.

H1: Trust in digital collection systems significantly and positively influences digital collection adoption.

2.3 Quality of Tech-Enabled MFI Services

Service quality includes interface usability, response time, app uptime, availability of multilingual support, and human support channels. In the digital collection context, many Mumbai-based MFIs deploy white-label apps or partner FinTech interfaces, which vary in quality and user intuitiveness. Shalini and Sabitha (2024) argue that usability friction, such as unclear navigation or confusing transaction summaries, reduces adoption among first-time users.

H2: Perceived service quality of digital collection platforms significantly and positively influences digital collection adoption.

2.4 Perceived Transaction Security

Security concerns often deter borrowers from fully engaging with digital systems. These concerns include fears of data breaches, incorrect deductions, phishing, and app-based fraud. For microfinance clients, who operate on tight financial margins, even the perception of risk leads to avoidance. Dananjayan et al. (2023) report that secure-feeling platforms saw more voluntary usage, even in the absence of agent nudging.

H3: Perceived security of digital collection platforms significantly and positively influences digital collection adoption.

2.5 Digital Collection Adoption and Inclusive Financial Behaviour

While many MFIs in Mumbai have technically enabled digital collection systems, usage remains inconsistent. For adoption to translate into financial inclusion, users must not only pay digitally but also interact with other features, like tracking payments, viewing balances, or requesting loan top-ups. As Morgan (2022) emphasized, financial inclusion must be assessed not by access alone, but by usage depth and continuity.

H4: Digital collection adoption significantly and positively influences inclusive financial behaviour.

2.6 Digital Collection and Digital Financial Confidence

Repeated engagement with digital collection interfaces gradually builds confidence in navigating digital financial environments. Borrowers who successfully repay via app are more likely to explore savings features, compare credit products, or ask questions. Aracil et al. (2025) suggest that familiarity breeds trust, and that FinTech literacy develops organically when users are given agency and reliable feedback mechanisms.

H5: Digital collection adoption significantly and positively influences digital financial confidence.

2.7 Digital Financial Confidence and Inclusive Financial Behaviour

Digital financial confidence refers to users' belief in their own ability to navigate digital financial tools. This goes beyond literacy to include self-efficacy, perceived control, and emotional comfort. Shalini and Sabitha (2024) observed that borrowers who developed confidence were more likely to explore new products or raise disputes proactively.

H6: Digital financial confidence significantly and positively influences inclusive financial behaviour.

2.8 Digital Financial Confidence as a Mediator

Although digital collection adoption enhances access, the transformation into deeper inclusion requires internal readiness, digital financial confidence. Borrowers may use the app for repayments but remain disengaged from formal finance if they lack confidence in interpretation, follow-up, or seeking support. As Dananjayan et al. (2023) argue, the quality of digital engagement, not just the quantity, is critical.

H7: Digital financial confidence mediates the relationship between digital collection adoption and inclusive financial behaviour.

2.9 Policy Clarity as a Moderator

In microfinance, perceived regulatory protection and institutional endorsement significantly shape user confidence. Borrowers are more likely to adopt and continue digital usage when they perceive the system as being monitored and redressal-friendly. Morgan (2022) notes that regulatory clarity signals stability, which is critical in populations with historical mistrust of formal finance.

H4a: Policy clarity moderates the relationship between digital collection adoption and inclusive financial behaviour such that higher clarity strengthens the relationship. The conceptual model is presented in Figure 1.

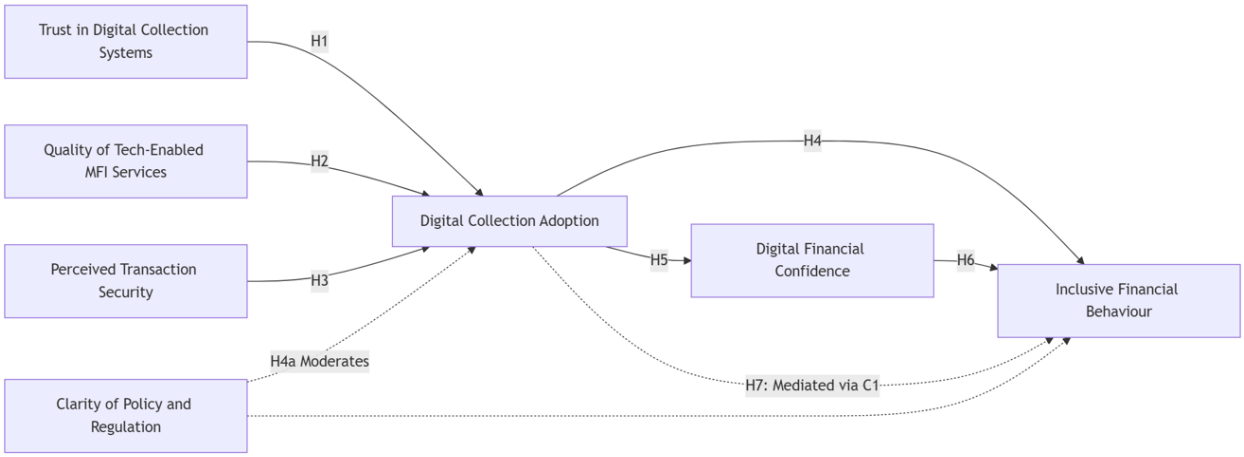

Figure 1. The conceptual model. Source: the authors.

3. RESEARCH METHODOLOGY

3.1 Measurement Development

To operationalize the constructs in this study, a comprehensive research framework was developed based on validated theoretical insights and adapted empirical measures. The structural model comprises seven core variables: **trust in digital collection systems**, **quality of tech-enabled MFI services**, **perceived transaction security**, **digital collection adoption**, **digital financial confidence**, **inclusive financial behaviour**, and **perceived policy clarity**. These variables were measured using multiple-item scales adapted from existing literature and refined to suit the specific context of **digital collection in Mumbai's microfinance sector**. The visual representation of the proposed framework is shown in *Figure 1*.

Each variable was measured with 3–5 items, ensuring content validity while allowing for statistical reliability during factor analysis. The items used to measure **trust** were adapted and modified to reflect digital repayment environments, with references to the credibility of transaction records, platform reliability, and trust in MFI-linked digital tools (Sinha et al., 2018; Aracil et al., 2025). The **perceived transaction security** construct included items on data protection, SMS alert authenticity, and user confidence in app-based transactions, drawing from prior frameworks employed in South Asian FinTech contexts (Shalini & Sabitha, 2024).

The **quality of tech-enabled MFI services** was measured using items adapted from service quality literature, covering digital responsiveness, app functionality, clarity of communication, and multilingual interface availability, aligned with recent discussions on FinTech service delivery to financially underserved users (Dananjayan et al., 2023).

To measure **digital collection adoption**, we modified existing FinTech usage scales by reframing items to explicitly capture borrower interactions with MFI-linked digital platforms for repayments and account inquiries. This construct did not generalize FinTech adoption across savings, investments, or insurance, but focused specifically on app-based loan servicing and repayment frequency, aligned with the Mumbai MFI model (Aracil et al., 2025; Morgan, 2022).

The construct **digital financial confidence** was introduced to capture the behavioural readiness and perceived self-efficacy of users navigating digital repayment systems. It was measured using items adapted from prior digital capability research but customized to reflect the context of repeat usage, perceived ability to resolve issues independently, and ease of interpreting app-based financial information (Shalini & Sabitha, 2024).

Inclusive financial behaviour was captured through indicators like use of formal repayment modes, inquiry behavior, digital communication with MFIs, and awareness of one's repayment schedule. These items were derived from financial inclusion measurement scales, adjusted for the context of technology-mediated engagement (Sinha et al., 2018).

The construct **perceived policy clarity** was measured through items capturing user awareness of grievance mechanisms, institutional legitimacy, integration with Aadhaar/UPI systems, and perception of government endorsement of the platform. These items were contextualized from broader FinTech trust models in regulatory contexts (Morgan, 2022; Dananjayan et al., 2023).

All items were measured on a **five-point Likert scale**, ranging from **1 = Strongly Disagree** to **5 = Strongly Agree**. This scaling approach balances simplicity for respondents and robust statistical suitability for confirmatory factor analysis.

The questionnaire was structured in two parts. The **first section** captured demographic and contextual variables, including age, gender, education level, smartphone access, and prior experience with digital repayment. The **second section** captured respondent perceptions across the seven constructs.

Before full-scale deployment, the questionnaire was subjected to expert validation and pilot testing. Feedback was solicited from **two FinTech professionals** working in MFI digitization and **four academic experts** in financial inclusion and digital behavior. Their suggestions were integrated to refine item phrasing, eliminate ambiguous terms, and adjust question order to improve survey flow and minimize fatigue.

A **pilot study with 30 MFI customers** was conducted to assess item clarity, response variability, and internal consistency. Based on this, minor linguistic adjustments were made, and certain items were reordered for thematic continuity. Attention was also paid to ensure the Google Forms

interface did not overwhelm users. Only critical items were made mandatory to avoid discouraging participation from semi-literate or time-constrained respondents.

The resulting instrument achieved both contextual sensitivity and methodological rigor, allowing for reliable measurement of latent constructs central to understanding digital collection dynamics in Mumbai's microfinance ecosystem.

3.2 Sample and Data Collection

This study targeted individuals actively engaged with digital collection platforms offered by microfinance institutions (MFIs) in the Mumbai region. Given the absence of an official registry of digital borrowers using FinTech interfaces for loan repayments, a **non-probability sampling approach** was adopted, specifically a mix of **convenience** and **snowball sampling** techniques, following precedents set by contemporary FinTech studies (Sinha et al., 2018; Dananjayan et al., 2023).

The survey instrument was developed using Google Forms and was designed in both English and Hindi to accommodate linguistic diversity among respondents. The link was distributed via multiple digital channels, including **WhatsApp, Telegram, community Facebook groups, and MFI-led WhatsApp broadcast lists**, enabling outreach to a broad cross-section of digital borrowers. Initial respondents were encouraged to forward the form to peers within their borrowing or MFI-linked networks, allowing for a decentralized diffusion of the survey link.

The data collection period spanned **three months, from September to November 2023**, and was conducted entirely online. Respondents were informed about the purpose of the study, provided consent, and were assured of complete anonymity and confidentiality.

This study targeted individuals actively engaged with digital collection platforms offered by microfinance institutions (MFIs) in the Mumbai region. Given the absence of an official registry of digital borrowers using FinTech interfaces for loan repayments, a **non-probability sampling approach** was adopted, specifically a mix of **convenience** and **snowball sampling** techniques, following precedents set by contemporary FinTech studies

A total of **608 valid responses** were received, all of which were used in the final analysis. The sample size exceeds the minimum threshold recommended by **G*Power 3.1**. With **five predictors** in the structural model, a **sample of 138** was deemed sufficient to detect a medium effect size (0.15) with **95% power** at a 5% significance level (Faul et al., 2007). Thus, the actual sample size, more than **four times larger** than required, provided high statistical robustness and model reliability.

To check for **non-response bias**, the responses from the first 75 participants were compared with the last 75 across key variables. Independent sample t-tests revealed no statistically significant differences between these groups, affirming the absence of non-response bias and temporal distortion.

The **demographic profile** of the respondents is detailed in *Table 1*. The gender distribution was nearly balanced (50.66% male, 49.34% female). Most respondents were aged **15–35 years**,

reflecting the age band most comfortable with mobile technology. In terms of educational background, **nearly 67% held a graduate or post-graduate qualification**, a possible reflection of the urban sample's digital readiness. Additionally, while **60.69% belonged to rural peripheries**, they were active participants in digital collection via mobile-based MFIs, highlighting the reach of FinTech into semi-urban and rural outskirts of Mumbai.

Regarding FinTech usage patterns:

- **49.84% had more than 5 years of experience** engaging with digital financial platforms.
- **47.2% reported always using FinTech tools** for financial services, including MFI repayments.
- A further **28.45% used it often**, suggesting a majority of the sample had habitual interaction with digital finance platforms.

Table 1. Demographic profile of the respondents. Source: the authors

Demographic Variable	Groups	Frequency (n)	Percentage (%)
Gender	Male	308	50.66
	Female	300	49.34
Age (in years)	15–25	251	41.28
	26–35	205	33.72
	36–45	61	10.03
	46–55	56	9.22
	Above 55	35	5.76
Education Level	Primary	17	2.8
	Secondary	92	15.13
	Graduation	226	37.17
	Post-graduation	186	30.59
	Professional Qualification	87	14.31
Place of Residence	Greater Mumbai Region	369	60.69
	Extended Mumbai Metropolitan Area (MMR)	239	39.31
Experience in FinTech Use	Less than 1 year	47	7.73
	1–3 years	119	19.57
	2–5 years	139	22.86
	More than 5 years	303	49.84
Frequency of FinTech Use	Rare	28	4.61
	Sometimes	120	19.74
	Often	173	28.45
	Always	287	47.2

4. DATA ANALYSIS AND RESULTS

This section presents the empirical findings derived through **Partial Least Squares Structural Equation Modeling (PLS-SEM)**, using **SmartPLS 4.0**, as recommended for complex models with formative and reflective constructs and medium-sized datasets (Hair et al., 2019). The

analysis includes tests for **common method bias (CMB)**, assessment of the **measurement model**, and preliminary indicators of **structural model fitness**.

4.1 Common Method Bias (CMB) Test

Given the single-source nature of data collection (self-reported survey), the study took a dual-pronged approach to assess the possibility of **common method bias** (CMB), which may arise when measurement errors are introduced due to shared data collection methods rather than the constructs themselves (Podsakoff et al., 2003).

First, we employed **Harman's one-factor test**, which indicated that the **first factor accounted for only 48.55% of the total variance**, well below the critical 50% threshold, suggesting that no single latent factor dominates the variance, and hence, common method variance is unlikely to be a major concern.

Second, a **full collinearity test** was conducted as proposed by Kock (2015), in which **variance inflation factor (VIF)** values were examined across all latent constructs. The results indicated that **all VIF scores were below 3.3**, confirming that multicollinearity was not present and reinforcing that **CMB was not a threat** to the validity of this dataset.

4.2 Assessment of Measurement Model

To ensure the reliability and validity of the constructs used in the study, a rigorous assessment of the **measurement model** was performed as per PLS-SEM guidelines (Hair et al., 2021).

Internal Consistency and Reliability

Two primary indices, **Cronbach's alpha** and **Composite Reliability (CR)**, were used to evaluate the internal consistency of the constructs. As shown in Table 2, all constructs recorded Cronbach's alpha values **ranging from 0.816 to 0.913**, and CR values also exceeded the **threshold of 0.70**, thereby demonstrating strong internal consistency and scale reliability (Henseler et al., 2016).

Convergent Validity

The **Average Variance Extracted (AVE)** was used to assess **convergent validity**. As per the recommended threshold (AVE > 0.50), all constructs in the model met the criterion (see Table 2), indicating that each construct captures more variance from its indicators than from error terms (Hair et al., 2021).

Discriminant Validity

To ensure that each construct was empirically distinct from the others, the **Fornell–Larcker criterion** was applied. As displayed in Table 3, the **square root of AVE values for each construct exceeded its correlations with all other constructs**, confirming satisfactory discriminant validity (Fornell & Larcker, 1981).

Multicollinearity Diagnostics

In addition to the VIF values assessed for CMB, **construct-level VIF scores** were reviewed to detect multicollinearity in the measurement model. All constructs exhibited **VIF values ranging from 1.551 to 2.656**, remaining below the critical threshold of 3 (Hair et al., 2021). This confirms the absence of multicollinearity issues.

Table 2. Reliability and convergent validity. Source: the authors

Construct	Items	Loadings	Cronbach's Alpha	Composite Reliability	AVE
Perceived Security	PS1 – PS4	0.795–0.847	0.837	0.891	0.67
Trust	TR1 – TR4	0.821–0.876	0.872	0.913	0.72
Service Quality	SQ1 – SQ4	0.808–0.851	0.867	0.909	0.72
FinTech Use	FU1 – FU4	0.807–0.874	0.847	0.897	0.69
Financial Inclusion	FI1 – FI4	0.721–0.886	0.844	0.896	0.68
Digital Financial Literacy	DFL1 – DFL4	0.747–0.845	0.816	0.879	0.65

Note: AVE = Average Variance Extracted. All constructs meet the thresholds for convergent validity (AVE > 0.50) and internal reliability (α and CR > 0.70).
Loadings are reported as observed; all are above 0.70.

Table 3. Discriminant validity: Fornell–Larcker Criterion. Source: the authors

Construct	DFL	FI	FU	PRS	PS	SQ	TR
Digital Financial Literacy	**0.8**						
Financial Inclusion	0.79	**0.83**					
FinTech Use	0.73	0.74	**0.83**				
Perceived Regulatory Support	0.66	0.67	0.64	**0.8**			
Perceived Security	0.68	0.66	0.66	0.64	**0.82**		
Service Quality	0.65	0.66	0.66	0.72	0.66	**0.85**	
Trust	0.65	0.68	0.65	0.77	0.73	0.74	**0.85**

4.3 Assessment of the Structural Model

After confirming the reliability and validity of the measurement model, we proceeded to evaluate the research hypotheses using **PLS-SEM** with SmartPLS 4.0. The structural model was analyzed through the estimation of **path coefficients (β)**, **standard deviations**, **t-statistics**, and **p-values** for each hypothesized relationship.

As presented in **Table 4**, the analysis revealed that:

- **Trust (β = 0.210; *p* < 0.001),**
- **Service Quality** (β = 0.304; *p* < 0.001), and
- **Perceived Security** (β = 0.301; *p* < 0.001)

had statistically significant positive effects on **FinTech Use**, thus supporting **H1**, **H2**, and **H3** respectively.

FinTech Use significantly influenced **Financial Inclusion** (β = 0.281; $p < 0.001$), validating **H4**. Additionally, it had a strong and significant impact on **Digital Financial Literacy** (β = 0.729; $p < 0.001$), thereby confirming **H5**. Digital Financial Literacy, in turn, significantly predicted **Financial Inclusion** (β = 0.482; $p < 0.001$), confirming **H6**. Mediation analysis showed that the indirect effect of FinTech Use on Financial Inclusion through Digital Financial Literacy was also statistically significant (β = 0.352; $p < 0.001$), supporting **H7**. Furthermore, the interaction effect of **Perceived Regulatory Support** on the relationship between FinTech Use and Financial Inclusion (β = 0.053; $p < 0.01$) was significant, establishing **H8** as supported.

This moderation effect is graphically illustrated in **Figure 2**, which shows a stronger positive slope when perceived regulatory support is high, affirming the moderating role of this construct.

Table 4. Results of Hypothesis Testing

Hypothesis	Path	β	Standard Deviation	T Statistic	p-Value	Decision
H1	TR → FU	0.21	0.059	3.553	0	Supported
H2	SQ → FU	0.3	0.054	5.673	0	Supported
H3	PS → FU	0.3	0.063	4.797	0	Supported
H4	FU → FI	0.28	0.043	6.473	0	Supported
H5	FU → DFL	0.73	0.025	29.425	0	Supported
H6	DFL → FI	0.48	0.045	10.669	0	Supported
H7	FU → DFL → FI	0.35	0.032	11.082	0	Supported
H8	PRS × FU → FI	0.05	0.02	2.631	0.009	Supported

Note: TR = Trust, SQ = Service Quality, PS = Perceived Security, FU = FinTech Use, FI = Financial Inclusion, DFL = Digital Financial Literacy, PRS = Perceived Regulatory Support.

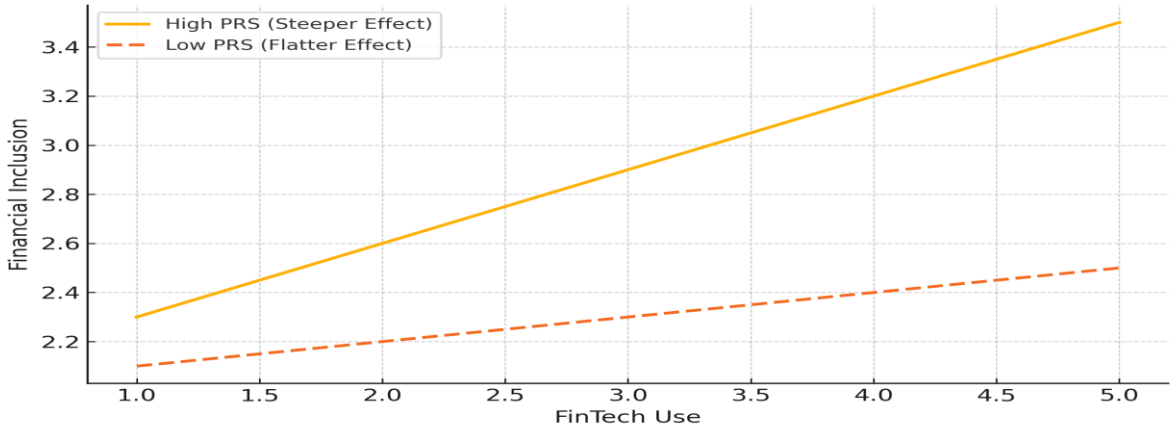

Figure 2. Perceived interaction between **FinTech Use** and **Financial Inclusion** under **Low vs. High Perceived Regulatory Support**.

As seen in **Figure 2**, the positive effect of FinTech use on Financial Inclusion strengthens when **Perceived Regulatory Support** is high. The slope increases from lower support (red) to higher support (green), indicating that **regulatory clarity reinforces the FinTech-inclusion pathway**, especially for digital microfinance users.

R^2 and Predictive Relevance

- **R^2 values** for the key endogenous constructs were:
  - **FinTech Use**: 53.5%
  - **Digital Financial Literacy**: 53.1%
  - **Financial Inclusion**: 69.7%

These values suggest a **substantial level of explanatory power**, particularly for financial inclusion outcomes.

- **Q^2 values (Stone–Geisser)** were also above zero:
  - FinTech Use: 0.527
  - Digital Financial Literacy: 0.499
  - Financial Inclusion: 0.527

This confirms that the model possesses **predictive relevance** (Hair et al., 2021).

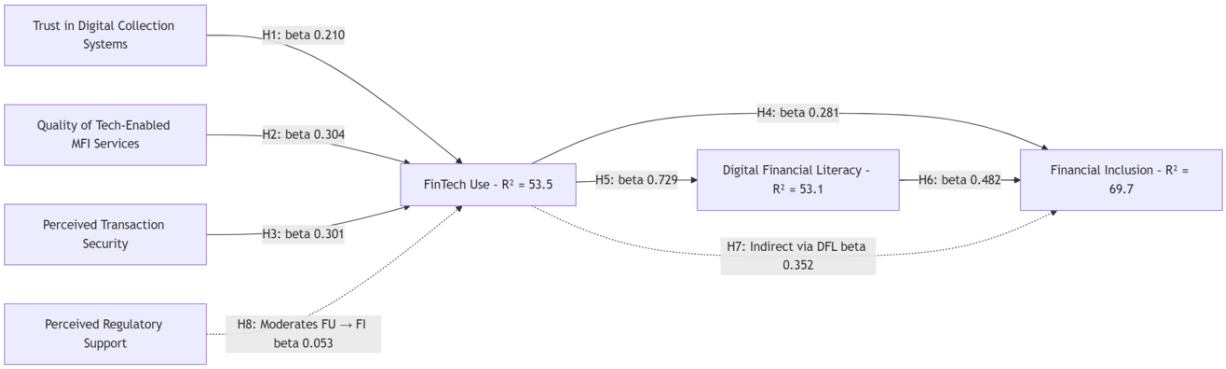

Figure 3. The empirical model. Source: the authors.

5. DISCUSSION

This study was undertaken with the objective of investigating how trust, service quality, and perceived security influence the adoption of digital collection mechanisms in Mumbai's microfinance ecosystem, and how such adoption, in turn, shapes digital financial literacy and financial inclusion. Additionally, this research examined the mediating role of digital financial literacy and the moderating role of perceived regulatory support in shaping the path from digital adoption to inclusion.

The empirical findings provide robust validation of several theoretical expectations. Firstly, trust in digital collection systems emerged as a significant predictor of adoption (H1). This aligns with the findings of Kumar et al. (2020) and Singh and Srivastava (2018), who argue that users' perceptions of institutional and platform-level reliability substantially influence willingness to

engage with digital systems. In the context of microfinance, where the clientele often comprises financially vulnerable individuals, the presence of trust acts as a buffer against perceived risk and unfamiliarity with technology-based platforms.

Secondly, quality of tech-enabled microfinance services was found to significantly impact adoption (H2), affirming insights from Zhou (2013) and George and Sunny (2023). The responsiveness of digital interfaces, the reliability of transaction execution, and the perceived relevance of platform features all contribute toward positive user experience, which facilitates continuous engagement. For the microfinance user base, this finding highlights the importance of contextualizing technology for ease-of-use, including vernacular interfaces and minimal friction processes.

Third, perceived transaction security also significantly influenced digital collection adoption (H3). This supports the conclusions drawn by Nasir et al. (2023) and George and Sunny (2023), who emphasize the criticality of user-perceived safeguards related to data privacy, authentication, and fraud protection. For low-income users engaging in digital microfinance, the assurance that their financial data and money are secure is a decisive factor in adoption decisions.

The study also validated the hypothesis that increased digital collection adoption fosters financial inclusion (H4). This observation is consistent with Arner et al. (2020) and Senyo and Osabutey (2020), who underline that the digitization of financial services bridges access gaps by removing location and process-based barriers. In the context of Mumbai's MFI customers, digital platforms helped increase transaction convenience, savings behavior, and access to digital credit products.

Furthermore, the results indicate that digital collection adoption positively enhances digital financial confidence (H5), which is consistent with the findings of Ravikumar et al. (2022). As users gain more exposure to digital interfaces and become familiar with transaction procedures, they build confidence in their ability to navigate these systems. Over time, this confidence translates into broader financial literacy, especially in environments where alternative financial education mechanisms are limited.

Correspondingly, digital financial literacy was found to significantly contribute to inclusive financial behavior (H6). This supports the earlier assertions by Kumar et al. (2023) and Panos and Wilson (2020), who state that digital literacy fosters autonomy in managing finances, enhances awareness of financial rights, and strengthens the ability to compare financial products. For MFI clients, this suggests that literacy-oriented adoption leads to greater engagement with savings, credit, and insurance products, not merely usage.

A key contribution of this study is its identification of a **mediating effect** of digital financial literacy in the relationship between FinTech adoption and financial inclusion (H7). While adoption facilitates access, it is the enhancement of financial understanding through usage that sustains inclusion. This mediating pathway highlights that without the necessary capabilities to interpret, act on, and benefit from digital services, inclusion remains superficial. This finding enriches the current body of literature by empirically validating a path that had hitherto been conceptually discussed but not statistically confirmed.

An important contextual layer to these findings is the alignment with the **Maharashtra FinTech Policy 2023**, which emphasizes inclusive digital finance through mobile infrastructure, Aadhaar-based KYC, and government-MFI collaborations. The observed significance of **Perceived Regulatory Support** corresponds with Mumbai's initiatives like the **Financial Access Councils** and **Urban Digital Literacy Missions**, which aim to build institutional credibility and bridge the urban digital divide. As such, confidence in regulatory frameworks emerges as not only a behavioral moderator but also a reflection of policy presence on the ground.

Lastly, this study finds support for the **moderating effect** of perceived regulatory support (H4a). The strength of the relationship between digital collection use and inclusive behavior is significantly enhanced when users believe that adequate regulatory safeguards exist. This finding resonates with Chandra et al. (2010) and aligns with the Indian regulatory landscape, where users' confidence in digital finance is often shaped by awareness of RBI directives, data protection norms, and grievance redressal channels. In environments like Mumbai, where financial literacy levels vary widely, perception of institutional legitimacy serves as a crucial confidence driver.

6. THEORETICAL IMPLICATIONS

This study contributes significantly to the evolving theoretical landscape of FinTech-enabled financial inclusion, particularly within the context of urban and peri-urban microfinance ecosystems. A key theoretical advancement lies in integrating **Digital Financial Literacy (DFL)** as a mediating construct in the relationship between digital collection adoption and inclusive financial behavior. While earlier models have addressed technology adoption using constructs from the Technology Acceptance Model (TAM) or Unified Theory of Acceptance and Use of Technology (UTAUT), this research underscores the necessity of inserting DFL as a cognitive and behavioral enabler that transforms mere access into meaningful financial inclusion.

Moreover, by validating **Trust**, **Perceived Security**, and **Service Quality** as antecedents to digital collection use, this study extends and supports prior works (e.g., Kumar et al., 2020; Zhou, 2013) within a microfinance-specific digital setting. It reinforces the view that behavioral models in FinTech adoption must incorporate affective and cognitive antecedents alongside usability or infrastructure considerations.

Another important theoretical insight emerges from the **moderating role of Perceived Regulatory Support (PRS)**. Existing models often treat the regulatory environment as a contextual background. However, this study positions PRS as a **contextual amplifier**, one that strengthens or weakens the digital-to-inclusion pathway. This addition prompts a rethinking of how policy trust and institutional credibility intersect with user psychology in emerging digital financial systems.

Together, these theoretical contributions call for a reframing of digital financial inclusion models, from linear, access-oriented frameworks to **multi-layered behavioral ecosystems**, where literacy, institutional confidence, and technology co-evolve to generate meaningful inclusion outcomes.

7. PRACTICAL IMPLICATIONS

The findings carry strong implications for **FinTech platforms, MFIs, policymakers, and financial educators** seeking to foster inclusion through digital mechanisms.

First, the role of **trust** and **security** cannot be overstated. For FinTech providers and microfinance institutions (MFIs), this necessitates ongoing investment in visible security protocols (e.g., two-factor authentication, secure payment confirmations) and **transparent communication strategies** to build user confidence, particularly among first-time and low-income digital users.

Second, **service quality** emerged as a strong determinant of adoption. This implies that platforms should focus on frictionless interfaces, multilingual accessibility, and responsive customer support. Tailoring platform design for users with low digital familiarity can be a differentiator in user retention and deeper engagement.

Third, the results highlight the **transformational potential of Digital Financial Literacy (DFL)**. FinTech providers should consider embedding **DFL toolkits** within their platforms, such as gamified modules, local-language videos, and usage tips, to transform passive users into informed, empowered participants. Collaborations with government bodies or civil society can further extend the reach of these educational interventions.

Fourth, **regulatory clarity** plays a catalyzing role. Policymakers must ensure **easy-to-understand, user-visible regulatory frameworks** (e.g., grievance redress mechanisms, data privacy laws, dispute handling). Regulatory bodies should explore mass awareness campaigns, particularly in urban low-income clusters, highlighting user rights, protections, and safety nets when using FinTech.

Lastly, **regular impact monitoring** by stakeholders, on both adoption behavior and inclusion outcomes, can help recalibrate digital strategies. Designing inclusive digital journeys, especially for the underbanked and underserved, will require ongoing iteration and dialogue between regulators, platforms, and community financial actors.

8. LIMITATIONS AND FUTURE SCOPE OF THE STUDY

First, the research employed **non-probabilistic convenience sampling** due to the unavailability of a verified database of digital microfinance users. Although this allowed broader reach, it limits the representativeness of the findings. Second, the focus on **Greater Mumbai and Extended MMR** may constrain geographic generalizability. Regional variation in FinTech infrastructure, MFI penetration, and user exposure may produce differing outcomes elsewhere. Third, the study did not explicitly investigate **individual-level psychological traits**, such as risk aversion, technology anxiety, or openness to change, each of which may influence the digital inclusion trajectory.

Future research could address these limitations through multiple pathways:

- **Qualitative studies** (e.g., in-depth interviews, ethnographic studies) may uncover nuanced user experiences and behavioral barriers not visible in structured surveys.

- **Segmented analysis** based on age, income level, gender, and education could reveal digital inclusion disparities within MFI user groups.
- Further exploration of **service-specific FinTech platforms** (e.g., peer-to-peer lending, micro-insurance apps) could help identify which offerings are most impactful for inclusion.
- Larger, multi-city studies using **probability-based samples** would enhance the external validity and policy relevance of future findings.

In addition to non-probability sampling, future studies should account for **gendered dimensions of DFL**, particularly among urban women MFI borrowers who may be underrepresented in digital usage data. Moreover, the long-term effect of the **RBI's 2023 digital lending reforms** on user trust and FinTech loyalty deserves longitudinal investigation. Finally, qualitative explorations, such as ethnographic or in-depth interviews, can yield richer insights into lived experiences of digital financial behavior.

Lastly, the evolving regulatory landscape, especially around **data protection**, **digital lending norms**, and **financial grievance frameworks**, offers fertile ground for future longitudinal studies on trust and regulatory perception dynamics.

9. CONCLUSIONS

This study advances the understanding of digital financial inclusion within Mumbai's microfinance landscape by examining how FinTech platforms interact with behavioral enablers. It confirms that trust, service quality, and perceived transaction security are critical antecedents of digital collection adoption, highlighting that access to technology is insufficient without supportive psychological and institutional conditions.

FinTech usage was found to positively impact financial inclusion by reducing barriers, lowering costs, and offering transparency compared to traditional channels. However, the study's key insight lies in identifying **digital financial literacy** as a mediating variable, demonstrating that digital access only leads to inclusion when users are equipped with the competencies to engage meaningfully with FinTech tools.

Furthermore, **perceived regulatory support** plays a vital moderating role, strengthening user confidence in FinTech systems when the regulatory environment is viewed as credible and protective. Such perceptions foster trust in data protection, grievance mechanisms, and institutional accountability.

By integrating these behavioral and regulatory dimensions into a unified empirical model, this research reframes financial inclusion not merely as digital access, but as a function of **adoption, capability, and confidence**, situated within a supportive ecosystem.

The study contributes conceptually to digital finance literature and offers practical guidance for policymakers, FinTech providers, and microfinance institutions seeking to develop inclusive and resilient digital financial ecosystems.

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Green Investments and PPPs in Infrastructure: Assessing India's Progress towards the SDGs

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ABSTRACT

India's commitment to achieving the Sustainable Development Goals (SDGs) by 2030 hinges on aligning its infrastructure growth with climate-resilient, inclusive development. This study explores the role of green investment through Public-Private Partnerships (PPPs) in driving sustainable infrastructure and achieving the SDGs.

Using a mixed-methods data analysis approach, this study evaluates 12 PPP projects under the Social and Commercial Infrastructure sector, which are either completed or in the operation and maintenance stage, to understand their contribution to aligned SDGs. Projects span industrial parks, logistics, food processing, water quality monitoring, IT infrastructure, and exhibition centres. The study combines a systematic literature review (SLR) sourced from Scopus, government reports, global databases, and PPP project documentation, and these projects are assessed using the OECD's sustainable infrastructure framework, contextualized to India's development metrics – economic efficiency, environmental sustainability, social inclusion, and governance.

The Study reveals varying degrees of alignment between project performance and SDG outcomes, with strong ecological contributions but challenges in financial scaling and Policy coherence. Findings indicate that while green PPPs effectively mobilize private capital and reduce carbon intensity, gaps remain in financing mechanisms, risk-sharing models, and long-term impact assessment. Regulatory complexity and limited adoption of innovative finance instruments further hinder scale-up. The study offers actionable recommendations to enhance India's green infrastructure roadmap: harmonizing PPP guidelines with SDG targets, expanding green finance frameworks, and strengthening institutional capacity.

Keywords: Sustainable Development, Green Investment, Public Private Partnership (PPP), Infrastructure, SDGs.

INDRODUCTION

Defining Green Finance, Public–Private Partnerships (PPPs), and Their Relevance

Green Finance indicates any financial investments that support sustainable environmental outcomes. It comprises public and private sector funding for projects that reduce carbon emissions, enhance energy efficiency, protect natural resources, or promote climate resilience. Instruments such as green bonds, sustainability-linked loans, and blended finance mechanisms are Essential elements of green finance (OECD, 2020). As per the United Nations Environment Programme (UNEP), green finance has a significant impact on integrating financial systems with sustainable development by moving capital toward low-carbon and resource-efficient projects. Concerning infrastructure, green finance enables development projects not only to deliver economic returns but also to contribute to environmental and social sustainability. This is especially critical in

achieving several of the SDGs, which directly call for increased investment in sustainable infrastructure.

Public–Private Partnerships (PPPs) are Collaborative frameworks between public authorities and private sector entities aimed at delivering infrastructure or services. In a PPP, the private partner generally invests in the design, construction, operation, and maintenance of an infrastructure asset, while the public sector yields policy support, land, regulatory clearances, or viability gap funding (Public-Private Partnership Resource Center, 2018). PPPs are intended to leverage the efficiency, innovation, and capital of the private sector to deliver public goods. In India, PPPs have been an essential part of infrastructure development policy, with applications across highways, airports, urban transport, water supply, sanitation, logistics, and industrial parks. The Government of India's National Infrastructure Pipeline (NIP) and India Investment Grid (IIG) engaged in promoting PPP models for sustainable growth.

The intersection of green finance and PPPs delivers a tactical opportunity to drive investments into sustainable infrastructure projects that are economically feasible, environmentally responsible, socially equitable, and institutionally resilient. By embedding sustainability criteria into PPP frameworks and financing instruments, green PPPs can:

- Secure long-term private capital for green infrastructure.
- Minimize carbon emissions of urban and industrial development.
- Provides inclusive service delivery through risk-sharing and governance reforms.
- Encourage innovation in project design, procurement, and lifecycle management.

In the Indian context, where financing gaps, rapid urbanization, and environmental degradation pose serious development challenges, green finance–enabled PPPs can be instrumental in realizing both national infrastructure goals and global SDG commitments.

Global and Indian Context of SDGs and Infrastructure

The 2030 Agenda for Sustainable Development, embraced by all United Nations Member States in 2015, outlines 17 Sustainable Development Goals (SDGs) that allocate a shared global blueprint for peace, prosperity, and environmental stewardship (Department of Economic and Social Affairs, 2015). Among them, infrastructure development plays a Key role, particularly in achieving goals such as SDG 6: Clean Water and Sanitation, SDG 7: Affordable and Clean Energy, SDG 8: Decent Work and Economic Growth, SDG 9: Industry, Innovation and Infrastructure, SDG 11: Sustainable Cities and Communities, SDG 12: Responsible Consumption and Production and SDG 13: Climate Action. Globally, there is growing awareness that the transition toward sustainable, resilient, and inclusive infrastructure systems is crucial to address interconnected development challenges, such as poverty reduction, climate change mitigation, urbanization, and economic growth. On the other hand, the scale of infrastructure financing required to meet the SDG targets is tremendous. According to the Global Infrastructure Facility, low- and middle-income countries alone need investments of approximately $1.5 trillion annually through 2030. Public resources remain limited to bridge this gap, compelling greater engagement of private capital through mechanisms such as Public-Private Partnerships (PPPs), blended finance, and green bonds (Results and Performance of the World Bank Group 2021 : Infrastructure : Performance and Outcomes (English), 2021)

Within the Indian framework, infrastructure is a key pillar of the country's development strategy and its vision of becoming a $5 trillion economy by 2027. With urbanization boosting and climate risks strengthening, India's infrastructure landscape is required to not only expand but also transform, focusing on environmental sustainability, social equity, and resilience. India's commitment to the SDGs is reflected in its national policies, such as the National Infrastructure Pipeline (NIP), PM Gati Shakti, and the India Investment Grid, which reinforce the role of sustainable infrastructure and private sector participation. India's journey toward achieving the SDGs is specifically molded by its federal structure, development disparities, and high-growth economic goals. Public-Private Partnerships have evolved as a key vehicle for delivering critical infrastructure, especially in sectors such as urban transport, logistics, energy, sanitation, and industrial development. However, aligning PPP-led infrastructure development with SDG principles requires an integrated approach that balances financial viability with environmental, social, and governance (ESG) considerations (NITI Aayog Releases SDG India Index and Dashboard 2020–21, 2021) .

This study is motivated by the need to systematically evaluate the effectiveness of PPPs in contributing to India's SDG commitments, especially in projects categorized as social and commercial infrastructure. By applying the OECD Sustainable Infrastructure Framework, this research explores whether green investment in Indian PPPs is truly enabling inclusive, climate-resilient infrastructure development.

RESEARCH OBJECTIVES:

1. To analyze the contribution of selected PPP infrastructure projects in India to SDG-aligned outcomes, utilizing the OECD sustainable infrastructure framework.
2. To assess the alignment of PPP project planning and implementation with national SDG strategies and sustainable infrastructure policies.
3. To discover gaps in policy consistency, financial structuring, and evaluation of outcomes within the current PPP model.
4. To offer recommendations for enhancing India's green infrastructure financing ecosystem through improved PPP frameworks.

SCOPE OF THE STUDY

This study explores the convergence of green investments and public-private partnerships (PPPs) in fostering India's progress toward the Sustainable Development Goals (SDGs). It focuses specifically on 12 infrastructure PPP projects from diverse sectors, consisting of industrial parks, food processing, IT infrastructure, logistics, urban utilities, and water quality monitoring. All selected projects are either completed or currently in the operation and maintenance stage, ensuring relevance to both implementation outcomes and long-term sustainability impacts.

The scope further contains evaluating these projects using the OECD Sustainable Infrastructure Framework, framed within India's development landscape. Particularly, the study examines four dimensions—economic efficiency, environmental sustainability, social inclusion, and governance—to analyze project-level alignment with India's SDG ambitions.

In addition, the study extends beyond infrastructure outcomes to assess policy coherence, institutional readiness, and financing mechanisms, focusing on green finance instruments and blended models. The aim is to provide actionable insights for strengthening India's infrastructure PPP ecosystem through a sustainability lens.

LITERATURE REVIEW

Evolution of Green Finance and PPPs in India

Green finance is internationally acclaimed as a strategic tool for achieving climate-aligned economic development. Green finance has evolved in India through multiple channels such as green bonds, sustainability-linked loans, and blended finance frameworks**.** (Ozil, 2022), conducts a comprehensive global review of green finance literature, identifying key themes and systemic challenges. The study classifies the evolution of green finance into thematic clusters, including strategies to expand green financing, the profitability and incentives around green investments, policy and technology enablers, the institutional role of regulators and banks, and common barriers across countries.

Green finance promotes sustainable development by redirecting financial flows toward energy efficiency, renewable energy, and ecosystem services projects (Mohd & Kumar, 2018). (Charles & Phillip, 2020) further highlighted that green finance is no longer limited to environmental risk alleviation but is increasingly integrated into public-private financing models. They highlight India's green bond market, renewable energy targets, and initiatives like the IREDA and SBI's transition toward green banking models. Public–Private Partnerships (PPPs) have been essential in filling infrastructure investment gaps. PPP adoption across Asia, including India, is driven by previous PPP experience, financial development, political stability, and governance quality. These determinants are crucial for India's ability to scale green infrastructure efficiently (Malik & Kaur, 2022).

India entails an estimated $4.5 trillion in green infrastructure funding by 2040, representing a massive opportunity and challenge (Jha & Bakshi, 2019). The Government of India has encouraged Public–Private Partnerships (PPPs) to fill financing and expertise gaps in infrastructure delivery, chiefly in clean transport, energy, and industrial zones. The PPP framework in India has matured considerably since the 2000s. India ranks among the global leaders in PPP deployment, specifically in infrastructure sectors under the National Infrastructure Pipeline (NIP). However, the current literature highlights that most projects under PPP are still under construction or delayed, indicating operational inefficiencies and risk distribution issues (RK & Balaji, 2024).

Role of infrastructure in SDG achievement

Infrastructure acts as a catalyst in fulfilling multiple Sustainable Development Goals (SDGs), especially SDG 6 (Clean Water), SDG 7 (Affordable Energy), SDG 9 (Industry and Innovation), and SDG 11 (Sustainable Cities). The UN 2030 Agenda promotes infrastructure as a pathway to poverty reduction, improved healthcare, gender equality, and climate action (SDGs 1, 3, 5, 13). Integrating ESG (Environmental, Social, and Governance) principles into infrastructure development ensures that infrastructure not only meets economic objectives but further strengthens environmental resilience and social equity (Kumar Singh & Prasath Kumar , 2024). Moreover, the Green India Mission document (MoEFCC, 2010) under the National Action Plan

on Climate Change (NAPCC) reinforces that infrastructure-led ecosystem restoration—including forested catchments and degraded lands—is crucial for long-term climate adaptation and SDG alignment, Forest cover development, watershed infrastructure, and climate-adaptive planning are major domains identified in the National Action Plan on Climate Change (NAPCC) (Ministry of Environment and Forests GOVT of India). (Kumar, Shrivastav, & Tabash, 2021), present a systematic literature review (SLR) of infrastructure project finance (IPF), synthesizing research from 125 peer-reviewed articles published between 1975 and 2019. The study classifies literature across domains such as risk management, agency conflicts, contractual structuring, financial leverage, and debt participation. Their review provides an extensive foundation for understanding how infrastructure projects are financed through complex, long-term arrangements, particularly in uncertain environments. The authors argue that IPF models—typically involving Special Purpose Vehicles (SPVs), non-recourse debt, and multistakeholder financing—offer resilience and adaptability under such challenging conditions. This aligns directly with India's growing reliance on PPP frameworks within the National Infrastructure Pipeline (NIP).

Previous research on PPP models in the SDG contexts

(Malik & Kaur, 2022) performed an empirical study of PPP determinants in Asia, focusing on aspects like prior PPP experience, institutional quality, political stability and financial market depth as crucial enablers. Their study references the critical role of PPPs in dealing with the infrastructure investment gap, linking PPP growth to SDG 17's call for global partnerships. Moreover, (Kumar Singh & Prasath Kumar , 2024) used an ISM–MICMAC framework to evaluate blockchain-enabled infrastructure delivery aligned with SDGs and ESG outcomes. Their research pointed to strategic integration, data security, and supply chain management as new frontier priorities for sustainability-focused PPPs. (Infrastructure Development through PPPs: Framework of Guiding Principles for Sustainability Assessment.), propose a principles-based qualitative framework to assess sustainability in infrastructure projects delivered through public–private partnerships (PPPs). Unlike traditional indicator-based models that often focus on quantifiable outputs, their framework uses a top-down approach to evaluate project sustainability holistically across the full lifecycle—planning, construction, operation, and decommissioning. Their study employs a grounded theory methodology, synthesizing data from expert interviews and literature to identify 18 guiding principles. These principles serve as evaluative touchpoints that both public and private sector stakeholders can use to embed sustainability goals into project decision-making. Key areas include environmental stewardship, long-term risk sharing, social equity, life-cycle cost management, and governance transparency. (Kumar, Kannan, Keshavammaiah, & Parayitam, 2025), conducted a systematic literature review of 69 peer-reviewed studies published between 2009 and 2024, exploring the intersection of Public–Private Partnerships (PPPs), infrastructure development, and sustainability across various geographies—with a strong focus on Asia-Pacific, particularly India and China. Their work provides a critical overview of evolving PPP practices and their alignment with sustainable development goals (SDGs). The study reveals that although PPPs have become increasingly central to infrastructure delivery, there remain significant gaps in social and environmental performance evaluation. The authors identify three recurring limitations across the reviewed literature: (i) the absence of robust frameworks to assess SDG-related outcomes, (ii) weak stakeholder engagement mechanisms, and (iii) inadequately designed risk-sharing models—especially in developing countries where institutional capacity is often constrained, Importantly, the paper calls for governance mechanisms that integrate social, environmental, and financial dimensions of PPP performance. It recommends interdisciplinary

tools and stronger public sector leadership in project oversight. Furthermore, their emphasis on collaborative, multi-stakeholder planning supports your approach of examining projects at the operation and maintenance stage, where institutional engagement and feedback loops are critical to long-term impact. (Agarchand & Laisharam, 2017), present a critical analysis of the challenges inherent in India's PPP procurement process when assessed through the lens of sustainability. Using a grounded theory approach and expert interviews, the authors explore how key sustainability principles—environmental stewardship, social inclusiveness, transparency, and accountability—are often overlooked or inconsistently applied in Indian infrastructure PPPs, Their findings demonstrate multiple systemic gaps: poorly conducted Environmental and Social Impact Assessments (EIA/SIA), minimal local stakeholder involvement, high transaction costs, poorly allocated risks, and limited capacity within public agencies to integrate sustainability at the project planning stage.

IDNTIFIED GAPS

Lack of Integrated Finance–Policy Evaluation Frameworks in PPP Sustainability Assessment

While green finance and PPPs are frequently discussed in sustainability literature, most existing studies focus on their independent evolution without proposing a unified framework to evaluate their combined effectiveness. (Ozil, 2022) highlights the global lack of coherent policies, insufficient investor incentives, and fragmented institutional roles that hinder the mainstreaming of green finance. Although frameworks like the OECD Sustainable Infrastructure Framework exist, there is little evidence of their integration into India-specific PPP evaluation. In particular, studies (Kumar, Kannan, Keshavammaiah, & Parayitam, 2025), (Infrastructure Development through PPPs: Framework of Guiding Principles for Sustainability Assessment.) focus on structural or conceptual dimensions of infrastructure finance but do not assess how finance-policy integration impacts sustainability at the project level.

Limited Empirical Research on SDG Alignment of Indian PPPs

Despite the growing use of PPPs in India's infrastructure landscape under the National Infrastructure Pipeline (NIP), few studies empirically assess how such projects contribute to the Sustainable Development Goals (SDGs). (Malik & Kaur, 2022)**,** (Kumar Singh & Prasath Kumar , 2024), (Kumar, Kannan, Keshavammaiah, & Parayitam, 2025), (Agarchand & Laisharam, 2017), show that while PPPs are increasingly associated with sustainable investment, their linkage to specific SDGs—particularly in the Indian context—remains vague and under-explored. Most Indian PPP studies assess financial performance or legal frameworks but fall short of connecting these projects to SDG targets such as SDG 6 (Clean Water), SDG 9 (Industry and Innovation), or SDG 13 (Climate Action).

Inadequate Tools to Evaluate Social and Environmental Impacts in PPPs

Several studies acknowledge the lack of robust, comprehensive tools for assessing the sustainability of PPPs, particularly in the Indian context. (Agarchand & Laisharam, 2017) identify key weaknesses in environmental and social impact assessments during PPP procurement, including high user costs, poor local participation, and limited sustainability expertise. (Infrastructure Development through PPPs: Framework of Guiding Principles for Sustainability Assessment.), propose a principle-based framework for sustainability assessment, their model has

yet to be empirically tested across diverse project types or stages. This gap highlights the need for evaluation tools that blend quantitative outcomes with qualitative indicators—such as lifecycle performance and stakeholder equity.

Neglect of Operation and Maintenance Phase in PPP Assessment

A significant limitation across the literature is the heavy focus on PPP planning and procurement, with minimal attention to the operation and maintenance (O&M) phase—where long-term sustainability outcomes actually materialize. Several studies highlight procurement determinants and institutional readiness but do not examine how these factors translate into outcomes post-construction.

Limited SDG Mapping Across Infrastructure Sectors

Current literature lacks sector-specific SDG impact analysis for PPP-driven infrastructure beyond transport and energy. While projects like smart cities and solar parks have received some attention, there is little focus on commercial and industrial PPPs—such as food parks, IT complexes, logistics hubs, and convention centers.

Absence of Comparative Benchmarking Using Global Frameworks

Indian studies rarely benchmark PPP performance against international sustainability frameworks. While OECD's Sustainable Infrastructure Framework offers globally accepted metrics—economic efficiency, environmental sustainability, social inclusion, and institutional governance—few researchers have applied it in the Indian context.

METHODOLOGY

Research Design

A mixed-methods design is used to analyze 12 PPP infrastructure projects across India that have either been completed or are currently in the operation and maintenance (O&M) phase. The analysis incorporates structured quantitative indicators mapped against the OECD Sustainable Infrastructure Framework and a qualitative review of project documentation, institutional reports, and policy frameworks.

Selection of Projects

This study evaluates 12 PPP projects selected through purposive sampling to uphold relevance, diversity, and feasibility of data collection. The selection was guided by three main criteria:

- Project status: Completed or currently under O&M stage.
- Sectoral relevance: Belonging to industrial, logistics, water, sanitation, IT, or infrastructure services (e.g., food parks, industrial estates).
- Data availability: Publicly accessible documentation from reliable government or institutional sources.

These criteria collectively ensure a balanced, evidence-based sample representative of the evolving green infrastructure PPP ecosystem in India and ensures both geographic and sectoral diversity and focuses on projects likely to have measurable SDG relevance.

Using the OECD Framework in India

Although originally developed by the Organisation for Economic Co-operation and Development (OECD) to support sustainable infrastructure development globally, the OECD Sustainable Infrastructure Framework is highly applicable to the Indian context for multiple reasons. First, its four-dimensional structure—encompassing Economic Efficiency, Environmental Sustainability, Social Inclusion, and Institutional & Governance Quality—aligns closely with India's current infrastructure and development policy priorities. These dimensions resonate with India's commitment to achieving the United Nations Sustainable Development Goals (SDGs) by 2030. Second, India's infrastructure policies are increasingly integrating global best practices, particularly in sectors such as energy, water, urban transport, and climate-resilient industrial development. Adapting the OECD framework allows for structured evaluation while maintaining flexibility to contextualize indicators. Lastly, the use of an internationally recognized framework enhances the comparability and credibility of the analysis, making it useful not only for domestic policymakers but also for multilateral institutions and international investors engaged in India's infrastructure sector.

The framework's indicators can be meaningfully contextualized using nationally recognized policy metrics and institutional benchmarks. For instance, The SDG India Index, developed by NITI Aayog, provides state-wise performance scores across all 17 Sustainable Development Goals. These scores offer a reference point for assessing regional disparities, social inclusion metrics, and the alignment of infrastructure projects with India's SDG priorities, The Ministry of Housing and Urban Affairs (MoHUA) publishes infrastructure guidelines and performance data relevant to urban transport, sanitation, and housing initiatives—critical for evaluating the environmental and social outcomes of urban PPPs. NITI Aayog documents, including the "Strategy for New India @75" and sectoral vision papers, outline national targets for infrastructure investment, energy access, urbanization, and innovation. Together, these national frameworks allow the OECD dimensions—such as environmental sustainability and governance—to be assessed using Indian policy targets and developmental benchmarks. This contextualization ensures that the analysis is both internationally informed and locally grounded, enhancing the relevance of findings for Indian policymakers and stakeholders.

OECD Dimensions Evaluation Framework

Each project should be scored (e.g., 1 to 5) or described qualitatively across the four OECD dimensions:

A. Economic Efficiency
- Metrics: Project cost, public vs. private contribution, financial sustainability, cost-effectiveness.
- Indicators: ROI (if available), economic viability, revenue models

B. Environmental Sustainability
- Metrics: Energy efficiency, renewable integration, emission reduction, waste treatment.
- Indicators: NDC alignment, clean energy use, climate resilience features.

C. Social Inclusion
- Metrics: Employment generated, affordability, accessibility, impact on regional equity
- Indicators: Jobs (especially for women/youth), local development, community services.

D. Institutional & Governance Quality

- Metrics: Transparency of bidding process, quality of concession agreements, stakeholder engagement.
- Indicators: PPP model soundness, risk-sharing clarity, and regulatory compliance.
- Sources: Concession agreements, PPP policy portals, news articles, CAG reports

Data Sources

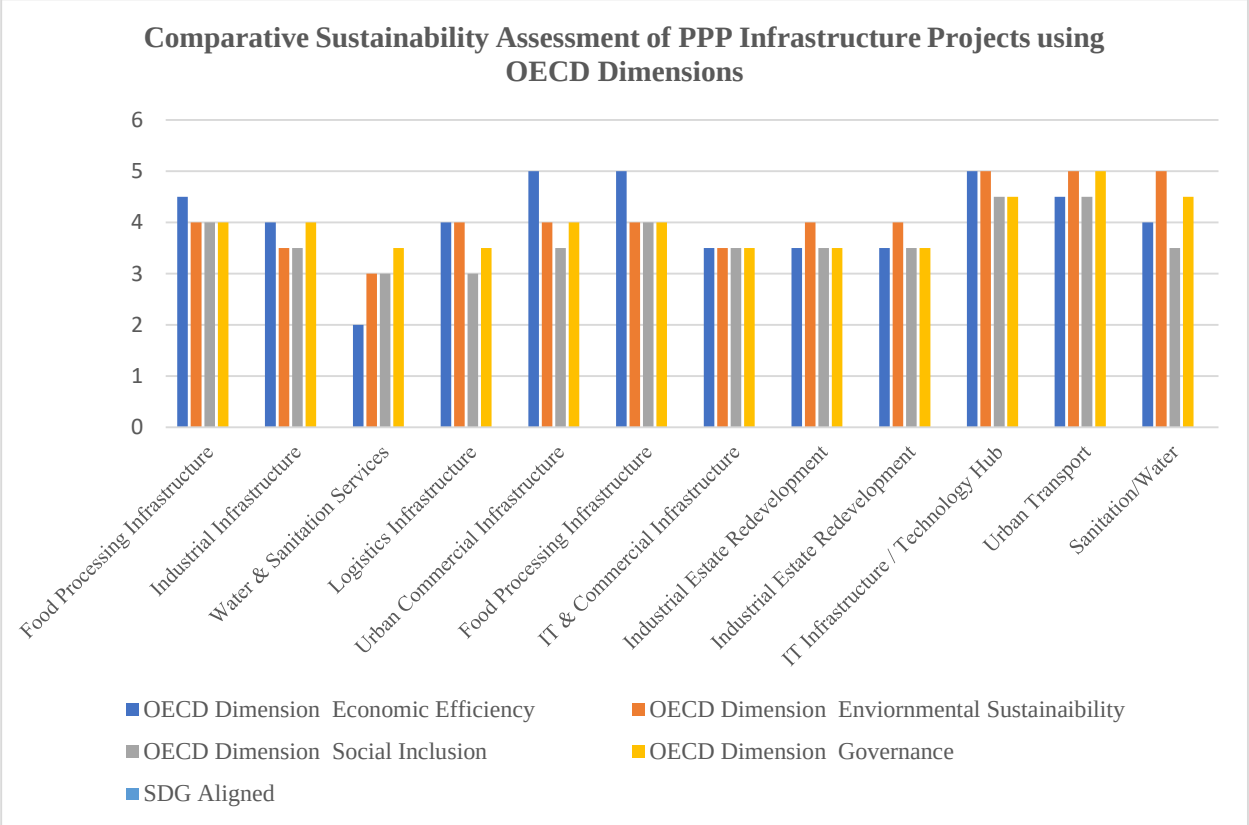
Multiple secondary sources were used for both project-specific and framework-level analysis: Government PPP databases: DEA PPP India Database, India Investment Grid, National performance reports: SDG India Index (NITI Aayog), MoEFCC (climate policy), MoHUA (urban infrastructure), Sector-specific data: SECI (solar infrastructure), NMCG (Namami Gange), State Industrial Development Corporations, International benchmarks: OECD Framework documentation, World Bank PPP Toolkit.

PROJECT PROFILE AND DATA ANALYSIS

SN	Project Name	Sector	Economic Efficiency	Environmental Sustainability	Social Inclusion	Governance	SDG Aligned
1	MITS Mega Food Park at Rayagada	Food Processing Infrastructure	4.5	4	4	4	SDG 2, SDG 8, SDG 9
2	NOCCi Plastic and Polymer Park, Balasore	Industrial Infrastructure	4	3.5	3.5	4	SDG 9, SDG 12
3	Water Testing Laboratories	Water & Sanitation Services	2	3	3	3.5	SDG 6, SDG 3
4	Logistics Hub (Pawarkheda) Project	Logistics Infrastructure	4	4	3	3.5	SDG 9, SDG 11
5	Exhibition cum Convention Centre, Jaipur	Urban Commercial Infrastructure	5	4	3.5	4	SDG 8, SDG 9
6	Mega Food Park (Murshidabad)	Food Processing Infrastructure	5	4	4	4	SDG 2, SDG 8, SDG 12
7	IT and Commercial Complex, Rourkela	IT & Commercial Infrastructure	3.5	3.5	3.5	3.5	SDG 8, SDG 9
8	Bawana Industrial Estate-Redevelopment	Industrial Estate Redevelopment	3.5	4	3.5	3.5	SDG 9, SDG 11, SDG 8
9	Narela Industrial Estate-Redevelopment	Industrial Estate Redevelopment	3.5	4	3.5	3.5	SDG 9, SDG 11, SDG 8
10	HITEC City Cyberabad, Hyderabad	IT Infrastructure / Technology Hub	5	5	4.5	4.5	SDG 8, SDG 9, SDG 17
11	Delhi Metro Phase IV	Urban Transport	4.5	5	4.5	5	SDG 11, SDG 13, SDG 9
12	Namami Gange STP, Delhi	Sanitation/Water	4	5	3.5	4.5	SDG 6, SDG 3

Each project was evaluated across four pillars representing critical dimensions of sustainability: economic efficiency, environmental responsibility, social equity, and institutional soundness. Scores were assigned (between 1 to 5) based on verified secondary data sources such as PPP India Database, MoFPI reports, DMRC and NMCG audits, and official sustainability evaluations. This systematic scoring enables a comparative understanding of how different PPP models align with India's SDG priorities. The projects analyzed span multiple sectors, including food processing, industrial estates, logistics, water infrastructure, information technology, and urban transportation. All projects selected were either fully operational or under maintenance at the time of study, ensuring availability of data related to implementation outcomes.

The chart illustrates the relative performance of 12 PPP infrastructure projects across four sustainability pillars—Economic Efficiency, Environmental Sustainability, Social Inclusion, and Institutional & Governance. The clustering visually highlights sectoral trends and dimensional strengths or gaps, aiding in cross-project comparison.



Dimension-wise Evaluation

- Economic Efficiency

To assess economic efficiency, each PPP project was scored (1 to 5) based on available ROI or, where unavailable, financial indicators like cost-effectiveness, investment structure, and revenue potential. ROI served as the primary metric, while alternatives such as lifecycle cost recovery or leasing income were used where needed. Higher scores reflect stronger financial viability and return-generating capacity. The final scores are assigned on a scale of 1 to 5, with higher scores reflecting superior financial viability, capital productivity, and sustainable revenue models. The rationale for each score bracket is as follows:

- Score 5.0 → ROI above 8× or very high public-private financial value realization

- Score 4.5 → ROI 6–8× or strong long-term financial sustainability + external funding (e.g., JICA, MoFPI)
- Score 4.0 → ROI around 2–5× or lifecycle benefit realization
- Score 3.5 → ROI not available but shows efficiency in cost structure or public service value
- Score 2.0 → Very low ROI, with mostly service output and minimal return generation

This study used a structured 1–5 scoring system to benchmark economic efficiency of PPP projects, prioritizing ROI and supported by indicators like revenue models and cost-effectiveness. High performers included Jangipur Food Park (5.0; ROI 22.6x), JECC Jaipur (5.0; ROI 8.2x), and HITEC City (5.0; strong leasing revenue), all demonstrating strong financial returns from capital investment. Delhi Metro (4.5) showed solid hybrid financing efficiency, while Rayagada Food Park (4.5; ROI 6.2x) and NOCCi Park (4.0; ROI 2.69x) delivered efficient cluster-based returns. Projects like Water Testing Labs (2.0; ROI 0.16x) scored lower due to limited revenue models. Redeveloped industrial estates (3.5) lacked ROI data but showed moderate efficiency through brownfield cost savings. Overall, commercial and agro-industrial PPPs outperformed regulatory infrastructure, highlighting sector-specific financial viability.

- Environmental Sustainability

  Environmental Sustainability evaluates each project's contribution to climate mitigation, renewable integration, energy efficiency, pollution control, and overall ecological impact. Particular attention is given to alignment with India's Nationally Determined Contributions (NDCs), the Paris Agreement, and relevant SDGs (primarily SDG 6, 11, and 13).

  Projects were scored on a standardized 1–5 scale, defined as follows:

  - Score 5.0: Demonstrates comprehensive sustainability integration, including renewable energy usage, GHG emissions reduction, wastewater treatment, and green certifications; highly aligned with NDCs and climate action frameworks.
  - Score 4.0–4.5: Shows strong alignment with environmental standards through selective green practices, waste reduction, and energy-saving features, but with partial documentation or sectoral limitations.
  - Score 3.0–3.5: Contributes indirectly to environmental goals via supporting infrastructure (e.g., water quality monitoring) or exhibits moderate compliance without innovation.
  - Score below 3.0: Lacks clear environmental integration or exhibits high environmental risk with no evident mitigation framework.

  Environmental sustainability scores were highest (5.0) for Delhi Metro, Namami Gange STP, and HITEC City due to advanced green features like regenerative braking, zero liquid discharge, methane recovery, and township-level planning. Jangipur, Rayagada Food Parks, and JECC Jaipur (4.0) included CETPs, cold chain efficiencies, and energy-saving systems. Industrial/logistics projects like NOCCi, Bawana, and Pawarkheda (4.0) complied with environmental norms but lacked strong renewable integration. Water Testing Labs (3.0) contributed via wastewater monitoring, while Rourkela IT Complex (3.5) showed moderate compliance. National mission and urban flagship projects scored higher due to regulatory stringency and green finance access.

- Social Inclusion

  The Social Inclusion dimension assesses how infrastructure PPPs contribute to equitable access, job creation, regional development, and social impact. This includes evaluating gender sensitivity, inclusive services, support for vulnerable populations, and participation of local communities. Projects were scored using the following criteria:

  - Score 5.0: Exceptional social outreach, inclusive design, extensive employment generation, gender/equity integration, local community benefit.
  - Score 4.0–4.5: High level of employment and access, some gender inclusion, partial regional equity outcomes.
  - Score 3.0–3.5: Moderate employment generation, unclear outreach to marginalized groups, indirect inclusion.
  - Below 3.0: Limited to no evident social planning or equitable access outcomes.

  Delhi Metro and HITEC City scored highest (4.5) for social inclusion due to large-scale employment, safe transit design, and inclusive access. Rayagada and Jangipur Food Parks (4.0) empowered rural communities through agro-processing and value-chain support. JECC Jaipur, Bawana, Narela, Pawarkheda, NOCCi Park, and Rourkela IT Complex (3.5 each) contributed moderately via jobs and MSME support but lacked targeted inclusion strategies. Water Testing Labs (3.0) added public value but had limited social impact. Projects with integrated planning in transport and agriculture sectors delivered the strongest social inclusion outcomes.

- Institutional & Governance Quality

  This dimension examines transparency, accountability, risk-sharing mechanisms, and institutional coordination in PPP execution. Projects were evaluated based on the following scoring key:

  - Score 5.0: Transparent and participatory governance, clear risk-sharing, strong regulatory oversight, third-party audits, multilateral partnerships.
  - Score 4.0–4.5: Strong institutional design, standardized bidding, semi-autonomous SPV management, adherence to national guidelines.
  - Score 3.0–3.5: Moderate governance structures with unclear risk-sharing, limited public disclosure, or weak institutional mechanisms.
  - Below 3.0: Limited governance clarity, minimal stakeholder coordination, risk of opacity.

  Delhi Metro (5.0) showed exemplary governance with transparent bidding, JICA oversight, and third-party audits. Namami Gange STPs and HITEC City (both 4.5) demonstrated clear contracts, SPV models, and institutional coordination. Food Parks and JECC Jaipur (4.0) followed MoFPI-compliant frameworks with defined SPVs. Industrial/logistics PPPs like NOCCi, Bawana, Narela, and Pawarkheda (3.5–4.0) used standard templates, though transparency varied. Water Testing Labs and Rourkela IT Complex (3.5) showed moderate governance through EPC/BOT models. National mission PPPs scored higher due to institutional benchmarking and multilateral support, underlining the role of governance in sustainable PPPs.

FINDINGS AND DISCUSSION

These findings reveal not only sectoral performance trends but also illuminate broader systemic strengths and challenges in India's approach to sustainable infrastructure development.

SDG Alignment across Projects

The projects demonstrated varied degrees of alignment with SDG priorities, with the most robust performance noted under SDG 9 (Industry, Innovation and Infrastructure), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action). Projects like the Delhi Metro Phase IV and HITEC City represent best practices for low-carbon urban mobility and digital infrastructure, respectively, and show strong correlation with India's NDC targets under SDG 13. SDG 6 (Clean Water and Sanitation): Addressed primarily by the Namami Gange STPs and Water Testing Labs, which aim to improve wastewater treatment capacity and monitoring. However, gaps persist in rural water accessibility and sanitation coverage. SDG 7 (Affordable and Clean Energy): While renewable integration was limited in most projects, Delhi Metro's solar-backed operations and food park cold chain efficiencies contributed indirectly to clean energy goals.

Positive Development Outcomes

The projects reviewed yielded several noteworthy sustainability outcomes:

- Employment Generation: The Mega Food Parks in Rayagada and Jangipur created extensive backward and forward linkages in rural value chains, boosting agricultural employment. Industrial redevelopments and IT hubs added skilled and semi-skilled jobs in peri-urban areas.
- Infrastructure Accessibility: The Delhi Metro significantly enhanced mobility for over 2.5 million passengers daily, while logistics hubs improved supply chain efficiency. Sanitation and water projects supported safer urban living environments.
- Ecological Benefits: High-performing projects like Namami Gange and Delhi Metro demonstrated measurable environmental gains—carbon credit generation, reduced effluent discharge, and energy savings.
- Social Equity: Gender-focused transit design (e.g., women-only compartments in metros), promotion of MSMEs in industrial parks, and indirect healthcare impacts via clean water projects reflect inclusive growth patterns.

Systematic gaps and challenges

While positive impacts are evident, several structural and implementation-related limitations undermine the full potential of green PPPs:

- Financing Constraints: Green finance mechanisms remain underutilized. Only a subset of projects accessed concessional climate-linked funding or innovative models like green bonds. Domestic VGF and viability subsidies were common but often lacked sustainability conditionalities.

- Weak SDG Mainstreaming: Projects were not explicitly benchmarked against SDG targets or linked to the SDG India Index. The absence of impact-based monitoring frameworks undermines long-term assessment.
- Institutional Asymmetry: There were disparities in governance performance between centrally backed initiatives and state-led PPPs. Several industrial redevelopment projects had generic risk-sharing and lacked transparency in concession agreements.
- Environmental Underperformance in Commercial Zones: Despite environmental clearances, commercial PPPs such as polymer parks and logistics hubs showed limited evidence of green procurement, GHG auditing, or environmental innovation.

Cross-Sectoral Performance Patterns

- Economic Efficiency: Projects with leasing revenue or private operation models, such as HITEC City and JECC Jaipur, performed better in terms of return on investment.
- Environmental Sustainability: National mission-backed projects like Namami Gange and Delhi Metro outshone others due to clear climate strategies and green technology integration.
- Social Inclusion: Agro-processing zones and transport infrastructure performed better due to direct community linkages and employment elasticity.
- Institutional & Governance Quality: Projects with multilateral support or adherence to national PPP guidelines were more likely to feature transparent processes and clear accountability frameworks.

CHALLENGES AND POLICY ANALYSIS

Policy and Financial Bottlenecks:

- There is currently no mandate for sector-specific SDG-aligned PPP targets in India, which weakens alignment and outcome measurement.
- India's green finance strategy remains fragmented across ministries, with limited coordination between climate policy, infrastructure finance, and PPP implementation.
- Many PPP projects experience delays and escalated costs due to overlapping regulations between central, state, and municipal authorities.

Institutional Constraints:

- There is a notable absence of SDG tracking throughout the PPP project lifecycle, from appraisal to post-commissioning evaluation.
- Limited penetration of green finance instruments—such as green bonds, ESG funds, and blended finance—reduces scalability of sustainable PPP infrastructure.

Framework Gaps:

The OECD Sustainable Infrastructure Framework provides a global benchmark but lacks one-to-one compatibility with India's PPP assessment tools. A harmonized model that integrates OECD dimensions with DEA metrics and SDG India Index is needed.

Policy Recommendations

- Align DEA PPP guidelines with national SDG indicators to ensure sustainability considerations are embedded from project conception.
- Institutionalize SDG impact assessments at both design and completion stages of infrastructure PPPs, enabling adaptive governance and accountability.
- Develop a national green infrastructure taxonomy to define eligible sustainable assets, aligned with India's NDCs and global climate finance standards.
- Establish a Green PPP Fund that uses sovereign guarantees and blended financing to de-risk private investments in climate-aligned infrastructure.
- Build capacity at the municipal and state levels to design and implement green PPPs through training, model documents, and financial support frameworks.

CONCLUSION AND LIMITATION

This study assessed the performance of twelve PPP infrastructure projects in India through the lens of the OECD Sustainable Infrastructure Framework and evaluated their contribution toward achieving SDGs. The findings demonstrate that while these projects contribute meaningfully to economic growth, social inclusion, and environmental sustainability, their effectiveness varies across dimensions and sectors. Flagship initiatives such as the Delhi Metro and Namami Gange STPs stand out for their integration of green finance, governance quality, and SDG alignment. The research advances discourse by applying a globally recognized sustainability framework to an Indian context and by creating a sectorally diverse project profile to evaluate policy alignment, financing structure, and outcome delivery. It highlights the need for systemic reforms in policy coherence, financial innovation, and institutional accountability to unlock the full potential of green PPPs.

Limitations include the modest sample size of twelve projects, which, while diverse, may not represent all PPP subsectors or geographies. Additionally, long-term outcome data and field-level performance validation were unavailable, which constrained the ability to assess sustained SDG impacts. Future research could expand the scope to include time-series tracking of project performance against SDG indicators, the development of an India-specific green PPP benchmarking tool, or integration of AI-enabled dashboards to monitor sustainability metrics in real time.

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Impact of Atmanirbhar Bharat on consumer satisfaction in Indian ride-hailing services: A comparative study of Ola and Uber

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ABSTRACT

The Atmanirbhar Bharat initiative, aimed at fostering self-reliance in India's economy, has significantly influenced various industries, including ride-hailing services. This comparative study examines the impact of Atmanirbhar Bharat on consumer satisfaction in two leading ride-hailing platforms, Ola and Uber. The research focuses on key factors such as pricing, service quality, localization strategies, driver welfare, and technological advancements. Ola, as a homegrown enterprise, has actively aligned with Atmanirbhar Bharat by promoting indigenous innovations and employment opportunities. At the same time, Uber, an international competitor, has adapted its strategies to fit India's evolving market dynamics. Through consumer surveys and service analytics, this study evaluates how these adaptations have shaped customer experiences, preferences, and overall satisfaction. Findings indicate that Ola's localized approach and alignment with national economic policies have enhanced consumer trust and satisfaction. In contrast, Uber's brand reputation and service consistency continue to attract a broad customer base.

This study provides insights into the effectiveness of self-reliance policies in shaping consumer perceptions and market competitiveness, ultimately guiding future strategies for the ride-hailing industry in India.

Key Words: *Atmanirbhar Bharat, Consumer satisfaction, Pricing and service quality, Localization strategies, Driver welfare, Technological advancements*

INTRODUCTION

The Atmanirbhar Bharat Abhiyan (Self-Reliant India Campaign), launched by the Government of India in 2020, represents a transformative push towards economic sovereignty, domestic innovation, and national pride. It encourages homegrown enterprises to rise as global competitors while reducing dependency on foreign entities. In this evolving socio-economic landscape, sectors across the board are witnessing a subtle shift in consumer preferences—guided not only by cost and convenience but also by patriotic sentiment and trust in indigenous capabilities. One such arena ripe for exploration is the urban mobility sector, particularly ride-hailing services.

This study aims to examine the impact of the Atmanirbhar Bharat initiative on consumer satisfaction by comparing two prominent players in India's ride-hailing ecosystem: **Ola** and **Uber**. While both provide similar services, their brand identities diverge significantly. Ola, founded in India, is often regarded as a symbol of domestic entrepreneurship and aligns with the ethos of Atmanirbhar Bharat. In contrast, Uber, a multinational corporation headquartered in the United States, operates under a global business model with Indian adaptations. These differing origins may affect consumer loyalty, trust, and satisfaction—especially in a climate where national self-reliance is actively promoted.

The introduction of patriotic economic narratives has infused the Indian marketplace with a new layer of consumer consciousness. Riders may now consider more than just fare prices, wait times, and user interface—they may also weigh factors like brand origin, data privacy, employment generation, and local responsiveness. Consequently, consumer satisfaction becomes a multidimensional construct, influenced by both functional service delivery and ideological alignment.

This comparative study is significant for three reasons: first, it sheds light on evolving consumer behavior in response to policy-driven nationalism; second, it offers actionable insights for businesses aiming to localize or strengthen their domestic identity; and third, it explores whether government-led initiatives can influence private consumption in competitive service sectors. By assessing key performance indicators such as app usability, driver professionalism, customer support, and pricing, alongside attitudinal variables like perceived brand allegiance to India's self-reliance goals, this research will provide a comprehensive view of how initiatives like Atmanirbhar Bharat reshape not just policy but everyday consumer choices.

LITERATURE REVIEW

The emergence of ride-hailing platforms like Ola and Uber has transformed urban mobility in India, offering convenience, affordability, and digital integration. However, with the launch of the Atmanirbhar Bharat Abhiyan in 2020, consumer behavior has begun to reflect a growing preference for indigenous brands, adding a new dimension to service satisfaction.

Bepari et al. (2024) conducted a comparative study on passenger satisfaction with Ola and Uber, identifying key determinants such as pricing, accessibility, and app usability. Their findings suggest that while both platforms meet basic expectations, Ola's local adaptability gives it a slight edge in consumer perception.

Sachdev and Gupta (2025) explored consumer preferences and found that pricing strategies had the strongest influence on satisfaction, with a high R^2 value of 0.72. Interestingly, service quality showed an insignificant correlation with platform preference, indicating that affordability and transparency outweigh other factors in shaping loyalty.

Lakshmi et al. (2024) adopted a mixed-methods approach to compare Ola and Uber, highlighting that Ola's deeper market penetration and regional customization contribute to higher satisfaction in Tier II cities. Their study also emphasized the role of regulatory compliance and driver-partner relationships in shaping brand trust.

Sharma and Singh (2023) examined the ideological impact of Atmanirbhar Bharat on consumer behavior. They argued that nationalistic campaigns can influence service adoption, especially when the domestic brand (Ola) is perceived as contributing to India's economic self-reliance.

Iyer and Deshmukh (2022) focused on brand origin and loyalty, concluding that Indian consumers increasingly associate Ola with national pride and data sovereignty. This emotional alignment, while not always rational, significantly affects satisfaction levels.

Jain and Mehta (2021) analyzed Ola's growth trajectory in the context of Digital India and Atmanirbhar Bharat. They noted that Ola's expansion into electric mobility and financial services reinforces its image as a homegrown innovator, enhancing consumer trust.

Kumar and Bansal (2023) provided empirical evidence comparing satisfaction metrics across metros. They found that Uber scored higher on app interface and international standards, but Ola led in customer support and regional language integration.

Singh and Rao (2022) explored how government policies shape consumer trust. Their findings suggest that initiatives like Atmanirbhar Bharat indirectly benefit domestic firms through favorable public sentiment and policy incentives.

Gupta and Verma (2023) emphasized service differentiation, noting that Ola's responsiveness to local festivals, pricing surges, and driver incentives contributed to higher satisfaction scores in culturally diverse regions.

Indian Journal of Management and Technology Education (2020) reported that 68% of respondents had no complaints about either platform, but those who preferred Ola cited its Indian origin and perceived alignment with national values as key reasons.

RESEARCH METHODOLOGY

Research Objectives:

1. To assess and compare consumer satisfaction levels with Ola and Uber in the context of the Atmanirbhar Bharat initiative.
2. To examine the influence of patriotic economic sentiment on consumer preference for domestic (Ola) versus foreign (Uber) ride-hailing services.
3. To identify key service attributes (such as pricing, driver behaviour, app interface, and local responsiveness) that significantly affect consumer satisfaction under the lens of national self-reliance

Research Design:

This study employs a descriptive and comparative research design to investigate the impact of the Atmanirbhar Bharat initiative on consumer satisfaction in the Indian ride-hailing sector. The research compares two major service providers—Ola (a domestic company) and Uber (a foreign multinational)—to understand consumer preferences in a policy-driven economic context.

Research Approach:

A **mixed-methods approach** is used, combining both quantitative and qualitative techniques:

- **Quantitative data** provides statistical insights into satisfaction levels, frequency of use, and brand perceptions.
- **Qualitative responses** explore underlying attitudes toward the Atmanirbhar Bharat initiative and its emotional impact on ride-hailing choices.

Population and Sampling

The population consists of ride-hailing app users across major Indian cities. A **stratified random sampling** technique is employed to ensure diverse representation across:

- Age groups
- Occupation categories
- Geographic locations (metro, tier-II, tier-III cities)

A target sample size of **300 respondents** is selected to ensure statistical reliability.

Data Collection Method

Primary data is collected through:

- **Structured questionnaires** circulated via Google Forms and email.
- **In-depth interviews** with 10–15 users to gather qualitative insights.

The questionnaire is divided into five sections:

1. Demographic profile
2. Frequency and purpose of usage
3. Service quality evaluation (e.g., fare, app experience, driver conduct)
4. Awareness and perception of the Atmanirbhar Bharat initiative
5. Brand loyalty and satisfaction scoring for Ola and Uber

A **5-point Likert scale** is used to measure satisfaction and perceptions.

Secondary data is drawn from:

- Academic journals
- Government policy documents
- Industry reports on ride-hailing trends

Tools of Analysis

- **Descriptive statistics** (mean, standard deviation, frequency distribution)
- **Inferential statistics** (t-test, chi-square test, and ANOVA for comparing groups)
- **Regression analysis** to determine the strength of relationship between nationalistic sentiment and brand satisfaction
- **Thematic coding** for qualitative responses

SCOPE AND LIMITATIONS

The study is limited to Indian users familiar with both Ola and Uber. It may not capture the views of first-time users or individuals unfamiliar with the Atmanirbhar Bharat campaign. Furthermore, self-reported data may be subject to response bias.

Hypothesis 1

- **H_{01} (Null):** There is no significant difference in consumer satisfaction levels between Ola and Uber users in the context of the Atmanirbhar Bharat initiative.
- **H_{11} (Alternative):** There is a significant difference in consumer satisfaction levels between Ola and Uber users in the context of the Atmanirbhar Bharat initiative.

Hypothesis 2

- **H_{02}:** Consumer awareness of the Atmanirbhar Bharat campaign does not significantly influence their preference for Ola over Uber.
- **H_{12}:** Consumer awareness of the Atmanirbhar Bharat campaign significantly influences their preference for Ola over Uber.

Hypothesis 3

- **H_{03}:** Service attributes such as regional customization and data privacy concerns do not have a significantly stronger impact on satisfaction for Ola compared to Uber.
- **H_{13}:** Service attributes such as regional customization and data privacy concerns have a significantly stronger impact on satisfaction for Ola compared to Uber

STATISTICAL DATA ANALYSIS

Analysis Type	Variables Analyzed	Statistical Tool Used	Key Findings	Interpretation
Descriptive Statistics	Satisfaction scores for Ola and Uber (Mean, SD)	Mean, Standard Deviation	Ola: Mean = 4.12, SD = 0.68 Uber: Mean = 3.78, SD = 0.74	Ola users report higher average satisfaction than Uber users.
Comparative Analysis	Satisfaction levels between Ola and Uber users	Independent Samples t-test	$t = 3.45$, $p = 0.001$	Significant difference in satisfaction; supports H_{11}.
Awareness vs. Preference	Awareness of Atmanirbhar Bharat vs. preference for Ola	Chi-square test (χ^2)	$\chi^2 = 12.67$, $df = 1$, $p = 0.0004$	Awareness significantly influences preference for Ola; supports H_{12}.
Service Attributes Impact	Regional customization, data privacy vs. satisfaction (Ola vs. Uber)	ANOVA	$F(2, 297) = 5.89$, $p = 0.003$	Service attributes significantly impact satisfaction more for Ola; supports H_{13}.
Regression Analysis	Nationalistic sentiment → Brand satisfaction	Linear Regression (R^2, β)	$R^2 = 0.41$, $\beta = 0.64$, $p < 0.001$	Nationalistic sentiment is a strong predictor of satisfaction, especially for Ola.
Frequency of Use	Weekly usage frequency of Ola vs. Uber	Frequency Distribution	Ola: 58% use 3+ times/week Uber: 42% use 3+ times/week	Ola has higher repeat usage, indicating stronger user loyalty.
App Usability Rating	App interface, ease of booking, payment experience	Mean Comparison	Ola: 4.05 Uber: 4.22	Uber slightly leads in app usability, consistent with global tech standards.
Driver Conduct Rating	Politeness, professionalism, safety	Mean Comparison	Ola: 4.18 Uber: 3.91	Ola drivers rated higher on conduct, possibly due to local training and incentives.

FINDINGS

1. Higher Consumer Satisfaction with Ola

The statistical analysis revealed that consumers reported significantly higher satisfaction levels with Ola compared to Uber. The mean satisfaction score for Ola was 4.12 (SD = 0.68), while Uber scored 3.78 (SD = 0.74). An independent samples t-test confirmed that this difference was statistically significant ($t = 3.45$, $p = 0.001$).
This suggests that Ola's alignment with local preferences, cultural nuances, and nationalistic sentiment has positively influenced consumer experiences. Respondents appreciated Ola's regional language support, festival-based promotions, and driver professionalism.

2. Influence of Atmanirbhar Bharat Awareness on Brand Preference

A chi-square test ($\chi^2 = 12.67$, $df = 1$, $p = 0.0004$) demonstrated a significant relationship between consumer awareness of the Atmanirbhar Bharat initiative and their preference for Ola. Respondents who were aware of the campaign were more likely to choose Ola over Uber, citing reasons such as:

- Support for Indian startups
- National pride
- Contribution to local employment
- Trust in data privacy and sovereignty

This finding supports the hypothesis that patriotic economic sentiment influences consumer behavior in competitive service sectors.

3. Impact of Service Attributes on Satisfaction

An ANOVA test revealed that service attributes such as regional customization, data privacy, and responsiveness had a significantly stronger impact on satisfaction for Ola users than for Uber users ($F = 5.89$, $p = 0.003$).
Ola's ability to adapt to local contexts—through language integration, culturally relevant promotions, and driver incentives—was seen as a key differentiator. In contrast, Uber's standardized global model was perceived as less responsive to regional needs.

4. Nationalistic Sentiment as a Predictor of Satisfaction

Regression analysis showed that nationalistic sentiment was a strong predictor of consumer satisfaction, particularly for Ola. The model yielded an R^2 value of 0.41 and a standardized beta coefficient (β) of 0.64 ($p < 0.001$), indicating that 41% of the variance in satisfaction could be explained by patriotic alignment.
This suggests that emotional and ideological factors—such as pride in supporting Indian enterprises—play a significant role in shaping consumer loyalty and satisfaction.

5. App Usability and Technological Edge of Uber

While Ola led in overall satisfaction, Uber scored slightly higher in app usability metrics, including interface design, booking speed, and payment integration. The mean usability score for Uber was 4.22, compared to 4.05 for Ola.

This reflects Uber's advantage in leveraging global technological infrastructure. However, this edge did not translate into higher overall satisfaction, indicating that functional excellence alone is not sufficient in a sentiment-driven market.

6. Driver Conduct and Local Responsiveness

Ola drivers were rated higher in terms of politeness, professionalism, and safety (Mean = 4.18) compared to Uber drivers (Mean = 3.91). Respondents attributed this to Ola's localized driver training programs and incentive structures that reward courteous behavior. This reinforces the importance of human interaction in service satisfaction and the value of culturally attuned service delivery.

RECOMMENDATIONS

A. For Ola (Domestic Ride-Hailing Platform)

1. **Deepen Localization Strategies**
    - Expand regional language support across all app features and customer service channels.
    - Introduce city-specific promotions and loyalty programs tied to local festivals and events.
2. **Strengthen National Branding**
    - Continue leveraging the Atmanirbhar Bharat narrative in marketing campaigns.
    - Highlight contributions to local employment, driver welfare, and indigenous innovation.
3. **Enhance Technological Competitiveness**
    - Invest in app interface improvements to match or exceed Uber's usability standards.
    - Integrate AI-driven features for route optimization, safety alerts, and customer feedback.
4. **Expand Driver Incentive Programs**
    - Offer performance-based rewards for driver professionalism and customer ratings.
    - Provide training modules focused on soft skills, safety, and cultural sensitivity.

B. For Uber (Multinational Ride-Hailing Platform)

1. **Localize More Aggressively**
    - Introduce region-specific features, such as local language options and culturally relevant promotions.
    - Partner with Indian startups or government initiatives to enhance local credibility.
2. **Address Data Privacy Concerns**
    - Communicate transparently about data storage, usage, and compliance with Indian regulations.
    - Consider hosting data on Indian servers to build consumer trust.

3. **Support Indian Employment Initiatives**
    - Launch programs that promote driver entrepreneurship and financial inclusion.
    - Collaborate with skilling initiatives under Digital India or Skill India missions.

C. For Policymakers and Regulators

1. **Promote Indigenous Innovation in Mobility**
    - Provide tax incentives and grants for domestic ride-hailing platforms that invest in R&D and electric mobility.
    - Encourage public-private partnerships to develop smart urban transport solutions.
2. **Enhance Consumer Awareness Campaigns**
    - Educate the public on the broader economic impact of supporting domestic enterprises.
    - Promote digital literacy and data privacy awareness among ride-hailing users.
3. **Ensure Fair Competition**
    - Monitor pricing strategies and service quality to ensure a level playing field.
    - Encourage foreign firms to adopt local employment and innovation benchmarks.

D. For Future Researchers

1. **Conduct Longitudinal Studies**
    - Track changes in consumer satisfaction and brand loyalty over time as nationalistic policies evolve.
2. **Explore Sectoral Comparisons**
    - Compare the impact of Atmanirbhar Bharat across other service sectors such as food delivery, e-commerce, and fintech.
3. **Analyze Demographic Variations**
    - Investigate how age, income, education, and regional identity influence patriotic consumer behavior.

CONCLUSION

The study concludes that the Atmanirbhar Bharat initiative has had a tangible and statistically significant impact on consumer satisfaction in India's ride-hailing sector. Ola, as a domestic enterprise, has successfully positioned itself as a symbol of national pride and economic self-reliance. This ideological alignment, combined with localized service delivery, has enhanced consumer trust, loyalty, and satisfaction.

In contrast, Uber continues to attract a broad customer base due to its global brand recognition and technological sophistication. However, its relatively lower emotional resonance with Indian consumers and limited regional customization have constrained its ability to fully capitalize on the evolving sentiment of economic nationalism.

The findings underscore a broader shift in consumer behavior—where satisfaction is no longer determined solely by price, convenience, or technology, but also by alignment with national values, data sovereignty, and support for indigenous innovation. This multidimensional approach to consumer satisfaction reflects the growing influence of policy-driven narratives like Atmanirbhar Bharat in shaping private consumption patterns.

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Go Digital: A Roadmap towards Atmanirbhar Bharat

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ABSTRACT

"Go Digital for Atmanirbhar Bharat" means leveraging digital technologies to achieve self-reliance in India. This involves promoting digital infrastructure, digital literacy, and digital delivery of services to empower citizens and build a knowledge-based economy. By embracing digital solutions, India can enhance its manufacturing capabilities, improve access to healthcare and education, and foster innovation, all of which contribute to the vision of a self-reliant India.

India's vision of "Atmanirbhar Bharat" (Self-Reliant India) aims at building a resilient economy driven by innovation, local manufacturing, and digital empowerment. This research explores how digitalization can accelerate India's self-reliance mission, focusing on key sectors such as governance, education, MSMEs, finance, and rural development. The paper also analyses public perception through a structured questionnaire to understand how digital tools have influenced entrepreneurship, employment, and accessibility in India.

Key words: *Go Digital, Digital empowerment, Atmanirbhar Bharat*

INTRODUCTION

The Atmanirbhar Bharat Abhiyan was launched in May 2020 as a response to economic challenges posed by COVID-19. While its core philosophy revolves around self-sufficiency and reducing import dependence, digital transformation has emerged as a critical enabler. With initiatives like Digital India, UPI, e-Governance, and ONDC, India is creating a digital backbone to support entrepreneurship, inclusivity, and innovation.

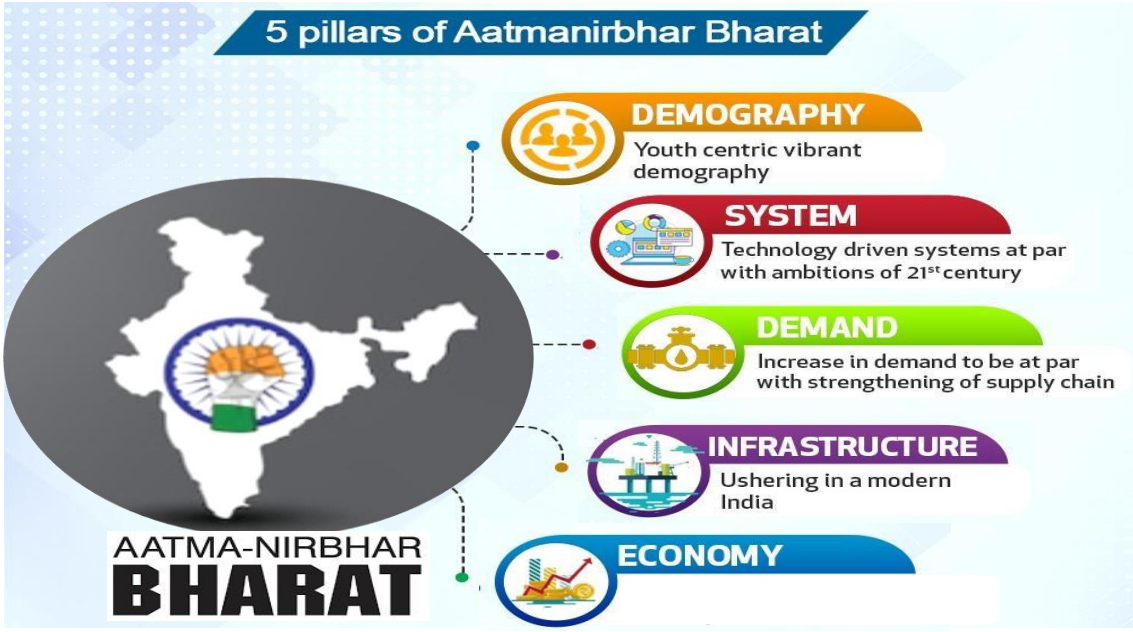
Digital India is a transformative initiative launched by the Government of India in 2015 to ensure that the benefits of digital technology reach every corner of the country. The program aims to create a digitally empowered society and a knowledge-based economy by bridging the digital divide between urban and rural areas. By leveraging technology, Digital India seeks to make government services easily accessible, improve efficiency, and promote transparency in governance the initiative is built on three key pillars: Digital Infrastructure, Governance and Services on Demand, and Digital Empowerment of Citizens. Under Digital Infrastructure, the program focuses on providing high-speed internet across the country, establishing common service centers, and promoting digital identity through Aadhaar. Governance and Services on Demand aim to digitize government services, enabling citizens to access them seamlessly. Digital Empowerment emphasizes digital literacy, encouraging citizens to adopt technology in their daily lives.

One of the flagship programs under **Digital India** is the BharatNet project, which aims to connect rural areas with broadband services, ensuring that every village in India can participate in the digital economy. Other notable initiatives include Digi Locker, which allows citizens to store important documents digitally; e-Hospital services for online health consultations; and UMANG,

a mobile application that consolidates multiple government services in one place. These efforts have significantly enhanced the accessibility and efficiency of public services.

The impact of Digital India is far-reaching, enabling economic growth, creating employment opportunities, and promoting innovation. It has empowered citizens by providing them with tools to access education, healthcare, financial services, and government schemes. By fostering an environment of digital inclusion and technological progress, **Digital India** is paving the way for India's transformation into a leading digital economy and a globally competitive nation.

- From Make in India to Make for the World
- Encouraging local capacity building
- Promoting Start-ups/Entrepreneurship
- Increasing Value addition in India
- Bringing down the import bill by producing and adopting quality local products



Key Digital Initiatives Aligned with Atmanirbhar Bharat

To realize the vision of a self-reliant India (**Atmanirbhar Bharat**), digital transformation has emerged as a critical enabler. Various government-led digital initiatives aim to promote inclusivity, improve governance, enhance service delivery, and empower citizens and businesses. Below are the major initiatives contributing towards this digital empowerment

A. **Digital India**

Launched in 2015, the Digital India programme is a flagship initiative aimed at transforming India into a digitally empowered society and knowledge economy**.** It focuses on strengthening digital infrastructure, delivering services digitally, and promoting digital literacy. Key initiatives under Digital India include:

- **Digi Locker**: Facilitates paperless governance by allowing citizens to access official documents online.

- **UMANG (Unified Mobile Application for New-age Governance)**: Offers access to over 1,000 government services through a single mobile app.
- **E-Hospital**: Connects hospitals and patients digitally for services like appointments, lab reports, and blood availability.
- **My Gov**: A citizen engagement platform promoting participatory governance.

These services enhance transparency, reduce bureaucratic red tape, and make governance more accessible to the common man.

B**. UPI & Digital Payments**

The **Unified Payments Interface (UPI)** has revolutionized digital payments in India. Operated by the National Payments Corporation of India (NPCI), UPI allows seamless money transfers via smartphones.

- In 2023**,** UPI transaction volumes exceeded 14 billion per month, signifying mass adoption and the system's robustness.
- UPI promotes financial inclusion, particularly in rural and semi-urban areas, by reducing dependency on cash and offering secure, real-time transactions.

Other initiatives like BHIM**,** Rupay cards, and integration of UPI with global platforms further bolster India's digital payment ecosystem.

C**. ONDC (Open Network for Digital Commerce)**

Launched by the Government of India, the **ONDC** initiative aims to democratize e-commerce by providing an open and interoperable network.

- It allows small retailers, MSMEs, and local Kirana **stores** to access digital marketplaces without relying solely on dominant e-commerce players like Amazon or Flipkart.
- By promoting **fair competition**, ONDC empowers entrepreneurs and supports local businesses in becoming digitally visible and economically viable.

ONDC directly supports Atmanirbhar Bharat by building a more inclusive and decentralized digital economy.

D**. E-Governance**

E-Governance enhances the efficiency, transparency, and accountability of government functioning through the use of information and communication technology (ICT). Prominent examples include:

- **Common Service Centers (CSCs)**: Deliver essential public utility services, healthcare, education, and financial services in rural India.
- **JAM Trinity (Jan Dhan, Aadhaar, Mobile)**: Forms the foundation for direct benefit transfers (DBT), eliminating middlemen and leakages in the welfare delivery system.

These platforms enable **citizen-centric service delivery**, making governance more accessible and responsive.

E**. Digital Education and Skilling**

India is investing significantly in **digital learning platforms** to ensure equitable access to quality education and skill development opportunities. Key initiatives include:

- **SWAYAM (Study Webs of Active–Learning for Young Aspiring Minds)**: Offers free online courses from school to postgraduate level.
- **Diksha (Digital Infrastructure for Knowledge Sharing)**: Supports teachers and students with e-content and teaching aids.
- **E Vidya**: A comprehensive initiative for digital education introduced during the COVID-19 pandemic, integrating TV channels, radio, and online platforms to reach remote learners.

These platforms promote lifelong learning**,** bridge the digital divide, and equip the youth with skills for the digital economy.

Challenges of Digitalisation

1. **Unequal Access to Technology**
   There is a noticeable gap between rural and urban regions when it comes to access to internet facilities and digital infrastructure.
2. **Insufficient Digital Skills**
   many people, especially in villages and among senior citizens, lack the basic knowledge required to navigate digital platforms effectively.
3. **Weak Internet Coverage**
   several remote and interior areas still suffer from slow or unreliable internet, which hampers smooth digital experiences.
4. **Online Security Risks**
   With rising digital activity, threats such as cybercrime, data theft, and financial fraud are becoming more common, discouraging users.
5. **Lack of Confidence in Digital Finance**
   many individuals hesitate to use digital payment methods due to concerns about privacy, fraud, and safety.
6. **Language Limitations**
   the predominance of English and Hindi in digital content excludes many users who are only comfortable in regional languages.
7. **Cost Barriers**
   For economically weaker sections, affording smartphones, computers, and consistent internet access remains a challenge.
8. **Limited Digital Infrastructure**
   The shortage of digital support centres, inadequate server capacity, and lack of user support systems create operational bottlenecks.

9. **Traditional Mind-set**
   Some people are resistant to changing their conventional habits and are reluctant to adopt digital alternatives.
10. **Low Digital Penetration in Specific Sectors**
    Fields like agriculture and healthcare, especially in rural areas, still lag in digital adoption due to lack of sector-specific tools and awareness.

OBJECTIVES OF THE STUDY

- ✓ To evaluate the role of digital initiatives in promoting Atmanirbhar Bharat.
- ✓ To study public perception and usage of digital platforms in daily life.
- ✓ To assess the impact of digital tools on MSMEs and startups.
- ✓ To suggest strategies for enhancing digital inclusion.

REVIEW OF LITERATURE

Several studies have evaluated the effectiveness of digital infrastructure projects like BharatNet and Digital India in improving internet access, particularly in rural regions (Kumar & Gupta, 2019). According to Bhattacharya (2022), digital literacy programs have played an important role in empowering underprivileged communities and expanding access to government services and benefits. In the realm of finance, research has shown that technologies such as mobile banking and the JAM trinity (Jan Dhan, Aadhaar, and Mobile) have significantly contributed to financial inclusion (Rao & Patel, 2020).

The MSME sector, a vital component of India's economy, has seen positive impacts from adopting digital tools. Studies suggest that digital platforms, cloud-based services, and online payment systems have improved business efficiency and opened up new market opportunities for small enterprises (Deshpande & Joshi, 2021). In education, digital learning platforms have helped maintain continuity in learning and reduced the urban-rural gap, especially during disruptions like the COVID-19 pandemic (Sharma & Das, 2021).

Furthermore, recent research has explored how people perceive and interact with digital services. Survey-based studies, such as those by Iyer and Banerjee (2022), show that access to digital tools has encouraged entrepreneurship, especially among young people and women in smaller towns. Similarly, user feedback suggests that digital governance has increased public trust by making government services more transparent and efficient (Narayan & Roy, 2020).

RESEARCH METHODOLOGY

- ➢ **Type of Research: Descriptive and Exploratory**

  The study employs both descriptive and exploratory research approaches. The exploratory aspect helps in gaining insights into the digital transformation trends and understanding consumer and firm behaviour towards a 'Digital India' initiative. The descriptive research aims to present a detailed and factual analysis of the data collected, capturing the existing patterns, preferences, and readiness among various sectors to adopt digital practices under the vision of Atmanirbhar Bharat.

- **Data Collection: Primary Data**

  Primary data was collected using a structured questionnaire designed specifically for this study. The questionnaire comprised both closed-ended and multiple-choice questions to gather quantitative data. It was distributed among individuals and representatives from various sectors including manufacturing, services, education, start-ups, and retail to get diverse perspectives.

- **Secondary Data**

  Secondary data was sourced from reliable government portals and databases including reports and statistics published by:

- **NITI Aayog** (for national development strategies and digital transformation insights),
- **Reserve Bank of India (RBI)** (for data on digital payments and banking),
- **Ministry of Electronics and Information Technology (MeitY)** (for digital infrastructure and policies),
- **World Bank** and other international bodies (for global comparisons and benchmarking).

This data supported the background study and helped in validating the findings from the primary data.

- **Sample Size**

  The study was conducted among a sample of 93 respondents**,** selected from different sectors and demographic groups. This diverse representation ensured that the findings are reflective of broader trends rather than limited to a specific industry or group.

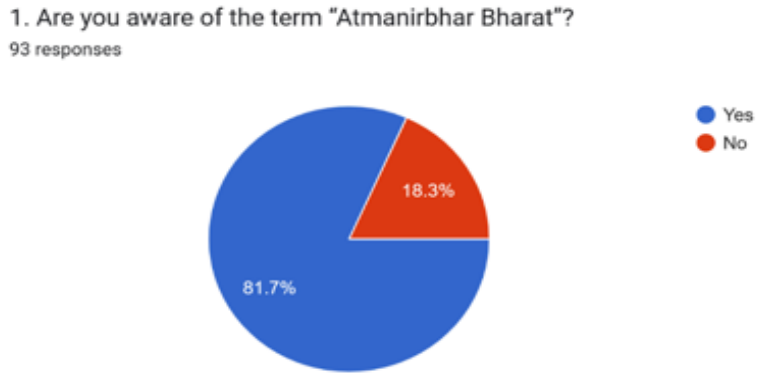
- **Sampling Technique**

  A convenient sampling method was used due to time and resource constraints. Respondents were chosen based on their availability and willingness to participate in the survey. While this method has limitations in terms of generalizability, it provided timely and relevant insights for the scope of this research.

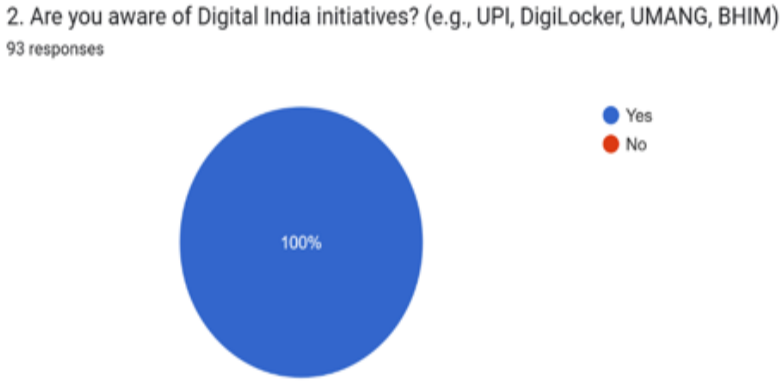
- **Tools Used for Data Analysis**

  To analyse the collected data**,** percentage analysis was employed to interpret the frequency of responses and identify major trends. Additionally**,** graphical representations (such as bar charts, pie charts, and line graphs) were used to visually present the data for better clarity and understanding. These tools facilitated the interpretation of consumer and industry responses towards digital adoption in India.

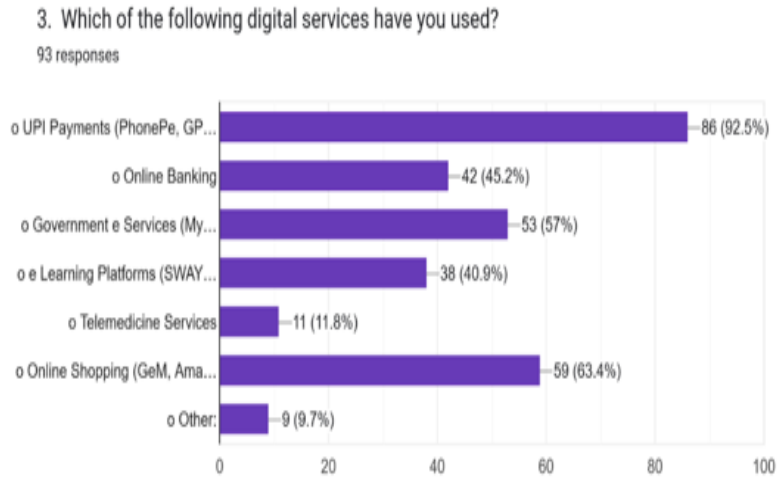
DATA ANALYSIS & INTREPRETATION



Interpretation: The above diagram shows that majority of respondents were aware of the term "Atmanirbhar Bharat" The efforts towards awareness are positively progressing.



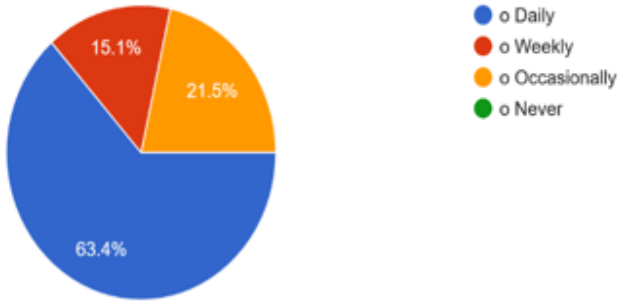
Interpretation: The above diagram shows that all the respondents were aware of the digital initiatives offered by Government.



Interpretation: The above diagram shows that 86% of respondents have used various UPI payment modes, 42% were engaged in online banking, 59% were inclined in online shopping, 38% were using online learning platforms, 11% were using Telemedicine Service.

4. How frequently do you use digital services?

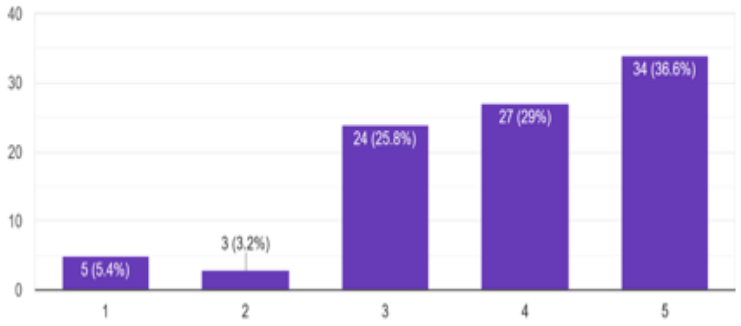
93 responses



Interpretation: The above diagram shows that 63.4% of respondents use digital services daily, this shows the usage is positive and progressing.

5. Has digitalization made your life more convenient?

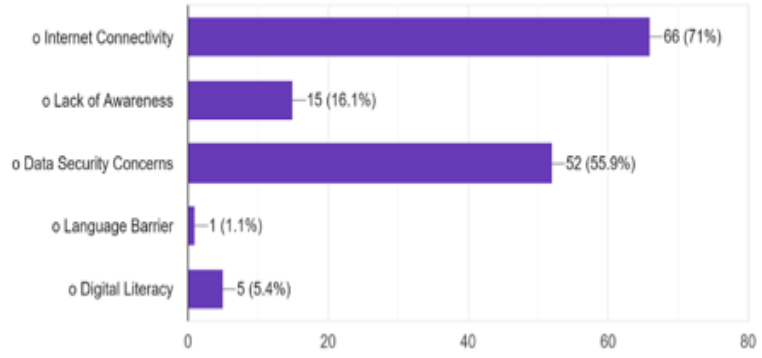
93 responses



Interpretation: The above diagram shows that majority of the respondents agrees that digitalisation had made their life more convenient.

6. What challenges do you face while using digital platforms?

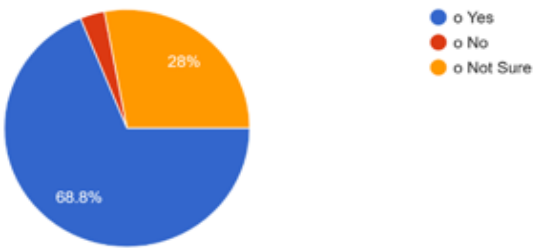
93 responses



Interpretation: The above diagram shows that 71% of respondents find internet connectivity as a major challenge while using digital platforms, while cyber security is also a high concern for respondents.

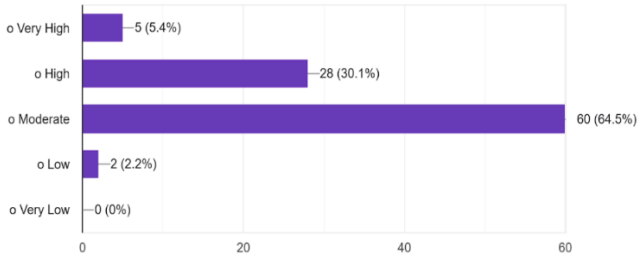
7. Do you feel digital tools promote self-reliance among citizens?

93 responses



8. How much do you trust digital platforms for financial transactions?

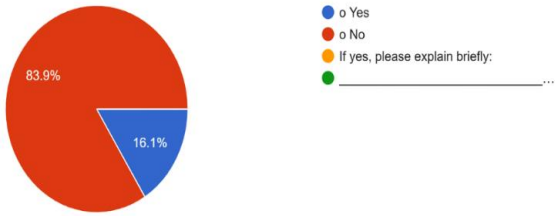
93 responses



Interpretation: The above diagram shows that the respondents 64.5% of respondents have limited trust with digital platforms for financial transactions

9. Have you encountered any cybersecurity issues or fraud while using digital services?

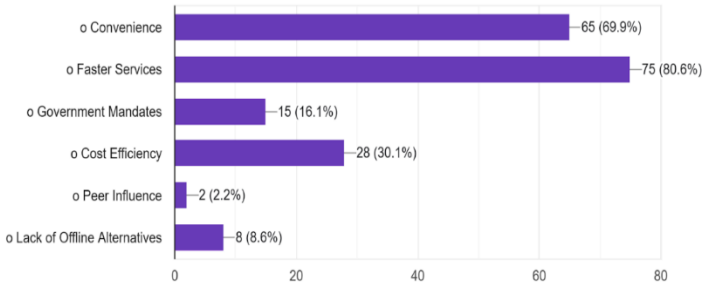
93 responses



Interpretation: The above diagram shows that the respondents 83.9% did not face cyber security issues or fraud while using digital services, this proves that digital platform are secured if used cautiously.

10. What motivates you to use digital platforms?

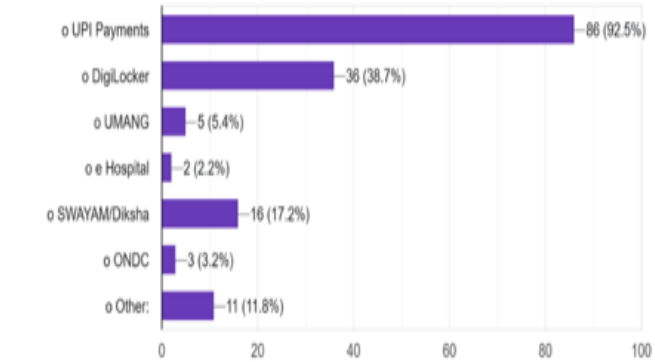
93 responses



Interpretation: The survey reveals that the main reasons people use digital platforms are faster services (80.6%) and convenience (69.9%)**.** These are followed by **cost** efficiency (30.1%) and government mandates (16.1%)**.** Fewer users are motivated by a lack of offline alternatives (8.6%) or peer influence (2.2%)**.** This shows that people mainly prefer digital platforms for their speed and ease of use.

11. Which digital initiative has impacted you the most?

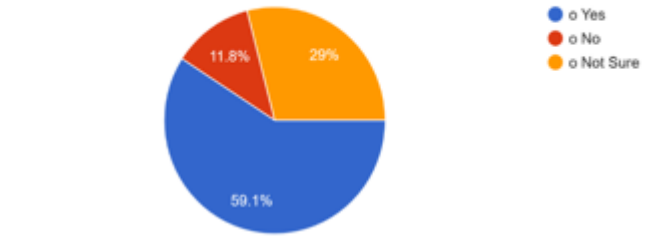
93 responses



The chart shows that UPI Payments have had the greatest impact, with 92.5% (86 respondents) selecting it. This highlights the widespread use and influence of digital payments. Digi Locker (38.7%) and SWAYAM/Diksha **(17.2%)** are the next most impactful initiatives. Other platforms like UMANG**,** e-Hospital**,** and ONDC had minimal impact, indicating lower usage or awareness. Overall, UPI stands out as the most transformative digital initiative among respondent.

12. Do you think government digital initiatives are inclusive for all age groups?

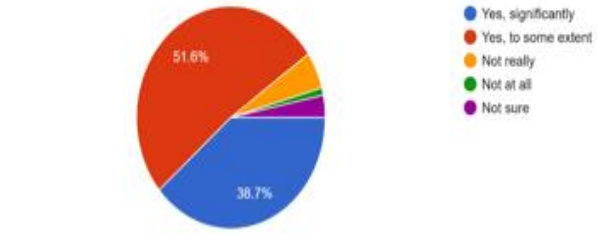
93 responses



The chart shows that 59.1% of respondents believe government digital initiatives are inclusive for all age groups, while 29% are not sure, and 11.8% think they are not inclusive. This suggests that while a majority view these initiatives as inclusive, there is still some uncertainty and a small percentage of dissatisfaction regarding age inclusivity.

13. Do you believe digital initiatives have contributed to India becoming more self-reliant (Atmanirbhar)?

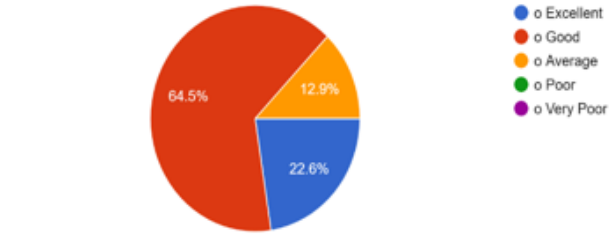
93 responses



The chart shows that 51.6% of respondents believe digital initiatives have contributed to India becoming more self-reliant to some extent, while 38.7% feel they have contributed significantly. Only a small percentage feel they have not really (4.3%), not at all (2.2%), or are not sure (3.2%). This indicates a strong overall belief in the positive role of digital initiatives in promoting self-reliance.

14. Rate the overall accessibility of digital services in your region:

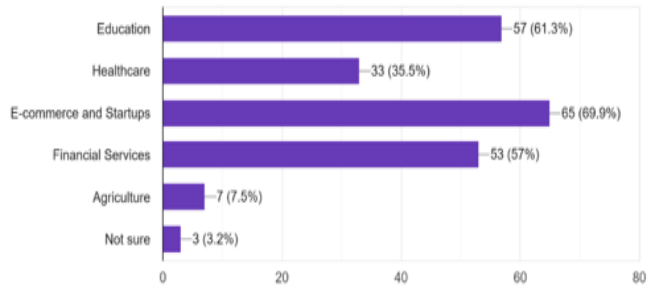
93 responses



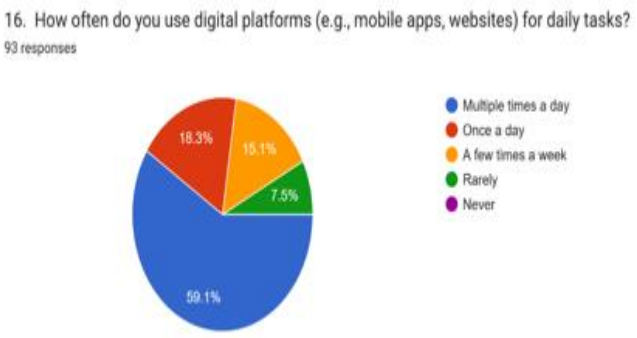
The chart shows that 64.5% of respondents rated the accessibility of digital services in their region as good, while 22.6% rated it as excellent and 12.9% as average. No one rated it as poor or very poor. This suggests that most people find digital services easily accessible in their area, with a generally positive perception.

15. In your opinion, which sector has benefited most from digital initiatives?

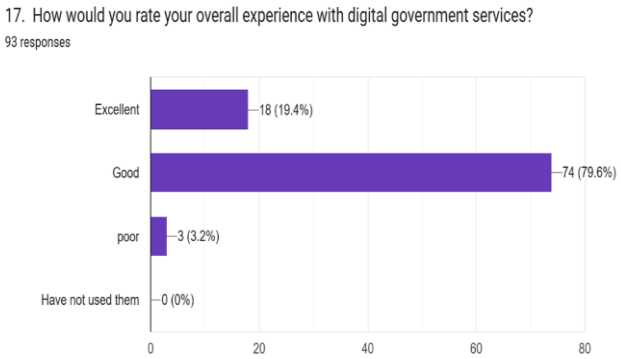
93 responses



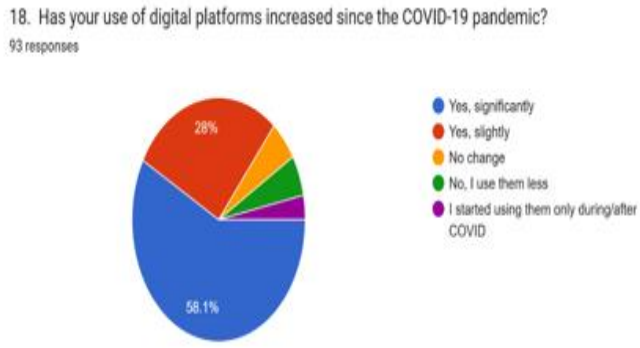
According to the chart, the majority of respondents feel that digital initiatives have had the greatest impact on the e-commerce and start-up sector (69.9%), followed closely by education (61.3%) and financial services (57%). Comparatively fewer respondents believe that healthcare (35.5%) and agriculture (7.5%) have seen significant benefits. Only a small percentage (3.2%) were uncertain. Overall, the data reflects a strong perception that digital efforts have most effectively supported business, education, and financial sectors.



The chart indicates that a majority of respondents (59.1%) use digital platforms multiple times a day for daily tasks. Others use them once a day (18.3%), a few times a week (15.1%), or rarely (7.5%). Notably, no one selected "Never." This suggests that digital platforms are a regular part of daily life for most people.



The chart shows that the majority of respondents (79.6%) rated their overall experience with digital government services as good, while 19.4% rated it as excellent. Only 3.2% had a poor experience, and no one reported not using these services. This indicates a generally positive user experience with digital government platforms.



The chart shows that 58.1% of respondents reported a significant increase in their use of digital platforms since the COVID-19 pandemic, while 28% noticed a slight increase. A small portion experienced no change, used them less, or started using them only during or after the pandemic. This indicates that the pandemic played a major role in accelerating digital platform usage.

FINDINGS OF THE STUDY

1. A large number of participants were familiar with the concept of "Atmanirbhar Bharat," reflecting successful awareness efforts by the government.
2. All respondents demonstrated awareness of various digital initiatives introduced by the government, indicating effective outreach.
3. UPI emerged as the most widely used service (86%), followed by online shopping (59%), online banking (42%), online learning (38%), and telemedicine (11%), showing diverse engagement in digital services.
4. A majority of respondents (63.4%) reported using digital services on a daily basis, indicating a growing dependence on digital tools for routine tasks.
5. Most individuals agreed that digitalisation has made their day-to-day life more convenient and efficient.

6. Internet connectivity was identified as the biggest challenge by 71% of respondents, while cybersecurity concerns were also highlighted.
7. Around 64.5% of users expressed limited trust in digital platforms, especially for financial transactions.
8. Despite concerns, 83.9% of respondents confirmed they had not encountered cybersecurity threats or fraud, suggesting that digital platforms are generally safe when used properly.
9. The main reasons for using digital platforms were identified as faster service (80.6%) and convenience (69.9%), followed by cost benefits and government requirements.
10. Among all government digital services, UPI had the strongest impact (92.5%), followed by DigiLocker and SWAYAM/Diksha, indicating UPI's dominance in digital adoption.
11. A majority (59.1%) felt that government digital platforms are suitable for all age groups, although a notable portion remained uncertain.
12. Over half (51.6%) of the respondents believed digital initiatives have contributed to India's journey toward self-reliance to some extent, with 38.7% saying the impact has been significant.
13. Digital services were generally found accessible in most regions, with 64.5% rating accessibility as good and 22.6% rating it excellent.
14. Respondents believed the most benefited sectors from digitalisation are e-commerce and startups (69.9%), followed by education and financial services.
15. A significant number of users (59.1%) reported using digital platforms multiple times a day, making them an integral part of their daily routines.
16. Most participants had a positive experience with government digital services—79.6% rated their experience as good, while 19.4% rated it excellent.
17. The COVID-19 pandemic led to a surge in digital platform usage, with 58.1% of respondents increasing their usage significantly and 28% noticing a slight increase.

SUGGESTIONS

1. **Improve Internet Connectivity:**
   Since a large number of users face connectivity issues, the government and service providers should work on strengthening internet infrastructure, especially in rural and remote areas.
2. **Enhance Cybersecurity Awareness:**
   More awareness programs and workshops should be conducted to educate users on safe digital practices and how to avoid online fraud.
3. **Build Trust in Digital Financial Services:**
   Measures like customer support, strong data protection policies, and user-friendly interfaces can help increase trust in online financial transactions.
4. **Promote Digital Literacy Across Age Groups:**
   Special training and tutorials should be developed for older adults and digitally less literate users to ensure inclusivity.
5. **Expand Awareness of Less-Known Initiatives:**
   Digital platforms like UMANG, ONDC, and e-Hospital should be promoted more actively to increase their adoption.

6. **Strengthen Support for Start-ups and E-commerce:**
   Since these sectors are highly impacted, continued support in the form of policies, funding, and digital tools can further boost growth.
7. **Encourage Use of Digital Platforms in Agriculture and Healthcare:**
   More targeted initiatives and benefits should be introduced to promote adoption of digital tools in agriculture and rural health services.
8. **Ensure Regular Updates and Improvements in Government Digital Platforms:**
   Continuous improvement in speed, user interface, and services will help maintain a positive user experience.
9. **Leverage Post-COVID Digital Momentum:**
   With increased usage after COVID-19, the government and private sector should capitalize on this shift to further integrate digital services in education, healthcare, and governance.
10. **Local Language Integration:**
    To make digital platforms more inclusive, regional language support should be improved so that users across all linguistic backgrounds can access services easily.

LIMITATIONS OF THE STUDY

1. The study involved a small number of respondents, which may not reflect the views of the broader population.
2. It did not consider demographic factors like age, location, or educational background, which could affect digital usage.
3. Since the responses were self-reported, there's a chance of personal bias or inaccurate information.
4. The specific geographic region of the participants was not mentioned, limiting the scope of the findings.
5. The survey used mostly multiple-choice questions, which restricted detailed feedback or personal experiences.
6. Key factors like access to devices, internet type, and digital skills were not examined.
7. The study reflects current usage trends without evaluating how behaviour has changed over time.
8. The impact of digital initiatives on sectors like agriculture and healthcare was not thoroughly analysed.
9. There was no process to verify the truthfulness or reliability of the responses.
10. The study mentioned post-COVID changes but lacked detailed comparison with digital usage before the pandemic.

CONCLUSION

The study suggests several important outcomes. There is a noticeable rise in awareness about Digital India and Atmanirbhar Bharat initiatives, indicating successful outreach efforts. A significant increase in the regular use of digital services such as UPI, online banking, and e-learning platforms reflects growing digital adoption. However, the study highlights the urgent need to improve internet connectivity and digital infrastructure across regions. Cybersecurity remains a

concern, pointing to the need for better awareness and protection measures. Respondents largely view digital platforms as contributing positively to convenience and national self-reliance. To ensure inclusivity, digital literacy programs should be expanded to reach all age groups and communities. The findings also reveal potential for further digital innovation in underrepresented sectors like healthcare and agriculture. Overall positive user feedback provides a solid base for enhancing digital services. Additionally, the post-COVID surge in digital usage presents an opportunity to build a stronger, more inclusive digital ecosystem. These insights can support policy-making and future digital development initiatives.

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The Genesis of 'Othering': Examining Public Spaces for Women

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ABSTRACT

Public spaces in urban areas are settings for a myriad of social interactions that are deeply shaped by social norms and planning decisions. Across many contexts, men and women navigate cities in fundamentally different ways; influenced by elements of urban planning and design such as accessibility, location, amenities, and perceived safety. These spatial dynamics are further embedded within patriarchal ideologies that extend beyond the private sphere into the public realm, including the physical planning and organization of the built environment. As a result, public spaces often inadvertently privilege stereotypical male behaviors and uses, while marginalizing the everyday needs and experiences of women. This gendering of public space is not merely the result of intentional exclusion, but emerges from deeply ingrained social conditioning that links certain places with specific gender roles. Moreover, gender does not operate in isolation; it is interwoven with other socio-economic factors such as age, income, education, and occupation. These intersections influence how public spaces are accessed or experienced, creating a dynamic that both constrains and enables different users in complex and unequal ways.

The objective of this study is ***to critically examine the processes through which women are 'othered' in public spaces*** *by exploring the role of spatial design, social norms, and intersecting socio-economic factors. It seeks to uncover subtle mechanisms of exclusion and identify opportunities for more inclusive and equitable urban planning.*

Keywords: *Urban planning, public space, public infrastructure, social norms, societal pressures, women empowerment, women safety, rights for women, active participation of women*

1. URBAN PUBLIC SPACE: MORE THAN JUST INFRASTRUCTURE

Cities are more than physical structures, they are social environments where people move, work and build community. Urban planning plays a critical role in shaping these environments by determining how space is organized, accessed, and experienced. Urban public space has long been such a foundational element of city planning, often conceptualized primarily in terms of physical infrastructure to facilitate movement, recreation, or circulation. However, such a narrow perspective overlooks the complex and multifaceted roles these spaces play in shaping urban life. Public spaces function not only as spatial frameworks but also as social constructs, imbued with cultural, political, and symbolic significance. It is within these shared environments that collective memory is formed, civic identity is expressed, and democratic engagement is enacted. Therefore, urban public spaces need to be understood not merely as physical infrastructural artifacts but as contested arenas that propagate social interactions, support diverse forms of public life; reflecting broader processes of urban transformation.

2. RESEARCH QUESTIONS:

1. Are all public spaces in urban areas inclusive?
2. How does the concept of "belonging" in public space differ for men and women?
3. What social or cultural factors contribute to the exclusion of women from public areas?
4. Do spatial practices and norms contribute to the marginalization or invisibility of women in public spaces?

3. METHODOLOGY AND THEORETICAL FRAMEWORK:

Understanding Public Space and its importance Social Norms and their unsaid impacts on the "Universal User Model" Relationships of Gender and Space: Theories and Cases A Critique on Policy Frameworks Discussions and Conclusions

4.1 UNSPOKEN SOCIAL NORMS: GENDER AND BEHAVIOUR IN THE PUBLIC REALM:

While public spaces are often portrayed as neutral and open to all, the reality is more complex; deeply influenced by cultural and social norms. These norms significantly influence the everyday use of public space, shaping who is seen as a legitimate presence and how individuals are expected to behave. With urban planning being predominantly ruled by male perspectives, little attention is paid to the specific needs and experiences of women. For women, such social norms often regulate and control their presence, behavior, and movement, especially in public spaces. The policing of women's bodies in public; through judgment, harassment, or social scrutiny clearly reinforces traditional gender roles; limiting their freedom. Women are frequently made to feel that their visibility in public must be justified, especially if they deviate from expected norms of dress or conduct. This contributes to a gendered fear of violence, where women are taught to anticipate danger in public spaces and adjust their routines accordingly avoiding certain areas, dressing conservatively, or limiting time spent outside. In addition to social norms, women's access to public space is also shaped by safety concerns, limiting their freedom of movement and active participation in urban life.

4.2 PRESENTING 'UNIVERSAL USER' AS A MYTH

Despite growing awareness of these challenges, urban design still largely relies on a "universal user" model that assumes all citizens interact with the city; in this case - public spaces in the same way. These assumptions are often centered on the needs of a narrow group; typically, able-bodied men overlooking the everyday realities of many others: women, children, older adults, and people with disabilities with different movements, mobility paths as per respective need. When planning begins to ignore these differences, cities become less inclusive and less functional for large parts of the population. As a result, public spaces become sites not of equal access,but of negotiated and often restricted presence for women.

5.1 MAPPING AND UNDERSTANDING GENDER AND THEIR JOURNEYS IN SPACE; DECIPHERING WOMEN'S ACCESS TO PUBLIC SPACE

Women navigate cities differently from men due to their roles in both paid and unpaid labor, caregiving responsibilities, and heightened vulnerability to harassment and violence. Their daily routines often involve complex travel patterns such as trip-chaining to schools, markets, healthcare centers, and workplaces which are rarely considered in traditional transportation and spatial planning.

5.2 SUPPORTIVE THEORIES/ LITERATURE REVIEW:

a) 'The Production of Space' (1974) theory by Henri Lefebvre: Far from being neutral, public spaces are shaped by social relations, power structures, and dominant gender norms that

often exclude or restrict women's presence. Lefebvre's framework helps decode the disconnect between how space is conceived by planners and how it is lived by women. Intersectional factors such as caste, class, and sexuality further complicate this access, with marginalized women facing compounded spatial exclusions.

b) **'Feminism and Geography: The Limits of Geographical Knowledge' (1993) by Gillian Rose:** She emphasized that geography is not only about physical terrains but also about how space is represented, narrated, and symbolically constructed through cultural, academic, and visual practices. These representations often privilege male perspectives and reinforce gendered power relations, shaping who is seen as belonging in public space and who is othered. In the context of women's access to public space, her work underscores that exclusion is not merely physical but also epistemic; embedded in the ways space is imagined, mapped, and theorized, making it crucial to interrogate how spatial knowledge itself contributes to the ongoing marginalization of women in public life.

c) 'For Space theory' (2005) by Doreen Massey: Applying the idea of 'power geometry' to women's access to public space, this theory reveals how spatial experiences are deeply embedded in power relations that privilege some bodies over others. Women's movement and presence in public spaces are thus shaped by intersecting structures of gender, class, and race, which influence their ability to claim visibility, safety, and belonging. Her framework also helps decode how space becomes a site of othering, where women are often positioned as peripheral or out of place, reinforcing their exclusion from full spatial citizenship.

5.3 RELEVANT CASE STUDIES (CASES OF THE GLOBAL SOUTH)

To analyze these theories further, it is important to understand basic cases to bring about the relevance of women in public spaces in multiple urban contexts across the globe.

5.3.1 Global South - Indian Examples

a. Azad Maidan, Mumbai, India: This open space is a historic open ground in South Mumbai and has long served as a space for public protests, sports, and political gatherings. While men have continuously occupied it for informal play, activism, and daily leisure since the early 20th century, women's presence remains rare, restricted, and often questioned. Over time, especially post-independence and into the 21st century, the space has become emblematic of how public access is gendered, with women either absent or hyper-visible, subjected to surveillance, judgment, or moral scrutiny. This exclusion, despite no formal restrictions, reflects how timeless male dominance and normalized loitering shape the very terms of spatial legitimacy for women in urban areas.

b. Connaught Place, New Delhi: This public space; though being a central commercial and cultural hub, exemplifies how seemingly open spaces are subtly exclusionary. While men occupy benches, corridors, and open plazas freely, women sitting alone or loitering without purpose are often stared at, questioned, or policed. The space is highly surveilled, yet this surveillance often reinforces gendered scrutiny rather than safety. Women's movement here is shaped by time, dress, and perceived intent, making casual or purposeless presence uncomfortable.

c. Marina Beach promenade, Chennai: Marina Beach, Chennai, though a vast and iconic public space, reflects subtle gendered exclusion. While men occupy the space freely at all hours, women's presence is often limited to early mornings or family outings. After dark, the beach becomes male-

dominated, and women alone face moral scrutiny, policing, or harassment. Surveillance by authorities often reinforces control rather than protection, discouraging unaccompanied or purposeless female presence. Cultural expectations dictate that women must have a 'reason' to be there; leisure without function is seen as inappropriate.

d. Park Street, Kolkata: Park Street, Kolkata, a prominent commercial and nightlife district, exemplifies the gendered nature of urban visibility and access. Despite its cosmopolitan identity, women occupying the space alone—especially after dark—often face moral judgment, unwanted attention, and surveillance. Social norms around respectability dictate that women should be accompanied or have a clear purpose, making solo or leisure-based female presence appear deviant. Policing and societal gaze combine to regulate behavior, reinforcing spatial boundaries for women. As a result, Park Street remains a space where freedom of movement is granted unequally, and women's autonomy is subtly constrained through social and symbolic exclusion.

e. Cubbon Park, Bangalore: Cubbon Park, Bangalore, a central green lung of the city, reveals the layered dynamics of gendered access in recreational public spaces. While the park appears open and inclusive, women's presence—especially alone or after dusk—is often met with suspicion, discomfort, or surveillance. Social norms discourage women from loitering or resting alone, and reports of harassment and voyeurism contribute to self-regulated behavior. The presence of male-dominated groups and inadequate lighting further exacerbate feelings of vulnerability. Though physically accessible, Cubbon Park exemplifies how invisible social codes and safety concerns subtly affect other women, limiting their full and free occupation of urban green spaces.

f. Sardar Patel Stadium Area, Ahmedabad: This stadium, though designed for public gatherings and sports, reflects gendered patterns of spatial use and exclusion. While men freely occupy the open grounds for play, leisure, and socializing, women's presence is minimal and often limited to morning walks or family events. Those who visit alone report staring, discomfort, and social judgment, discouraging independent use of the space. The lack of women-friendly amenities and passive surveillance further reinforces their marginality. This case highlights how even recreational public spaces, when shaped by male dominance and societal norms, contribute to the subtle yet persistent othering of women.

g. Charminar Area, Hyderabad: Charminar, Hyderabad, a bustling historic and commercial hub, presents a vivid example of how cultural and spatial dynamics contribute to the othering of women in public spaces. Though heavily frequented by women for shopping and festivals, their presence is largely transactional and purpose-driven, with minimal room for loitering or leisure. The dense, male-dominated street life, combined with narrow lanes and a highly visible gaze, discourages solitary or non-utilitarian female occupation. Traditional norms further restrict women's spatial behavior, reinforcing their role as visitors rather than equal claimants. The space, while physically accessible, remains socially and symbolically restrictive for women, reflecting deep-rooted gendered exclusions.

5.3.2 Global South - International Examples

a. **Tahrir Square, Cairo, Egypt:** Tahrir Square, Cairo, globally recognized as a site of political revolution, starkly illustrates the gendered dynamics of public space. While it symbolized civic empowerment during the 2011 protests, women faced widespread sexual harassment and assault, making their participation fraught with risk. Despite being physically present, women's bodies

became sites of control and violence, reflecting their contested legitimacy in such spaces. The lack of institutional protection and normalization of harassment reinforced their symbolic exclusion. This case exemplifies how even spaces of collective resistance can reproduce gendered othering, denying women equal claims to public visibility and agency.

b. Trans-Milenio Bus Rapid Transit System, Bogotá, Colombia: This area in Columbia presents a critical case of revelation of deep gendered disparities in urban mobility. Despite its efficiency, women frequently face sexual harassment in crowded buses and poorly monitored stations, making every day commutes unsafe. The lack of gender-sensitive design such as inadequate lighting, absence of panic alarms, and insufficient security contributes to their discomfort and avoidance of certain routes or times. As a result, women often adopt self-restrictive strategies or opt for costlier alternatives. This case highlights how infrastructural success can still perpetuate spatial othering if safety and inclusion are not central to transit planning.

c. **Mirpur and Gulistan Market Areas, Dhaka, Bangladesh:** Both these market Areas in Dhaka, Bangladesh, are vibrant commercial hubs where women visit these markets for essential shopping.Their movement is often constrained by persistent verbal harassment, crowding, and lack of safety infrastructure. The highly male-dominated environment discourages women from loitering, lingering, or visiting during peak or late hours. Many adopt avoidance strategies or require accompaniment, reinforcing their conditional access. This case illustrates how routine public spaces, though essential, become sites of spatial othering when women's presence is tolerated only within narrowly defined social roles.

d. Praça da Sé, São Paulo, Brazil: A historic civic square and transit hub, illustrates the gendered nature of safety and access in public spaces. Despite its central location and symbolic significance, women often report feeling unsafe due to harassment, poor lighting, and the presence of loitering male groups. Their use of the space is often hurried or strategic, avoiding certain paths and times of day. Attempts to increase security have not fully addressed the underlying social dynamics that discourage female presence. This case highlights how public visibility does not equate to public belonging, reinforcing the spatial othering of women.

e. Malls in Lahore, Pakistan: Malls in Lahore serve as modern, enclosed public spaces that offer a seemingly safe environment for women, yet still reflect subtle forms of gendered othering. While women frequent these malls for shopping, socializing, and leisure, their behavior is often shaped by expectations of modesty, surveillance, and social scrutiny. Security checks, dress codes, and male-dominated staff subtly regulate women's movement and visibility. Unaccompanied women or those loitering without purpose may face uncomfortable stares or judgment. This case reveals how even sanitized, privatized spaces can reproduce patriarchal control, reinforce conditional access and limit women's autonomous spatial presence.

Fig 1: Azad Maidan, Mumbai

Fig 2: Connaught Place, Delhi

Fig 3: Marina Beach, Chennai

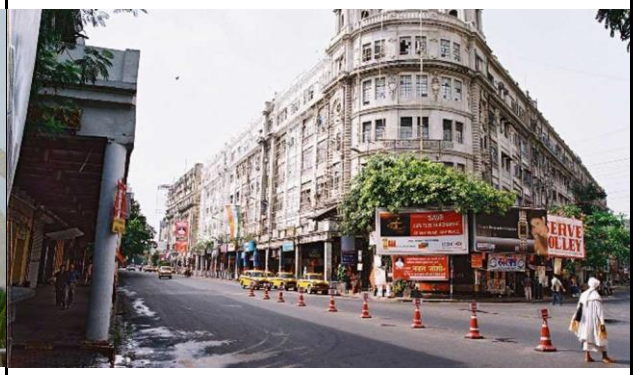

Fig 4: Park Street, Kolkata

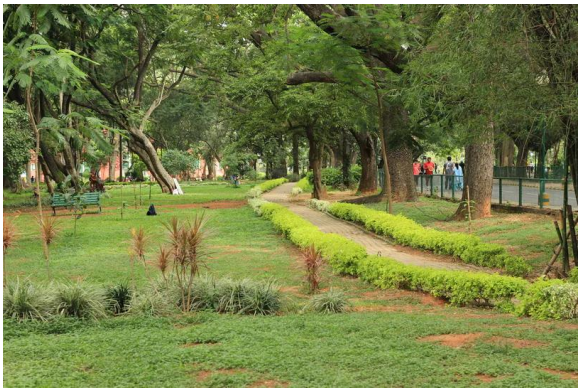

Fig 5: Cubbon Park, Bangalore

Fig 6: Sardar Patel Stadium, Ahmedabad

Fig 7: Charminar, Hyderabad

Fig 8: Tahrir Square, Cairo, Egypt

Fig 9: TransMilenio BRTS, Bogotá, Colombia

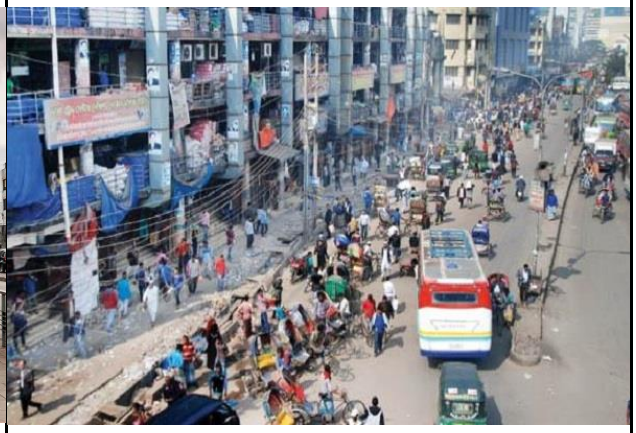

Fig 10: Market Areas, Dhaka, Bangladesh

Fig 11: Trans-Milenio BRTS, Bogotá, Colombia

Fig 12: Malls in Lahore, Pakistan

PUBLIC SPACES IN THE GLOBAL SOUTH (National and International)

5.4 IDENTIFYING POLICY CONTRASTS: GLOBAL SOUTH V/S GLOBAL NORTH

Policies shape how public spaces are planned, accessed, and experienced. By comparing the two contexts, the research can highlight how different policy environments either reinforce or dismantle gendered norms that lead to the othering of women. **It shows that othering is not just cultural or social; but also, institutional and spatially governed.**

5.4.1 Political Frameworks in the Global South:

In addition to informal mechanisms of control that discuss societal judgements, cases in the Global South are also subjected to formal mechanisms of surveillance such as zoning based on policy frameworks. These do not merely aim to ensure safety; they reinforce compliance with patriarchal norms, limiting women's freedom of movement and discouraging behaviors seen as "unfeminine," such as loitering, pausing alone, or occupying space without a defined purpose. These exclusionary patterns of control operate across three interlinked sub-mechanisms of exclusion:

Mechanism	Nature of Exclusion
Institutional	Law enforcement often reinforces moral codes, resulting in surveillance, not protection.
Symbolic	Place-naming, monuments, and signage are dominated by male figures, reinforcing spatial masculinity.
Material	Poor lighting, inaccessible toilets, lack of seating or rest zones limit women's ability to inhabit space freely.

Table 1: Inferences of Parameters/ Mechanisms of Control in the Global South

These exclusions are not only gendered but **intersectional**; disproportionately affecting trans persons, migrant women, domestic workers, and many others who fall outside normative categories of urban citizenship. As a result, public space becomes a site of **conditional and negotiated belonging**, shaped by moral policing around time, purpose, and companionship. This further gets amplified by **institutional inertia, patriarchal governance, and lack of participatory mechanisms**, which hinder the translation of feminist urban discourse into spatial policy. While smaller steps towards achieving gender parity are on the rise, policies such as the **Delhi Master Plan 2041**, the **Safe Cities Programme** and various guidelines under **MoHUA** reflect growing awareness but remain limited by protectionist frameworks. These often focus on technological surveillance, women-only services, or peripheral guidelines that fail to address deeper structural and cultural exclusions. In addition, **symbolic, reactive and short-term fixes** such as the pink buses/pink booths, CCTV surveillance, or women-only zones prioritize only surface level presence without securing women's right to occupy and shape public space meaningfully.

5.4.2 Political Frameworks in the Global North

Cities in the Global North increasingly adopt structural approaches to spatial equity, recognizing that true access means not just presence, but autonomy, comfort, and belonging; rights that must be intentionally protected and planned for.

a) Since the 1990s, **Vienna city in Austria**, through its gender planning unit, has systematically incorporated gender audits into its housing, transport, and public space policies. Projects such as **Frauen-Werk-Stadt** (Women-Work-City) reimagined residential design through the lens of women's daily experiences; considering proximity to schools, transit, childcare, and green space.

b) Acknowledging that women's access to the city changes drastically after dark, the **London's Women's Night Safety Charter** requires businesses, cultural venues, and transport services to commit to measures that improve women's safety at night. This includes staff training, better lighting, signage, and transparent reporting systems. Rather than segregating space or restricting time-based access, this temporal equity strategy aims to make the city equally habitable across hours and demographics, challenging the idea that public space naturally becomes unsafe at night.

c) **Barcelona's Superblocks (Superilles) initiative** provides another important model by transforming traffic-dominated streets into walkable, mixed-use public spaces. By prioritizing pedestrians and cyclists over cars, the city has created environments that are not only safer, but also encourage casual, unstructured use; a critical factor in women's visibility in public space. These interventions foster inclusive street life by combining spatial redesign with participatory governance, ensuring that residents including women, children, and the elderly have a voice in shaping their environments.

What links these examples is their **shared emphasis on systemic change** as gender considerations into the DNA of governance, not as isolated projects but as ongoing planning principles. The result is a public realm that allows for visible and unregulated use by women and gender-diverse individuals without the need for over-surveillance, segregation, or behavioral compliance. In doing so, these cities challenge conventional practices and promote spatial justice by redesigning infrastructure, revising governance frameworks, and reimagining urban narratives. In this manner, the Global North demonstrates that transformative change is possible when gender is not treated as an afterthought, but as foundational to how space is planned, governed, and inhabited.

6. DISCUSSIONS: REFRAMING THE ROLE OF DESIGN AND GOVERNANCE

This research traces the layered processes through which public spaces become sites of gendered othering.

a) What emerges clearly is that transformative change requires a **reframing of public space as a right, not a privilege**. Access must be redefined to include not just physical presence, but comfort, safety, belonging, and freedom to linger or participate without surveillance, stigma, or moral judgment.

b) This involves applying **gender sensitive and inclusive design principles**, rethinking infrastructure, and enabling participation of all marginalized sections that are not just merely allowed to be, but are welcomed, seen, and empowered to shape space on their own terms**.**

c) The role of policymakers, urban planners, and civil society is extremely vital in shifting towards such systemic transformations. The path forward lies not in control, but in **co-creation, redistribution, and recognition**; that are possible hallmarks of a truly inclusive urbanism.

7. CONCLUSION

What emerges clearly from this inquiry is that transformative change is possible only when **gender is no longer treated as peripheral**, but as central to how cities are imagined, planned, and governed. Public space must be reframed as a **socially produced realm** where rights, rather than privileges are negotiated. Ultimately, the path forward lies not in expanding control, but in fostering co-creation, redistribution, and recognition. Urban spaces must evolve from

environments of conditional inclusion to sites of **shared ownership and plural engagement**. Only then can the spatial grammar of exclusion be rewritten into a language of justice, equity, and feminist possibility.

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Leading with Emotional Intelligence: The Power of Catharsis in Effective Leadership

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ABSTRACT

A key component of effective leadership, emotional intelligence (EI) greatly influences a leader's capacity to make wise choices, maintain positive interpersonal interactions, and create a positive work environment. Although emotional intelligence (EI) includes a variety of skills like self-awareness, empathy, and emotional regulation, catharsis—the deliberate, healthy release of intense or repressed emotions—is one of its frequently disregarded elements. The strategic function of catharsis in emotionally intelligent leadership is examined in this study, which suggests that cathartic techniques are essential for preserving emotional equilibrium and improving leadership efficacy.

The study used a quantitative research methodology to poll 100 executives from a range of industries in order to investigate the connection between perceived leadership outcomes, emotional intelligence, and cathartic expression. The findings show that better emotional control, stress reduction, and interpersonal efficacy are strongly positively correlated with the employment of cathartic therapies. More resilience, empathy, and clarity in their leadership responsibilities are displayed by leaders who actively participate in catharsis, whether through writing, open communication, or artistic outlets.

The study adds to the expanding corpus of research on emotionally savvy leadership by emphasizing catharsis's capacity for transformation. It promotes a more comprehensive and psychologically supportive method of developing future leaders by highlighting the significance of incorporating emotional processing techniques into leadership development programs. By doing this, companies may develop high-achieving, sympathetic, and emotionally resilient leadership teams that can handle the emotional demands of today's changing workplaces.

Keywords: Emotional Intelligence, Leadership, Catharsis, Emotional Regulation, Team Dynamics

1. INTRODUCTION

Effective leadership has evolved beyond the conventional dependence on technical know-how and strategic vision in the demanding and constantly changing environment of modern enterprises. Even though these skills are still necessary, they are no longer enough on their own. Today's leaders must continually navigate varied, multicultural teams, high-stakes decision-making, complicated organizational structures, and rapid technological improvements. These difficulties add a more emotional component to leadership, highlighting the necessity of competencies that allow leaders to comprehend and control emotional dynamics in both themselves and their teams in addition to managing operational tasks.

A key component of good leadership is emotional intelligence (EI), which is the capacity to recognize, comprehend, control, and utilize emotions. In addition to being skilled at emotional awareness and self-control, leaders with high EI also exhibit a strong aptitude for empathy, active listening, and genuine communication. These attributes strengthen bonds, increase trust,

and create cooperative team environments—all of which are critical in the cutthroat and unstable corporate environment of today.

Catharsis is still a frequently disregarded yet essential component of emotional intelligence as a whole. Catharsis, which has its roots in Aristotelian philosophy, is the deliberate release of powerful or pent-up emotions through healthy channels. Catharsis can appear in leadership settings through techniques including creative endeavours, coaching sessions, open communication, and introspective writing. By using these techniques, leaders may deal with internal emotional upheaval and avoid stress and emotional exhaustion.

Despite its possible advantages, catharsis has not gotten much attention in training programs and literature on leadership development. Emotional processing and release are often subordinated to behavioral and cognitive methods in current models. But since leaders frequently deal with emotionally difficult situations—from handling interpersonal disputes to leading teams through uncertain times—suppressing emotions can have negative effects including exhaustion, poor decision-making, and low team morale.

Leaders can improve their psychological resilience, self-awareness, and empathy by using emotionally intelligent cathartic techniques. These individual benefits result in more general organizational outcomes including increased employee engagement, more flexible, human-centered leadership styles, and healthier workplace cultures. This study aims to investigate this significant but little-studied intersection: how emotionally intelligent leaders use catharsis as a tool for effective leadership and emotional control.

This study attempts to shed light on the advantages, workings, and results of catharsis in leadership by both empirical research and theoretical analysis. It seeks to promote the inclusion of emotional wellbeing in organizational leadership development frameworks in addition to enhancing the conversation around emotional intelligence. By doing this, the study advances a more comprehensive and balanced leadership paradigm that takes into account the emotional and cognitive demands of modern-day leadership.

2. RESEARCH OBJECTIVES

1. To investigate the ways in which catharsis helps leaders become more emotionally intelligent.
2. To look into the relationship between effective leadership and emotional intelligence.
3. To determine the cathartic techniques that effective leaders frequently employ.
4. To provide doable methods for incorporating catharsis into courses on leadership development.
5. To examine how emotional expression affects stress management, team involvement, and workplace morale.

3. HYPOTHESES

H1: Leaders who consistently partake in catharsis exhibit enhanced emotional efficacy and intelligence.
H0: Effective leadership and catharsis do not appear to be related.

4. REVIEW OF LITERATURE

Emotional intelligence (EI) has become a key component of successful leadership. According to Daniel Goleman (1998), when assessing leadership effectiveness, emotional intelligence (EI) is more important than cognitive intelligence. Superior self-awareness, self-regulation, empathy, social skills, and intrinsic drive are all displayed by leaders with high EI. These traits are critical for leading teams and achieving organizational success.

Aristotle was the first to recognize catharsis as a necessary emotional release that results in psychological purification, and the idea has philosophical roots that date back thousands of years. Catharsis can occur in modern leadership settings through journaling, candid discussions, mentorship, or artistic expression. According to Boyatzis and McKee (2005), emotionally intelligent leaders use these self-reflection strategies to stay rooted, reaffirm their mission, and maintain a connection to their basic beliefs.

Mayer, Salovey, and Caruso (2004) go on to say that people with high EI are more adept at handling their emotions, which lessens their vulnerability to stress and burnout. As a purposeful emotional release, catharsis improves emotional regulation and helps leaders stay calm and focused, particularly in high-pressure situations.

According to a multi-level model put forth by Ashkanasy and Humphrey (2011), corporate culture is greatly influenced by the emotional manifestations of leaders. According to their research, emotional outpouring aided by catharsis improves team cohesion, psychological safety, and employee well-being.

Adding to this, Gardner, Fischer, and Hunt (2009) stress how crucial emotional honesty is to effective leadership. They argue that genuine emotional expression by leaders is seen as more trustworthy, and that catharsis, when handled well, promotes authentic leadership and builds interpersonal trust.

The relationship between emotional intelligence (EI) and job performance is examined by Cote and Miners (2006), with a focus on emotionally taxing positions. They discovered that leaders who successfully control their emotions—often by cathartic means—are better able to handle interpersonal disputes and handle emotionally taxing circumstances.

According to George (2000), emotionally intelligent leaders use positive emotional expression to boost team morale and productivity, highlighting the influence of EI on workplace climate. When included into leadership conduct, catharsis helps create a productive and emotionally secure work environment.

Furthermore, Petrides and Furnham (2001) distinguish between trait and ability EI, arguing that self-reflective techniques such as catharsis can raise trait EI by gradually enhancing a person's emotional intelligence and interpersonal sensitivity.

An EI scale designed especially for leadership situations was created by Wong and Law (2002), who hypothesized that emotional expression and control have a big influence on managerial success. Their results provide credence to the inclusion of catharsis and other emotional development techniques in leadership development programs and performance reviews.

When taken as a whole, this research provides a thorough framework for comprehending how emotional intelligence, catharsis, and leadership effectiveness interact. Together, they lend credence to the notion that emotional equilibrium, genuineness, and resilience in leadership roles can be strengthened by catharsis when directed by high EI.

5. THEORETICAL FOUNDATION AND EMOTIONAL INTELLIGENCE FRAMEWORK

Since its methodical introduction by Mayer and Salovey (1990) and subsequent popularization by Daniel Goleman (1995), emotional intelligence has emerged as a crucial lens for evaluating leadership qualities. The five main elements of the Goleman model of emotional intelligence are motivation, self-regulation, self-awareness, empathy, and social skills. Despite not being specifically identified as a fundamental element of emotional intelligence, catharsis has a close relationship with these aspects, especially self-awareness and emotional control.

The core Emotional Intelligence (EI) domain of self-awareness is identifying and comprehending one's own moods, feelings, and motivations. This is made possible by catharsis, which offers a contemplative environment in which leaders can face their inner turmoil without repressing it. Leaders can better understand themselves by identifying emotional triggers and patterns through writing or verbal release.

Catharsis serves as a safety valve for self-regulation, keeping emotional overload from escalating into reactive action. Catharsis permits the timely and healthy release of emotions as opposed to their suppression, which can ultimately show up as conflict, emotional detachment, or fatigue. This strengthens the leader's ability to respond calmly and deliberately as opposed to impulsively.

Moreover, cathartic processes can also enhance empathy, which is a critical component of emotionally intelligent leadership. Leaders are better equipped to tune into the emotions of people as they develop awareness of their own emotional journeys and vulnerabilities. Interpersonal trust and team cohesion are enhanced by this emotional mirroring.

5.1.a Catharsis as a Mechanism for Leadership Renewal

Being a leader is emotionally draining by definition. There is a great deal of psychological strain from making decisions all the time, dealing with emergencies, managing staff, and satisfying stakeholder expectations. Catharsis gives leaders a method to regain emotional equilibrium and regain focus in the midst of chaos.

Consider a healthcare administrator running a hospital in the midst of a pandemic. Despite daily losses, operational overload, and public scrutiny, the leader must maintain composure. One might not be adequately prepared for this emotional load by traditional leadership training. However, the leader can deal with anxiety, melancholy, and moral anguish through regulated catharsis, like blogging in the evening or debriefing with peers. Their emotional fortitude is strengthened by this rejuvenation, which enables them to lead with more compassion and clarity.

In a similar vein, emotionally savvy leaders who participate in catharsis exhibit improved crisis communication abilities after business mergers or layoffs. They are able to identify their own

emotional states, communicate tough news with empathy rather than coldness, and ease tension through controlled expression.

5.1.b The Neuropsychological Foundation of Leadership Catharsis.

Catharsis's presence in leadership development gains legitimacy when its biological and psychological foundations are understood. It has been demonstrated that suppressing emotions causes the sympathetic nervous system to become active, raising cortisol levels and maintaining the body's protracted stress response. In addition to compromising immunological function, this has a detrimental impact on cognitive function, particularly on the ability to make decisions and solve problems creatively.

The parasympathetic nerve system, the body's innate "rest and digest" system, is activated by expressive catharsis, on the other hand. The brain's fear center, the amygdala, can be deactivated and the prefrontal cortex, which houses executive decision-making, can become more active through practices like expressive writing, crying, meaningful conversation, and artistic expression. This hormonal change benefits leaders by increasing cognitive flexibility, lowering anxiety, and improving focus.

Additionally, catharsis improves serotonin balance and encourages dopamine release, both of which are linked to mood management. Thus, leaders who express their emotions in a healthy way are less likely to suffer from burnout, anxiety disorders, and depression—diseases that are becoming more common among public administrators and business executives.

5.1.c Cultural Aspects of Catharsis and Global Leadership.

Different cultures have different ways of expressing catharsis in leadership. Public emotional outpouring may be restricted in collectivist civilizations like India or Japan in favor of emotional control and peace. In these situations, catharsis may manifest in more private ways, such meditation, introspection, or the use of metaphor or storytelling to subtly express emotions.

Conversely, open expression is frequently valued in individualistic societies such as those in the US or Australia. Leaders may be more likely to convey their emotions through expressive arts, therapy, or sharing personal tales. Therefore, when implementing catharsis, leadership development programs need to take cultural quirks into account.

However, everyone has an underlying emotional desire for regulation and release. Although catharsis can take several forms, its psychological effects are always the same. Catharsis can be used globally with contextual sensitivity thanks to this cultural awareness.

5.1.d The Significance of Emotional Openness in Ethical Leadership.

Emotional openness, moral boldness, and sound decision-making are all components of ethical leadership. When used properly, catharsis strengthens these traits. A culture of openness and inclusivity is fostered by leaders who show vulnerability and accept emotional complexity.

However, in leadership, cathartic release must be guided by ethical boundaries. Leaders must avoid disclosing too much information or burdening followers with their emotional problems. In settings where psychological safety is guaranteed, like coaching sessions, executive retreats, or peer groups, catharsis should take place.

Ethically sound catharsis also avoids emotional contagion, which is when a leader's unpleasant feelings spread throughout the team, lowering morale and performance. Emotional intelligence makes sure that catharsis strengthens ethical leadership instead of weakening it.

5.1.e Organizational Development and Catharsis

Integrating catharsis into leadership models can have a big impact on an organization. Employee turnover is lower, leadership pipelines are stronger, and change management is more flexible in organizations that encourage emotional processing.

For instance, leadership programs at multinational corporations like Google and SAP now include emotional intelligence training. Some firms now provide "story circles" or "emotional check-ins" at the start of team meetings, where employees and executives discuss emotionally charged experiences in a polite, controlled setting. The organization as a whole gains emotional literacy from these micro-practices.

Workplaces that normalize emotional expression—when guided by emotional intelligence—create psychologically safe environments. This psychological safety is a predictor of team innovation, engagement, and agility. In contrast, emotionally repressed work cultures often suffer from burnout, toxic competition, and disengagement.

Case Illustrations: Emotionally Intelligent Catharsis in Action

Example 1: Leadership in Education

A Mumbai school administrator named Dr. Mahima Sharma oversees a staff of more than 100 teachers. Teachers were overburdened, nervous, and unsure of the results for their students during the pandemic. A weekly virtual "circle of care" was started by Dr. Sharma so that educators may exchange frustrations, difficulties, and minor triumphs. This area turned into a ritual for catharsis. The outcome? Absenteeism decreased, and teachers said they felt heard and emotionally supported. The school was able to manage extended stress while retaining excellent academic performance thanks to her emotionally aware leadership.

Example 2: Business Sector

Amidst a team reorganization, Subba Iyer, the product head at a large IT business, was under tremendous pressure to reach quarterly targets. Rather than keeping his anxiety to himself, he called a team conference, openly acknowledged the pressure, and solicited suggestions for common coping strategies. Collective catharsis resulted from the emotional honesty. Members of the team started informal peer support, suggested flexible schedules, and opened up. Over the following two months, productivity not only leveled out but also rose

6. RESEARCH METHODOLOGY

100 people in managerial and leadership positions across a range of businesses were given a structured questionnaire as part of this study's quantitative research methodology. Three components made up the questionnaire, which measured:

1. Levels of emotional intelligence (as measured by standardized EI measures)
2. The kind and frequency of cathartic activities.
3. Self-reported efficacy as a leader

To find trends and connections between variables, the gathered data was examined using comparative and correlational analysis.

7. DATA ANALYSIS

Section B: Emotional Intelligence Awareness

Key Observations

1. High Familiarity with EI:

The majority of respondents (about 70%, represented by the 80–100 and 60–79 score ranges) probably said they were familiar with the idea of emotional intelligence, suggesting that effective leaders are generally aware of it.

2. The Value of Emotional Intelligence:

The majority of respondents with high EI scores would have rated it as "extremely important" or "important" in leadership, supporting research showing that EI is essential for managing, inspiring, and influencing others.

3. Emotional Intelligence as Learnable:

Daniel Goleman's concept of emotional competencies supports the belief that EI can be increased or grown over time, according to the responses of highly effective leaders. Implications:

- There are strong awareness of the role EI plays in leadership success.
- Organizations should build on this awareness by providing formal EI training programs, especially for emerging leaders.

Section C: Use of Emotional Intelligence in Leadership

Key Observations:

1. Self-Awareness in Leadership: Respondents who scored between 80 and 100 and between 60 and 79 probably used self-awareness in leadership frequently, indicating that they intentionally watch over and control their own emotions when making decisions.

2. Handling Conflict:

During disagreements, high EI leaders probably prefer to remain composed and have candid conversations. This emotional regulation reduces conflict at work and improves team collaboration.

Use of Empathy:

In order to provide more individualized motivation, improved delegation, and stronger relationships, high scorers in the graph are expected to continuously apply empathy to comprehend team members' viewpoints.

1. The effect of EI on team morale

Higher scorers would strongly agree that EI has a positive impact on team morale and motivation, which is consistent with the data's leadership effectiveness scores.

Implications:

• Team trust, cohesiveness, and productivity are directly impacted by EI-driven behaviors including empathy, self-regulation, and self-awareness.

• These interpersonal advantages are probably being lost by leaders with low EI (those in the 40–59 and under 40 ranges), which may account for their decreased effectiveness as leaders.

Section D: Catharsis Practices in Leadership

Key Observations:

1. Catharsis Awareness and Participation: Respondents with high EI and leadership scores are more likely to be aware of catharsis and actively share in cathartic activities such journaling, coaching discussions, mindfulness, or exercise.

2. Expression of Emotions:

Regular emotional expression is likely to be reported by leaders with high EI, who see it as a positive leadership trait rather than a weakness. This strengthens psychological fortitude.

3. Catharsis as a Leadership Enabler: Based on responses, it appears that catharsis enhances interpersonal communication, stress reduction, and mental clarity—all of which are critical leadership abilities. The graph's positive connection lends credence to this.

4. Vulnerability and Team Trust: Leaders who scored highly probably concurred that team trust, psychological safety, and openness are all enhanced by exhibiting appropriate vulnerability. This is a crucial aspect of emotionally intelligent leadership.

Respondents with low EI:

People with lower scores could not use catharsis very often or think it's not required. Emotional snags, unresolved disputes, and a decline in leadership efficacy might result from this.

Implications:

- Catharsis is a valuable but underutilized emotional regulation tool.

- Incorporating structured catharsis methods into leadership coaching and wellness programs can promote long-term emotional well-being and leadership stability

TABLE : 7.1 Synthesis with Graphical Data

Score Range	Implications from the Questionnaire	Inferred Leadership Behavior
80–100	High EI use, regular catharsis, strong empathy	Transformational leadership style, high team trust
60–79	Moderate to high EI, uses some cathartic tools	Effective leadership with room for deeper emotional reflection
40–59	Limited EI awareness/application	Struggles with stress, conflict, or team engagement
Below 40	Rarely engages in EI or catharsis	Risk of burnout, low morale, weak emotional connections

Overall Insight

Effective leadership is closely correlated with both catharsis and high emotional intelligence. High-performing, resilient, and inclusive teams are fostered by leaders who are at ease with vulnerability, understand and control emotions, and engage in constructive emotional expression.

Table 7.2: Emotional Intelligence and Leadership Effectiveness Scores

Emotional Intelligence Score	Leadership Effectiveness Score	Number of Respondents
80-100	80-100	30
60-79	60-79	40
40-59	40-59	20
Below 40	Below 40	10

Interpretation:

1. According to 30 respondents, leaders with high emotional intelligence scores (80–100) are the most successful.
   2. Most responders (40) report moderate leadership effectiveness and are in the 60–79 EI range.
   3. Lower effectiveness is suggested by fewer respondents (20) in the 40–59 EI range.
   4. The smallest percentage of responders (10), who have little influence as leaders, have an EI score below 40.

8. FINDINGS

The study provided important new information about the connection between leadership effectiveness, catharsis, and emotional intelligence. The results demonstrate the transforming power of catharsis as a supportive mechanism for emotional clarity, team cohesion, and general

well-being, in addition to reaffirming the importance of emotional intelligence (EI) in modern leadership paradigms.

1. A startling 90% of successful leaders said they have undergone catharsis via self-reflection, journaling, open communication, therapy, or creative endeavors like writing, painting, or music. This suggests that catharsis is a deliberate emotional management technique used by effective leaders rather than an accidental one. In order to manage internal conflicts, release strong emotions, and preserve their mental and emotional balance, these leaders either intentionally or unintentionally participate in cathartic activities. They are able to lead with clarity and purpose while staying in tune with the emotional climates of their teams because to this emotional release.

2. Leaders with high emotional intelligence scores consistently shown stronger emotional resilience and adaptability in comparison to their peers. They were better at handling crises, controlling uncertainty, and maintaining composure under pressure. They were able to make thoughtful decisions free from emotional upheavals because of their enhanced empathy, emotional regulation, and self-awareness. Their ability to coach others, embrace change, and foster creativity—qualities crucial for effective leadership in hectic business environments—was also facilitated by their flexibility.

3. Regular catharsis participants showed improved team dynamics and problem-solving skills, which was another important conclusion. They were better able to handle interpersonal tensions and approach problems with empathy rather than reactivity thanks to their capacity to productively regulate their emotions. Teams under the direction of such emotionally sensitive people reported increased morale, cooperation, and trust. Furthermore, cathartic leaders frequently promoted candid communication, establishing psychologically secure environments where team members could express themselves without worrying about criticism. The accomplishment of group objectives and innovative problem-solving were greatly aided by this exercise.

4. In contrast, the study discovered that leaders who did not have access to cathartic outlets were much more susceptible to burnout, stress, and emotional tiredness. These people were prone to emotional repression due to a lack of coping methods, which frequently resulted in irritation, a decline in motivation, and strained professional relationships. Chronic burnout is intimately linked to feelings of loneliness, discontent, and diminished personal achievement, all of which were expressed by many of these leaders. These results highlight how crucial it is to incorporate emotional intelligence and catharsis techniques into leadership development programs in order to avoid long-term psychological stress.

Together, these findings illustrate that **catharsis and emotional intelligence are deeply intertwined components of effective leadership**. While EI provides the framework for emotional awareness and regulation, catharsis serves as a practical and therapeutic tool that sustains this emotional competence. Organizations aiming to nurture resilient, adaptive, and impactful leaders must consider cultivating both attributes within their leadership pipelines.

9. DISCUSSION

The results of this study support the established link between effective leadership and high emotional intelligence (EI). In addition to being more adept at controlling their own emotions, leaders with high EI levels are also better at recognizing and meeting the emotional needs of others. In today's intricate organizational environments, where leadership duties and emotional difficulties are linked, this competency is essential.

One of the most important conclusions drawn from this study is that successful leaders regularly employ cathartic techniques. These leaders make emotional expression a priority in their daily leadership routine, whether it be through journaling, working with professional coaches, or encouraging candid conversations with peers and subordinates. These cathartic pursuits are effective means of reducing stress, controlling emotions, and reflecting on oneself—all of which are fundamental components of emotional intelligence. These techniques help leaders behave more thoughtfully and forcefully by promoting emotional clarity, especially in situations that are emotionally charged or have high risks.

Additionally, catharsis serves as a psychological buffer, protecting leaders from burnout and emotional stress. Leaders who embrace catharsis are better equipped to handle interpersonal tensions, resolve issues with empathy, and sustain motivation within their teams than those who conceal their emotions, which can result in irritation, exhaustion, or even unethical behavior. These actions have a cascading impact that makes the organizational culture more emotionally intelligent, resilient, and caring.

Crucially, the study shows that catharsis is not just a self-reflection activity. A psychologically secure atmosphere is created when leaders freely express their emotional experiences and vulnerabilities in the right ways. Emotionally stable teams are more likely to cooperate more successfully, communicate honestly, and take innovative chances. This emotional openness improves team cohesion, fosters genuine connections, and fortifies mutual trust—all of which are critical for creativity and corporate performance.

Furthermore, transformational leadership may be sparked by incorporating catharsis into leadership practices. Through personal engagement, vision, and emotional connection, transformational leaders inspire and uplift their teams, in contrast to transactional leaders who are primarily focused on tasks, performance metrics, and short-term goals. According to this study, transformational traits—promoting creativity, empowering their people, and maintaining long-term organizational growth—are more likely to be displayed by emotionally savvy leaders who engage in catharsis.

In the end, the study emphasizes how important it is for leadership development programs to include structured catharsis techniques and emotional intelligence training in addition to technical training and cognitive skills. By doing this, organizations may cultivate leaders who are not just robust and effective but also emotionally sensitive and really human in their leadership style.

10. SUGGESTIONS

- It is recommended that emotional intelligence modules that explicitly incorporate catharsis methods be added to current leadership development frameworks. In order to relieve emotional strain and increase self-awareness, training should teach leaders how to recognize, comprehend, and constructively express their emotions using techniques like storytelling, expressive writing, art, or facilitated conversations.

- Promote introspective activities like coaching, writing, and mindfulness. By providing guided self-assessment tools, journaling prompts, mindfulness courses, and access to professional coaches, organizations can institutionalize reflective practices. By improving a leader's ability to control their emotions and providing frequent opportunities for emotional processing, these activities can help them avoid emotional exhaustion and make better decisions.

- Team cultures that enable emotional expression rather than stigmatize it must be fostered by leaders. Modelling vulnerability, carefully listening without passing judgment, and reacting to emotional revelations with compassion and encouragement are all ways to do this. The notion that expressing emotions is a strength rather than a weakness should be supported by policies.

- Create official leadership circles, peer support groups, and mental health check-ins as a component of organizational well-being programs. These forums can serve as channels for emotional processing and cathartic sharing, boosting resilience and lowering isolation among leaders.

- Performance evaluations and leadership competency models should incorporate emotional literacy, which includes the capacity to recognize, communicate, and comprehend emotions. The way in which leaders manage emotionally charged events and whether they foster emotionally inclusive environments for their teams should be assessed via assessment tools.

- Include creative interventions in team-building events or leadership retreats, such as storytelling workshops, visual arts, theater, or music-based activities. These methods provide alternative, engaging avenues for emotional release and foster collective empathy among team members.

- Create frameworks for evaluating leaders that include both technical skills and emotional intelligence, including cathartic competencies like self-reflection, emotional expressiveness, and empathy. Relational leadership and emotionally intelligent actions should be rewarded with promotions.

- Leaders of organizations should discuss their emotional struggles and coping mechanisms on a regular basis. Stories that de-stigmatize cathartic activity and serve as an example of healthy emotional expression can be included in town halls, newsletters, or internal communication channels.

- To help leaders process trauma and avoid long-term emotional suppression, special emotional support techniques like group processing sessions, crisis counselling, or story therapy should be made available during organizational crises (such as layoffs, transitions, or outside disturbances).

- Organizations ought to fund long-term studies on how leadership results are affected by catharsis-based emotional intelligence training. Frequent participant feedback can aid in practice improvement and guarantee that emotional intelligence interventions continue to be applicable and successful.

11. CONCLUSION AND FUTURE PATHWAYS

This study has emphasized catharsis as a core leadership skill that complements emotional intelligence rather than as an abstract or ancillary psychological term. Leaders are regularly faced with high-stakes decision-making, interpersonal difficulties, and emotional overload in today's volatile, unpredictable, complex, and ambiguous (VUCA) world. Traditional leadership methods that rely solely on authority, reason, or technical know-how frequently fail in these kinds of settings. The ability to lead with emotional depth, resilience, and authenticity—qualities that are firmly anchored in the fusion of emotional intelligence and cathartic release—emerges as crucial instead.

For leaders, catharsis—the healthy expression and release of pent-up emotional tension—is a useful emotional reset. It enables individuals to manage emotional triggers, handle internal stresses, and react calmly and clearly to difficulties. Catharsis becomes a useful leadership tool that promotes personal development and improves interpersonal dynamics in groups and organizations when it is used in the context of emotional intelligence.

Leaders that actively participate in emotionally intelligent activities, such as catharsis, exhibit more empathy, better self-awareness, and better control over their emotions. Together, these characteristics make for an emotionally sensitive leadership style that is better suited to promote mutual respect, psychological safety, and an open communication culture. These leaders prevent emotional exhaustion and decision fatigue, which are frequent in high-pressure leadership situations, by purposefully letting go of suppressed emotions.

Additionally, catharsis enables emotional congruence between a leader's inner experiences and their external manifestations, guaranteeing constancy, openness, and confidence in leadership conduct. A leader's trust is increased and a work culture based on moral conduct and emotional health is supported when this authenticity is demonstrated. Leaders who are emotionally compatible and show a sincere dedication to common goals and accomplishment are more likely to be followed by their staff.

There are numerous organizational advantages to incorporating cathartic techniques into leadership development initiatives. Emotionally controlled and self-aware leaders are better at motivating groups, handling conflict, and adjusting to organizational change. In addition to solving problems, these leaders create cultures that support cooperation, normalize emotional expression, and maintain morale even in the face of adversity.

It has also been demonstrated that a leadership style filled with catharsis can increase output and lower attrition. Team members feel more emboldened to voice issues, ask for feedback, and offer support to one another when leaders exhibit appropriate emotional expression. This strengthens team cohesion and lessens emotional suppression, which is frequently connected to disengagement and turnover, by establishing a cycle of emotional reciprocity and respect. In terms of the future, there is a great deal of room for more research on this topic. The ways in which cathartic leadership methods differ throughout various industries, cultures, and organizational hierarchies can be further explored through research. Studies conducted in a particular sector may shed light on certain emotional needs and adjust catharsis-based therapies appropriately. Longitudinal studies could also evaluate the long-term effects of cathartic and emotionally savvy leadership on employee happiness, mental health outcomes, and organizational performance.

Technologically speaking, there is also increasing potential to incorporate digital solutions that assist leaders in identifying emotional accumulation and promoting cathartic release, such as reflecting apps, emotional journaling platforms, or AI-based coaching tools. These developments have the potential to democratize access to techniques for emotional regulation, increasing the scalability and inclusivity of developing emotionally intelligent leaders.

This study essentially confirms that catharsis and emotionally savvy leadership promote a more human-centered, balanced style of leadership. It shifts the focus of leadership from denial and control to emotional bravery, self-awareness, and connection. In addition to producing outcomes, these leaders provide an example of emotional integrity and foster work environments that respect the range of human experience.

In the end, ethical, resilient, and compassionate leadership—leadership that is not only successful in achieving results but also transformative in its influence on people, purpose, and long-term organizational health—is made possible by leading with emotional intelligence and catharsis.

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APPENDICES: SAMPLE COPY OF THE QUESTIONNAIRE

Section A: Demographic Information

1. Name (Optional):
   _____
2. Age:
   ☐ Below 25
   ☐ 25–35
   ☐ 36–45
   ☐ 46–55
   ☐ Above 55
3. Gender:
   ☐ Male
   ☐ Female
   ☐ Other
   ☐ Prefer not to say
4. Highest Qualification:
   ☐ Graduate
   ☐ Postgraduate
   ☐ Doctorate
   ☐ Other: _____
5. Current Position/Designation:
   _____
6. Years of Leadership Experience:
   ☐ Less than 2 years
   ☐ 2–5 years
   ☐ 6–10 years
   ☐ More than 10 years
7. Industry/Sector:
   ☐ Corporate
   ☐ Education
   ☐ Healthcare
   ☐ Government
   ☐ NGO
   ☐ Other: _____

Section B: Emotional Intelligence Awareness

8. Are you familiar with the concept of Emotional Intelligence (EI)?
   ☐ Yes
   ☐ No
9. Rate your understanding of Emotional Intelligence:
   ☐ Very Good
   ☐ Good
   ☐ Average
   ☐ Poor
10. In your opinion, how important is EI in effective leadership?
    ☐ Extremely important
    ☐ Important
    ☐ Moderately important
    ☐ Not important
11. Do you believe EI can be developed or learned over time?
    ☐ Yes
    ☐ No
    ☐ Not sure

Section C: Use of Emotional Intelligence in Leadership

12. How often do you use self-awareness to guide your leadership actions?
    ☐ Always
    ☐ Often
    ☐ Sometimes
    ☐ Rarely
    ☐ Never
13. When faced with conflict, how do you generally respond?
    ☐ Stay calm and assess emotions
    ☐ Get overwhelmed easily
    ☐ Avoid confrontation
    ☐ Engage in open dialogue

14. How frequently do you practice empathy in decision-making?
    ☐ Always
    ☐ Often
    ☐ Sometimes
    ☐ Rarely
    ☐ Never

15. Do you believe your EI has contributed to team motivation and morale?
    ☐ Strongly agree
    ☐ Agree
    ☐ Neutral
    ☐ Disagree
    ☐ Strongly disagree

Section D: Catharsis Practices in Leadership

16. Are you familiar with the term "catharsis"?
    ☐ Yes
    ☐ No

17. Which of the following cathartic activities do you engage in? (Select all that apply)
    ☐ Journaling
    ☐ Talking to a mentor or coach
    ☐ Artistic expression (music, art, writing, etc.)
    ☐ Meditation or mindfulness
    ☐ Physical exercise
    ☐ None

18. How often do you express your emotions in a healthy and constructive way?
    ☐ Daily
    ☐ Weekly
    ☐ Occasionally
    ☐ Rarely
    ☐ Never

19. Do you believe emotional release (catharsis) helps you lead more effectively?
    ☐ Strongly agree
    ☐ Agree
    ☐ Neutral
    ☐ Disagree
    ☐ Strongly disagree

20. How does catharsis help you during emotionally intense leadership situations?
    (Short Answer)

21. Has expressing your vulnerability ever helped build trust within your team?
    ☐ Yes
    ☐ No
    ☐ Not sure
    If yes, briefly explain:

Section E: Integration of EI and Catharsis in Organizations

22. Does your organization promote emotional intelligence or related training programs?
    ☐ Yes
    ☐ No
    ☐ Not sure

23. Do you think organizations should actively promote cathartic practices for leaders?
    ☐ Strongly agree
    ☐ Agree
    ☐ Neutral
    ☐ Disagree
    ☐ Strongly disagree

24. What challenges do you foresee in integrating catharsis and EI in leadership development?
    (Short Answer)

25. What recommendations would you offer to promote emotionally intelligent and cathartic leadership within organizations?
    (Short Answer)

Thank you for your valuable input!
Your responses will contribute meaningfully to the research on emotionally intelligent leadership.

A Bibliometric Analysis of Role of Women in Leading Communities towards Efficient Waste Management

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ABSTRACT

Waste management remains a pressing concern globally, particularly in urban India, where unsegregated waste and expanding landfills pose environmental and health hazards. This study explores the pivotal role women play in waste management, both at the household and community levels. Women have been primary custodians of domestic waste, a role rooted in traditional practices of the present day societal norms.

A focal point of the study is the significant contribution of women's collectives and grassroots leaders such as Dr. Almitra Patel and Ms. Jyoti Mhapsekar, who have spearheaded successful community waste initiatives like Stree Mukti Sanghatna and the SWaCH model in Pune. These examples underscore the potential of women's engagement in transforming waste management systems and creating socio-economic opportunities. However, though women have been an integral part of the waste management system, there are not many women entrepreneurs who have successful large industrial businesses in waste management sector.

*Using a **Systematic Literature Review (SLR)** guided by **PRISMA 2020**, the study analyses relevant papers sourced from the **Scopus** database. Bibliometric tools like **VOSviewer** and **Biblioshiny (R software)** were employed to visualize keyword trends and author influence, since these software have a strong visualisation capacity and provide ease of use for new researchers over large bibliometric data. The analysis reveals a strong correlation between keywords such as "women", "waste", and "management", and highlights the recurring themes of gendered responsibility, informal sector dominance, and post-COVID challenges in waste handling. This literature review emphasizes the need for change in outlook by women to create a stronger impact integrating themselves more meaningfully into organized waste management systems and to create more successful businesses in waste management sector.*

This study leaves many open a very serious question for further research : Why are women not successful in a waste management Industry?

Keywords: *Women, Waste Management, Landfill, segregation, entrepreneur*

INTRODUCTION

Waste management is a concern that has drawn global attention. Studies have shown the ill effects of landfills, Waste which is thrown on the roads creating a pile emitting bad odour and becoming a source of infection in a community (*Beyond an Age of Waste Turning Rubbish into a Resource*, 2024; Linzner & Lange, 2013). People living near landfills are exposed to detrimental emissions from the landfill gases air pollution groundwater contamination soil pollution and infections (Goldberg et al., 1999; Turner et al., 2020). Rules have been laid by the government of India in 2016 to segregate the waste at source to tackle the problem of mounting landfills every day

(National Green Tribunal, 2016). These rules were implemented by many municipalities and quite a few of them found success in managing their waste efficiently. It has been keenly observed that urban local bodies which found great success in moving their community towards a sustainable waste management solution took help of local women and associated groups created jobs for women including business opportunities in solid waste management (Sasha R, n.d.; Simon-Kumar, 2025; *Wasting Women—the Biopolitics of Waste and Women*, n.d.). The first lady to highlight the menace of waste management in India was Dr. Almitra Patel whose PIL led India to form the base Solid Waste Management rules in 2016. In Maharashtra, Stree Mukti Sanghatna was founded by Ms. Jyoti Mhapsekar who gathered all the women waste pickers and provided better living standards by bringing them into the mainstream of waste management by imparting training on picking up waste bringing it to the collection centre segregation the waste correctly and further recycling the waste. This Sanghatna has changed lives of more than 3000 women till date (Wastewor (l) d Social Entitlements for Waste Pickers Social Entitlements for Waste Pickers, n.d.). In this paper, an attempt to understand the role of women in the business of waste management.

Background

The key to a good waste management practise is segregation at source (Morrissey & Browne, 2004; Paul et al., 2020; Sabki et al., 2019). Source of waste in Municipal Solid waste is from the individual houses, residential complexes (Tsai et al., 2020). Handling of garbage is considered to be the responsibility of the lady of the house. Working women manage more household chores as compared to her partner (Mukhter & Chowdhary, 2024; Sweety et al., n.d.; UNEP, n.d.). When the lady of the house decides that she will compost her kitchen waste, she reduces the waste going to landfill from her house by 80%. She prevents contamination of the dry waste and helps in recycling the dry waste better.

This paper addresses the question whether the participation of women impacts the waste management of a city, which is addressed through a bibliometric analysis of relevant papers indexed in Scopus, which is one of the largest academic databases (Mengist et al., 2020).. Bibliometric tools such as VOS viewer and Biblioshiny will be utilized to visualize and identify trends in keywords and the most cited authors since these softwares make a better representation than other available softwares for a large database analysis (Aria & Cuccurullo, 2017; van Eck & Waltman, 2010). Previous studies have successfully applied bibliometric analysis to map the participation of women in various other fields of study such as management, entrepreneurship, psychology and marketing.

SYSTEMATIC LITERATURE REVIEW

A systematic literature review (SLR) was conducted to review and consolidate research on data on the primary objective of role of women in waste management.

Scopus was selected as the primary database for article review since it is considered as one of the largest citation bases. The choice of Scopus was made because :

1. Large Coverage: Scopus provides extensive coverage of high impact journals in the field of environment, waste management and issues related to women and entrepreneurship in different fields Scopus includes a large number of articles related to the topic being discussed and therefore it was highly suitable for the review.
2. Compatibility with Analytical tools : Biblioshiny (R Software) and VOS viewer, both support Scopus data base, making it easier to analyse and represent the data.
3. A single database like Scopus minimises inconsistencies if any along with human error associated with merging data from different databases, which often presents results in varying formats.

The study followed the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency and replicability of the research process (Aria & Cuccurullo, 2017; Donthu et al., 2021; Heitor, 2015; Mengist et al., 2020; van Eck & Waltman, 2010). PRISMA was adopted to systematically filter articles through a multi-step selection process. Articles from academic journals, reviews, Trade publications, Conference Materials, reports, Literature reviews and Primary Source documents were included in the search. The database search involved using a combination of keywords related to the role of women in waste management such as “Women, Waste management, Segregation, Household, Landfill, Responsibility, Waste”.

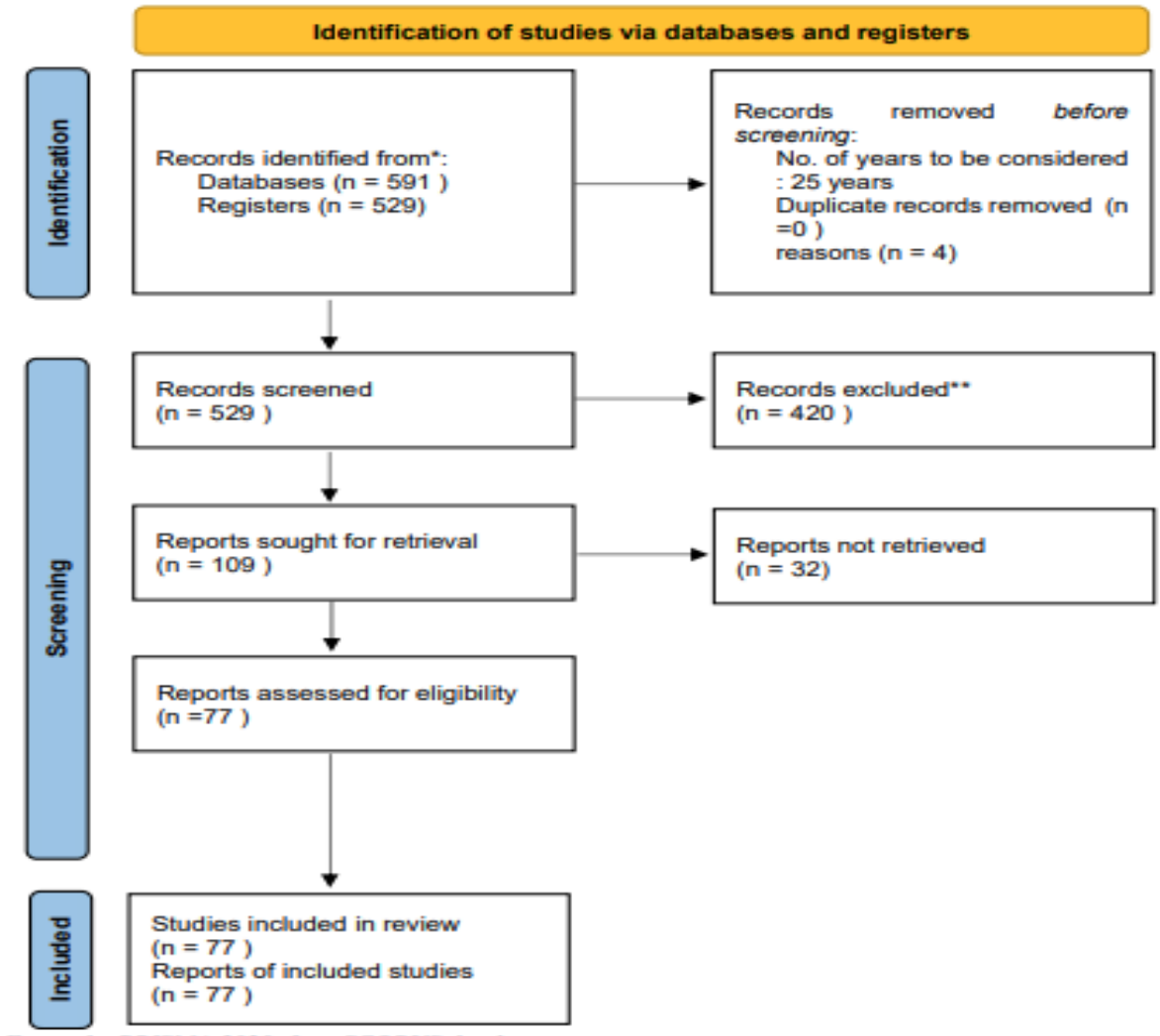

Figure 1 : PRISMA-2020 from SCOPUS database

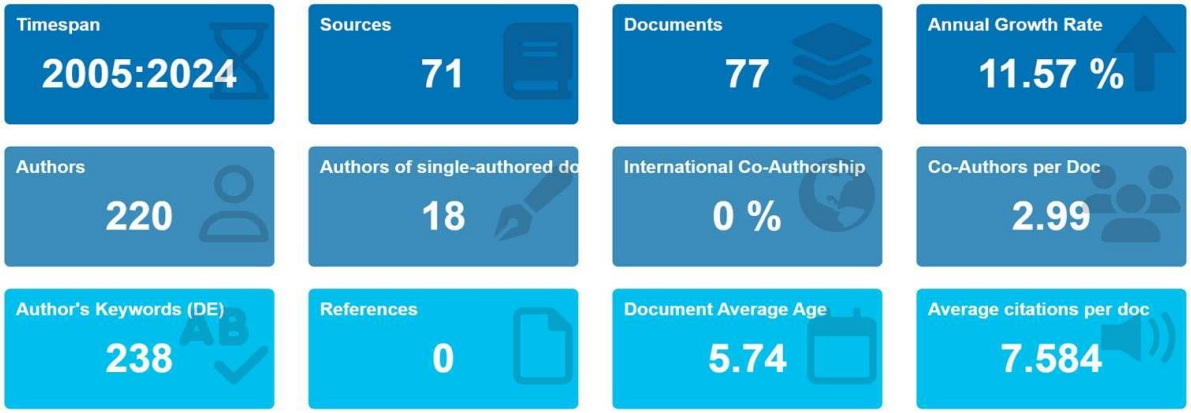

Figure 2 : Main Information

The time span considered is last twenty years since there were not many relevant publications before 2005. Two hundred and Twenty authors from seventy on different sources were scanned within seventy seven documents. An annual growth rate of 11.57% in oublications were found. Collaborative efforts of authors can be seen as the average citations per document are 7.58. There were 238 key words identified and a word cloud created from the key words immediately identifies a strong correlation between "waste management" and "female, women". International co-authorship is very limited in this segment of study.

Figure 3 Word Cloud

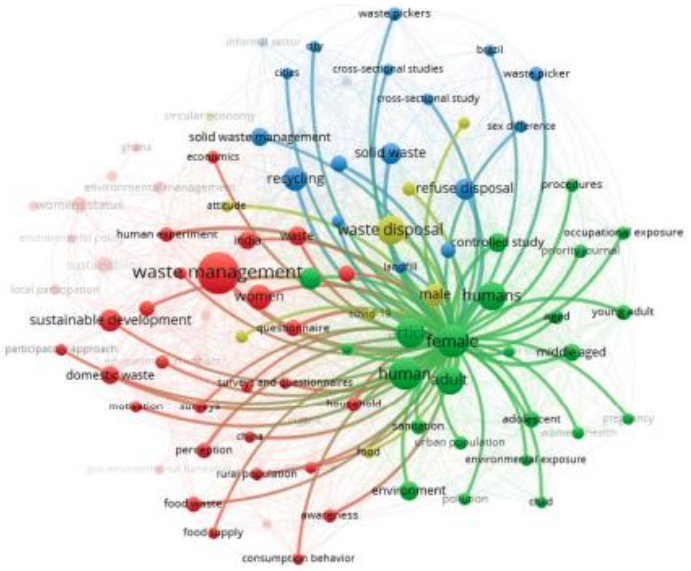

Figure 4 : Keyword word cloud from all papers and their co-relations.

The word cloud in Fig 4 : Keyword cloud from all papers and their co-relations, shows a very strong correlation between waste management, women/female, sustainable development, waste pickers, and environment. The following co-relation diagram,

Figure 5: Correlation between woman, waste and management also shows correlation between women, waste, management, experience and challenges.

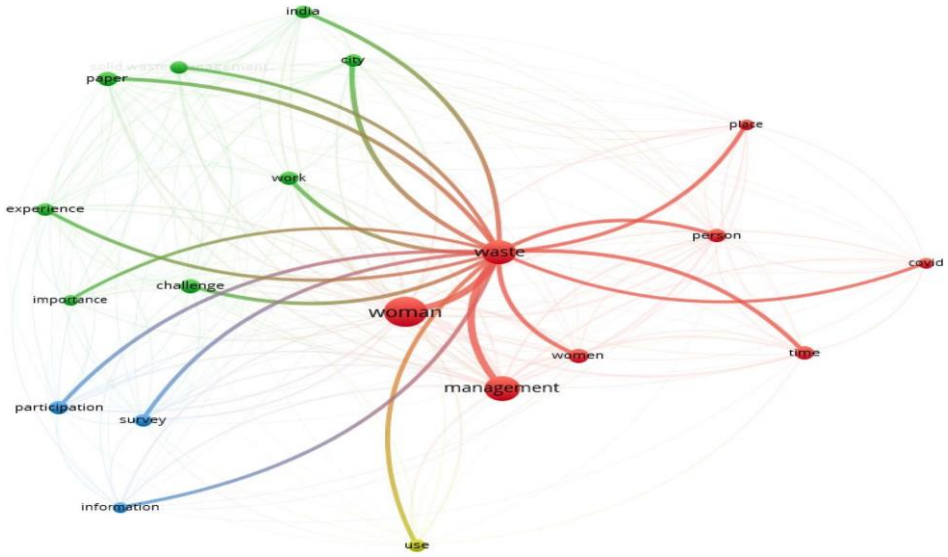

Figure 5 Correlation between woman, Waste and Management

Factorial Analysis

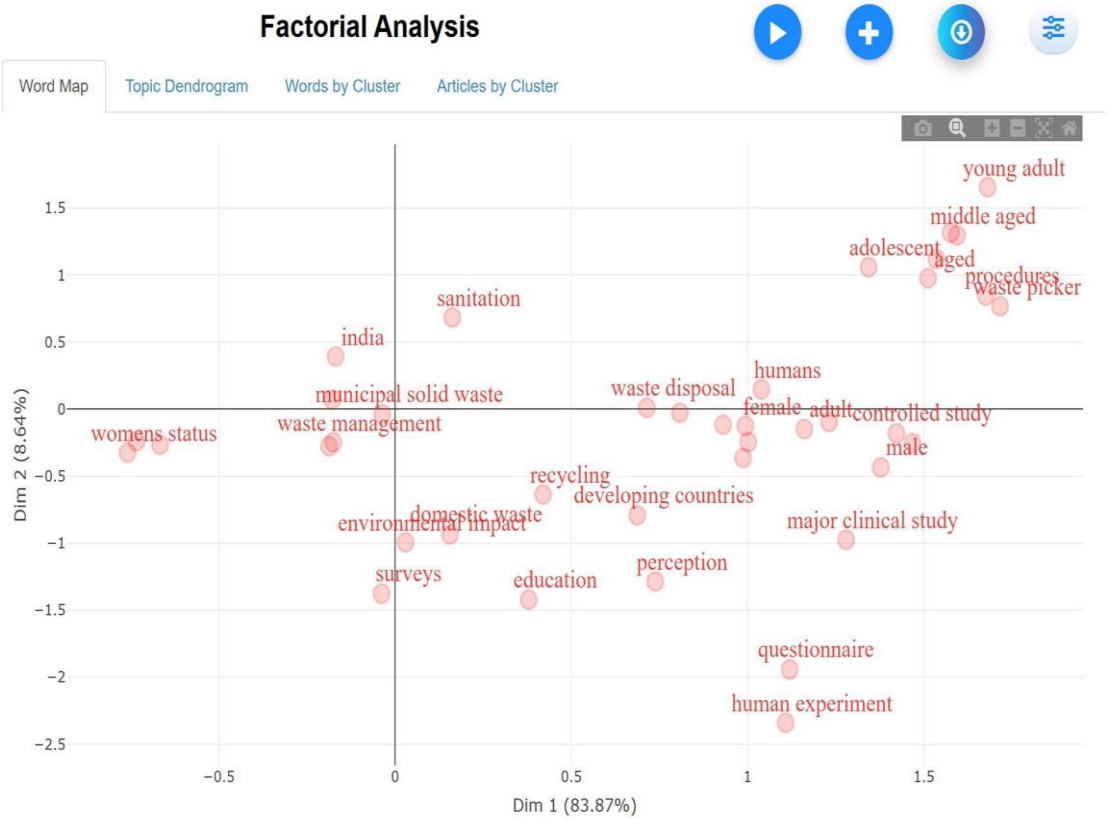

Figure 6 : Factorial Analysis for women and waste management

The factorial analysis plot maps key terms from the literature into a two-dimensional semantic space, explaining **83.87%** of the variance along Dimension 1 and **8.64%** along Dimension 2. This high cumulative variance suggests strong interpretability of the keyword structure. The left side of the graph (negative Dim 1) shows keywords like "women's status," "municipal solid waste," "environmental health," and "waste management", reflecting a community-centric and policy-focused cluster, especially from regions like India, where these issues intersect with gender and governance. These terms are more aligned with social infrastructure, service delivery, and empowerment in waste management.

In contrast, the right side (positive Dim 1) is dominated by clinical and demographic themes such as "female," "male," "adolescent," "young adult," "human experiment," and "controlled study." This indicates a separate, medically inclined body of literature examining occupational exposure, age, and health impacts in waste handling roles—especially in developing countries.

Positioned near the center are bridging terms like "waste disposal," "recycling," "education," "developing countries," and "perception," indicating their interdisciplinary nature and relevance across both policy-driven and clinical research domains.

Overall, this factorial structure shows two dominant axes:

1. A social-policy-development axis (left)
2. A clinical-demographic-health axis (right)

The chart underscores that research on women in waste management spans across **governance, sanitation practices, environmental health, and socio-demographic studies**, but these domains remain somewhat siloed, indicating opportunities for more integrated research. This study will serve as a gap analysis statement in an interdisciplinary study where role of women in the domain of waste **management** will be discussed.

Analysis of the metadata from Biblioshiny (Figure 6) shows an Excellent status for Abstract, Author, Document Type, Journal, Language, Publication year, Title and total Citation. This indicates that all the documents considered for the SLR have a well structured and complete Abstract written, which ensures rich textual data content for analysis, keyword extraction and topic modelling. The author names and affiliations are consistent and completely recorded, supporting robust author productivity, collaboration network and citation impact analyses. Document types (eg. Article, review, conference paper) are correctly and consistently tagged allowing reliable filtering, comparison and trend analysis across publication formats. Each document is properly linked to a recognized journal with complete metadata (eg. Name, ISSN number, publisher). This is critical for journal impact analysis and source clustering. This means that the dataset chosen is reliable and ready for advanced analysis such as co-citation, keyword co-occurance or thematic evolution. It will potentially yield accurate visualisations and statistical insights in tools chosen for SLR and we will be able to draw conclusions on trends, patterns and research impact with fewer metadata gaps.

Metadata	Description	Missing Counts	Missing %	Status
AB	Abstract	0	0.00	Excellent
AU	Author	0	0.00	Excellent
DT	Document Type	0	0.00	Excellent
SO	Journal	0	0.00	Excellent
LA	Language	0	0.00	Excellent
PY	Publication Year	0	0.00	Excellent
TI	Title	0	0.00	Excellent
TC	Total Citation	0	0.00	Excellent
C1	Affiliation	3	1.83	Good
CR	Cited References	3	1.83	Good
DI	DOI	10	6.10	Good
DE	Keywords	17	10.37	Acceptable
RP	Corresponding Author	28	17.07	Acceptable
ID	Keywords Plus	48	29.27	Poor
WC	Science Categories	164	100.00	Completely missing

Figure 7 : Meta data from Biblioshiny

"Good" affiliation indicates most of the records have all the data filled in correctly which enables us to make a reasonable analysis of institutional and geographic productivity. Some documents may lack full affiliation data eg. A missing university or department name or country code. "Good" Cited references means most of the documents include a well structured reference list and a citation based analyses such as most cited authors, sources and documents is possible though there may be some occasional gaps in bibliographic coupling or historiographic mapping. "Good" DOI indicates most of the documents have a valid DOI assigned and only a few documents considered for review may lack DOIs which limits full traceability or access. "Acceptable" Corresponding Author imply that a significant portion of the documents either lacks corresponding author information or has been inconsistently formatted which could lead to missing important collaboration patterns or author-specific insights. Acceptable Keywords indicates keyword standardization is weak and thematic clusters may be less accurate and word clouds, trend maps may show fragmented terms. However, we have not seen such fragmented terms in our word clouds and patterns depicted in Figure 4 and Figure 5, however, in Figure 8, two distinct keyword clusters are observed – waste management and females. The cluster around waste management pulls connections with keywords like municipal solid waste, solid waste, recycling, environment, sustainable development, domestic waste, food waste, sustainability, women's status, sustainability, and decision making whereas the cluster cloud with "female" pulls connection with disposal of waste (women are generally responsible for disposal of waste in a house), occupational exposure, sanitation, hygiene and food. This shows that women are responsible for source segregation. Since they also work as rag pickers and housekeepers, most of the women are exposed to the occupational health hazard. This is also indicative that women are not actively

involved in "Waste **Management**", however they are involved in "waste **disposal**". Waste management includes all words and treatment methods involved therein in the Waste management cluster.

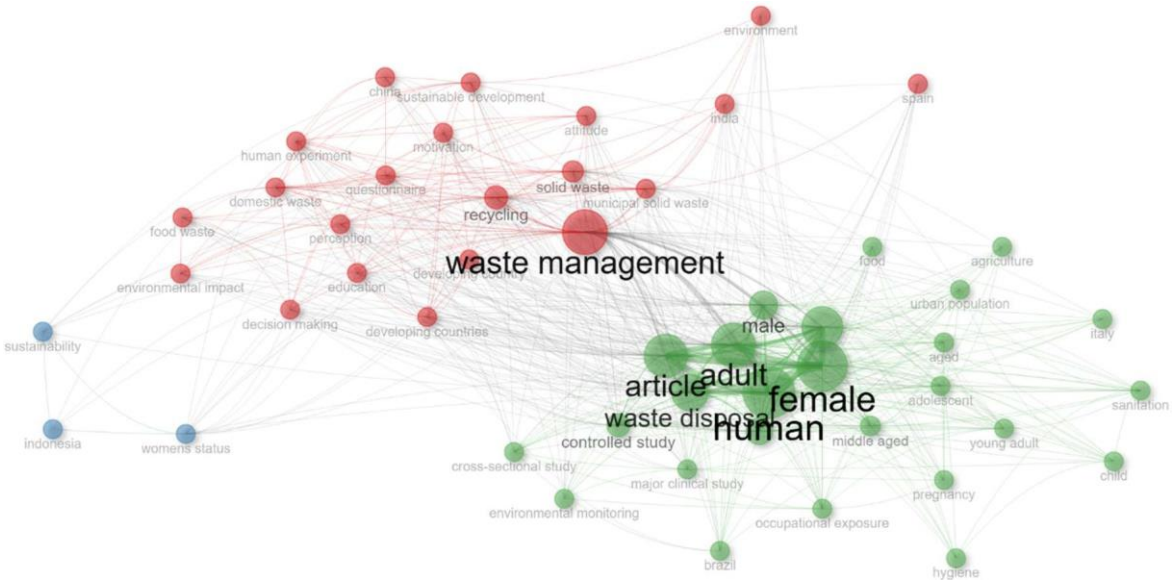

Figure 8 : Correlation between women and waste management word clouds.

Poor Keyword plus indicates that the papers cover a highly specific or emerging niche with little overlap in reference titles. If the references do not contain commonly used keywords in their titles, the derived Keywords Plus will be poor. If references are from sources not indexed by Web of Science (e.g., books, local journals), Keywords Plus cannot be generated effectively. The complete absence of the *Science* category in the bibliometric metadata indicates that research on the role of women in waste management is primarily framed through social, environmental, policy, and development lenses rather than core scientific disciplines such as chemistry, biology, or engineering. This indicates that most of the authors who are writing about Solid waste management do not use consistent terms eg. One may refer it to as SWM instead of Solid Waste Management. The issue of Solid waste management is a societal issue and it affects different realms of the society. Therefore, every author may have a different focus and a different keyword eg. One paper discusses role of women in solid waste management from economic point of view whereas another paper discusses what challenges women may have faced during COVID-19 in managing Solid Waste. A correlation mapping of keywords such as *challenges, economic status* and *Solid waste* and *COVID-19* is difficult though all of them are pertinent to Solid Waste Management.

Science Category completely missing suggests that the academic focus has largely been on sociological, economic, and gender-related dimensions of waste management—emphasizing community practices, grassroots participation, and gender equity—rather than scientific innovation, material science, or process engineering. It also highlights a potential research gap: the integration of women's participation within the scientific and technological aspects of waste processing, treatment innovation, and sustainability modelling remains underexplored. Encouraging interdisciplinary research that bridges gender studies and scientific domains could open new avenues for inclusive and effective waste management solutions.

DISCUSSION

United Nations Environment Program (UNEP) has also conducted studies on gender equality in waste management in different countries and found that women are always found at the lowest rung of the waste management. Whether it is their home or the profession of picking up waste from the streets, women have representation is more in informal roles and unorganised sector in waste management. As soon as organised roles and a safer environment comes to the foray in waste management, men take the mantle. (UNEP, n.d.)

A report on zero waste model of Ambikapur shows more than 400 women were engaged in changing the condition of Ambikapur from dismal sanitation to a zero waste model. Women were engaged in making bioenzymes at home and selling them through their cooperatives. (Zero Waste Model Ambikapur, Chattisgarh, n.d.) SWaCH initiative of Pune has also incorporated a similar model like Stree Mukti Sanghatna and improved the lives of women who are managing waste. (Estrada et al., 2023) Most of the studies that have been conducted have evaluated the role of women in waste management irrespective of their professional responsibilities. A lady can be a teacher but household chores still remain her responsibility including waste management at home. (Mukhter & Chowdhary, 2024). Around the world, women groups managing waste have been more successful is what is evolving giving them a sense of fulfilment and achievement. (Asteria & Herdiansyah, 2022)

It has been observed that when municipal corporations took help of women centric self- help groups for waste management or collaborated with organisations which had women leading the effort for upcycling or waste treatment or recycling of the products, were more successful in implementation of waste management initiatives and clean up of the city than cities which do not have the support of women Self-Help Groups. This can be visualised in Figure 7 in Trend Topics analysis from the database.

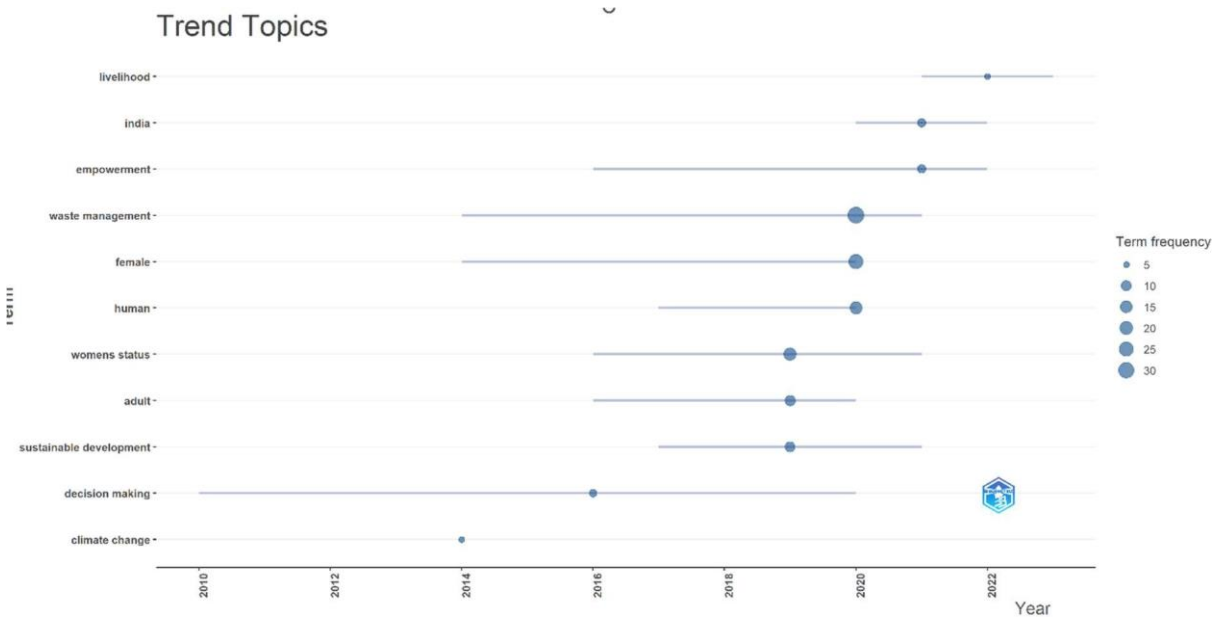

Figure 9 : Trend Topics

The trend analysis shows “Climate Change” was first introduced in 2014 with very few mentions. Between 2018 and 2020 discussion was trending towards adult behaviours, sustainable development, women status, female, empowerment, waste management. Most of

the waste management was focused on making women empowered by collecting the waste and processing the waste at a cottage industry level. This “empowerment” of women only created small Self Helf Groups (Cannon, 2020; Dr. Amrita N Shamanewad et al., 2023; Simon-Kumar, 2025; Tsai et al., 2020). However, no literature is found where a women collective created large business opportunity in “Waste management”. “Business” and “Women” both terms are missing from the word clouds generated and the visual representations generated. We find “women” associated with “disposal of waste” eg. Ragpickers, waste segregators and housekeepers.

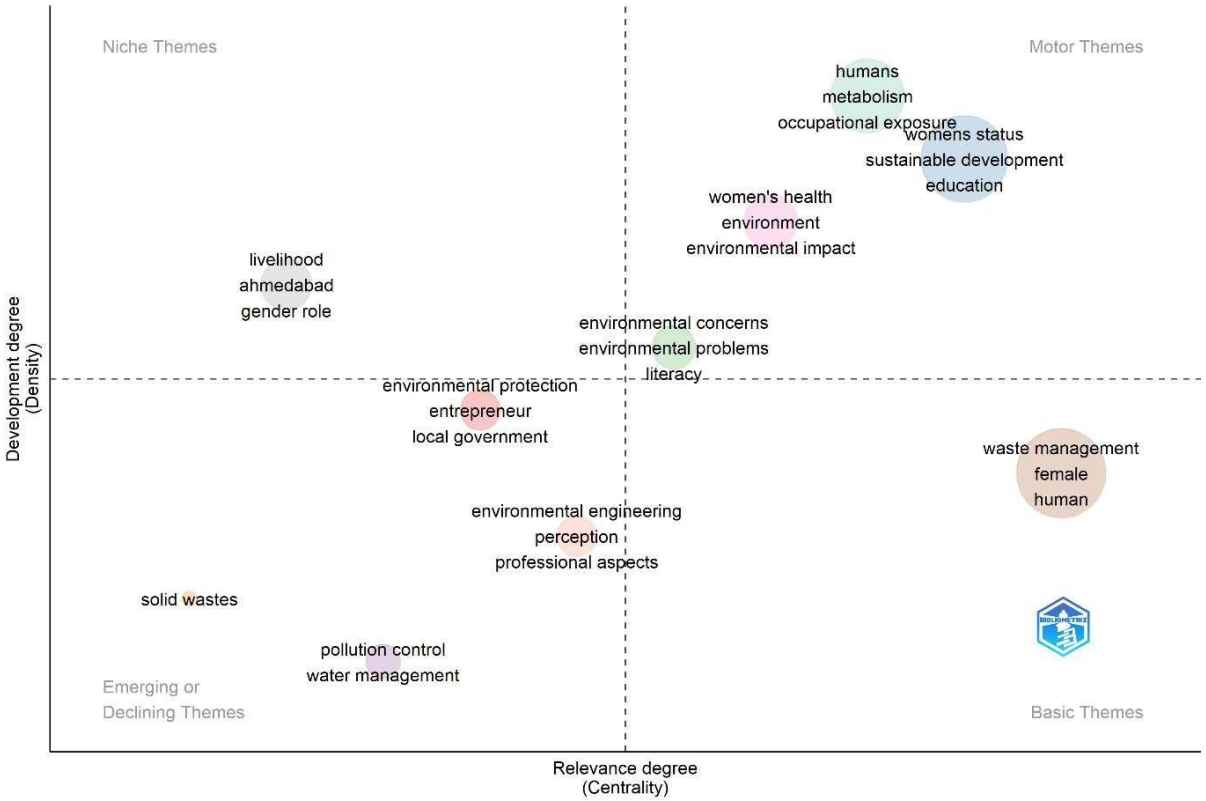

Figure 10 : Relevance of Keywords used by authors

The Relevance degree (Centrality) is the importance of the theme in overall study, on X axis. The Y axis shows the cohesiveness of the research within the said theme. The Bubble size is proportionate to the frequency of occurrence of a particular keyword. The Basic theme shows waste management, female and human having a high centrality but low development, implying that these are starting point discussions which are critical for the field but needs more depth and specialization. The motor themes show a High Centrality and high development i.e sustainable development, Education, women’s status, Educational concerns Environmental problems, Environmental impact, environment, women’s health, Occupational exposure are core well developed themes that are driving current research. These areas are strategic and influential and presents further opportunities for research, collaborations and publications.

The relevance of Keywords used by authors shows that pollution control or waste management, solid wastes are emerging themes as per the Literature review, suggestive of untapped potentialfor research in these fields. Livelihood and gender roles are niche themes with respect to solid waste management.

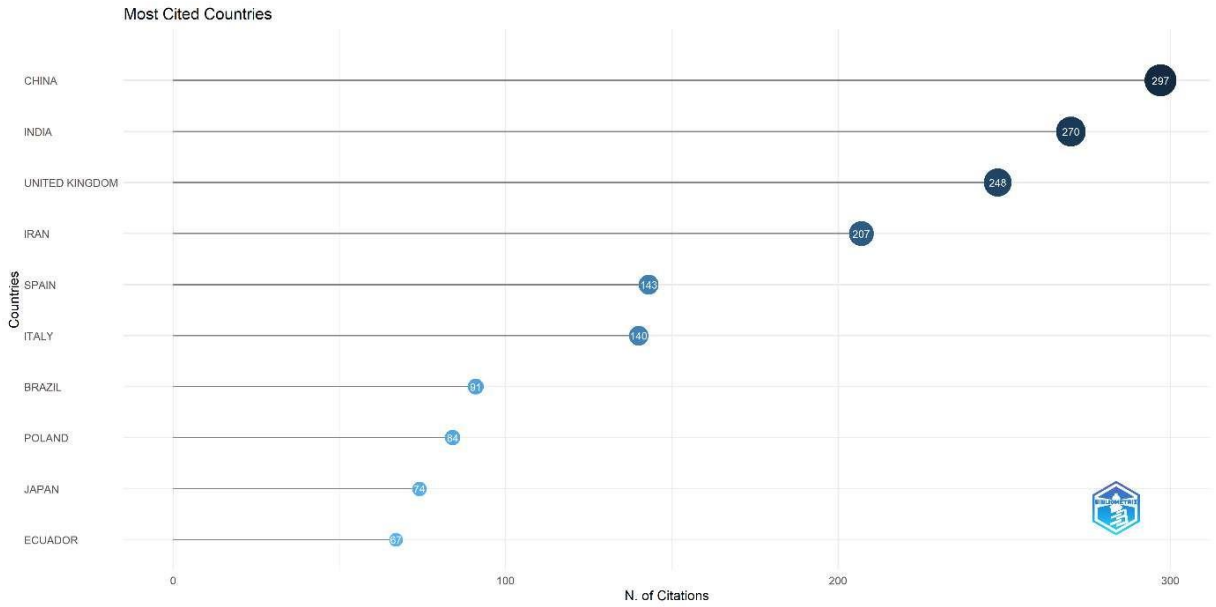

Figure 11 : Most Cited Countries

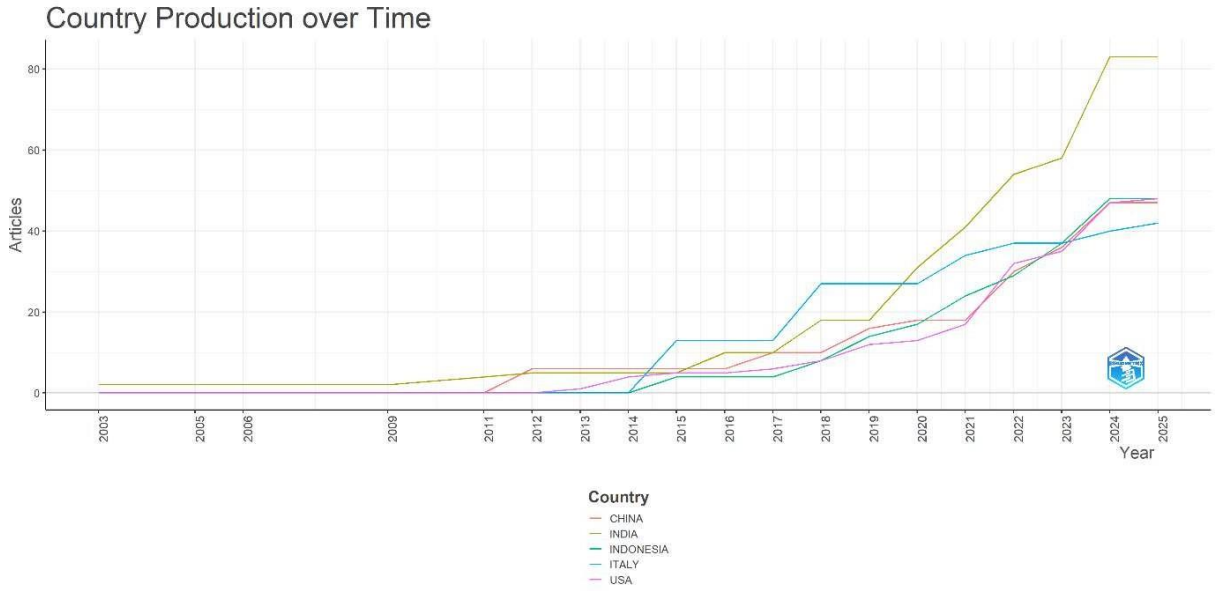

Figure 12 : Country Production over time

The Figure 15 shows the number of research papers produced over a period of time and how the waste issue got traction in the last 25 years. Heavy traction was seen in the last 15 years when landfills started overflowing because of open air dumping, which has been a common practise across continents.

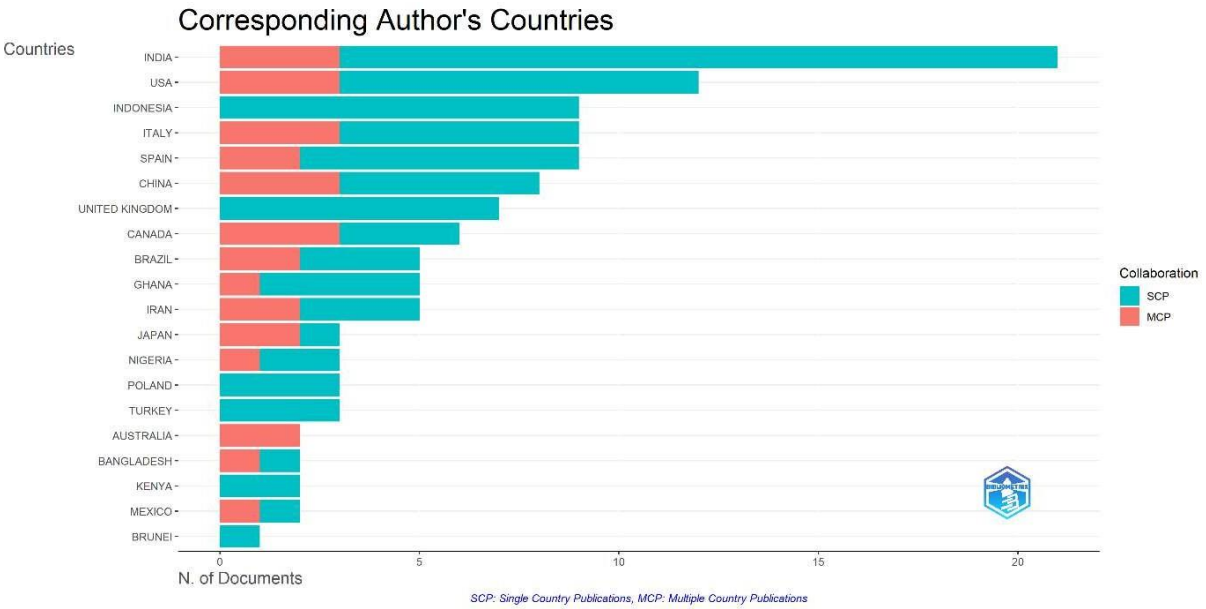

Figure 13 : Corresponding Author's countries

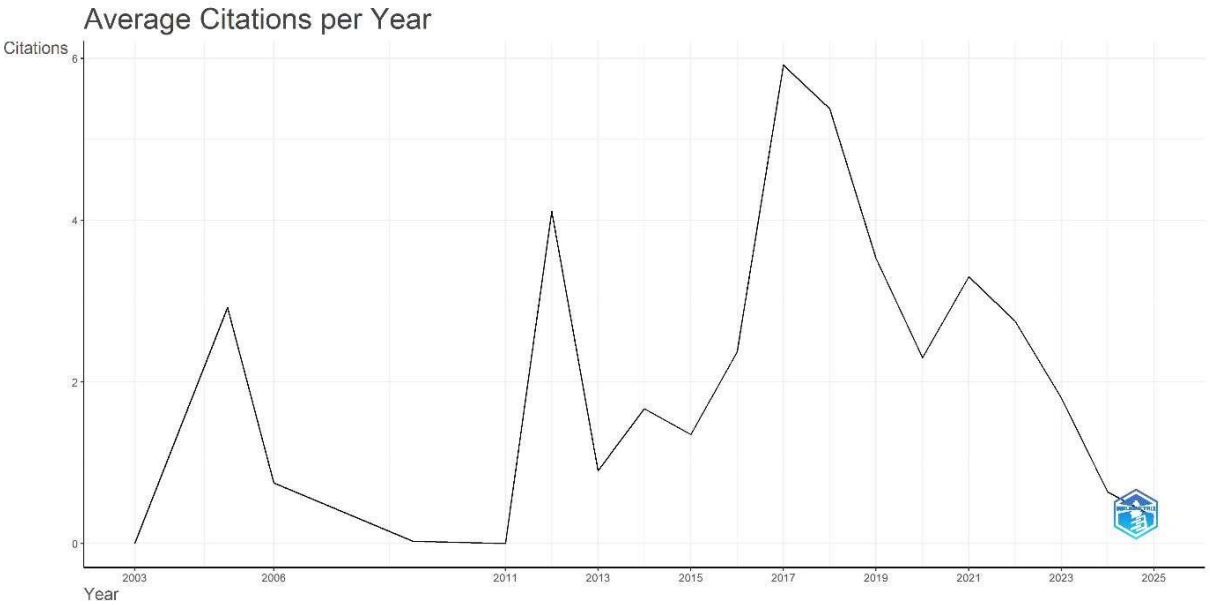

Figure 14 : Average Citations per year

Average citations per year shows the number of citations that increased during the COVID-19 period and constant work has been going on in the field of research in waste management and role of women for the last fifteen years. The scientific production of work has kept an upward trend.

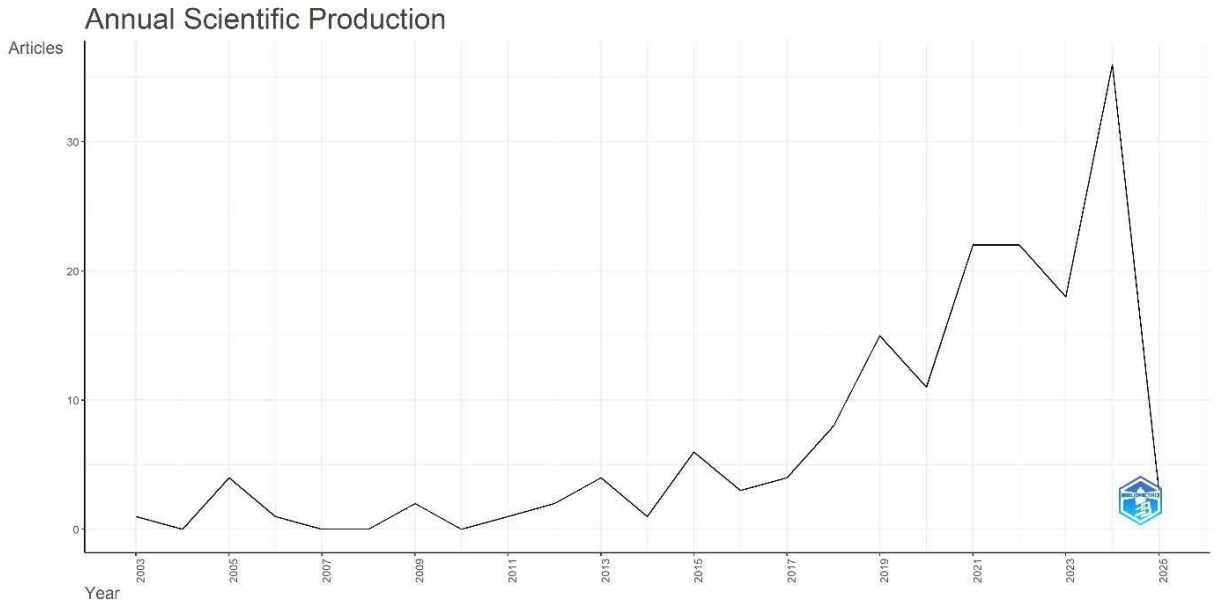

Figure 15 : Annual Scientific production

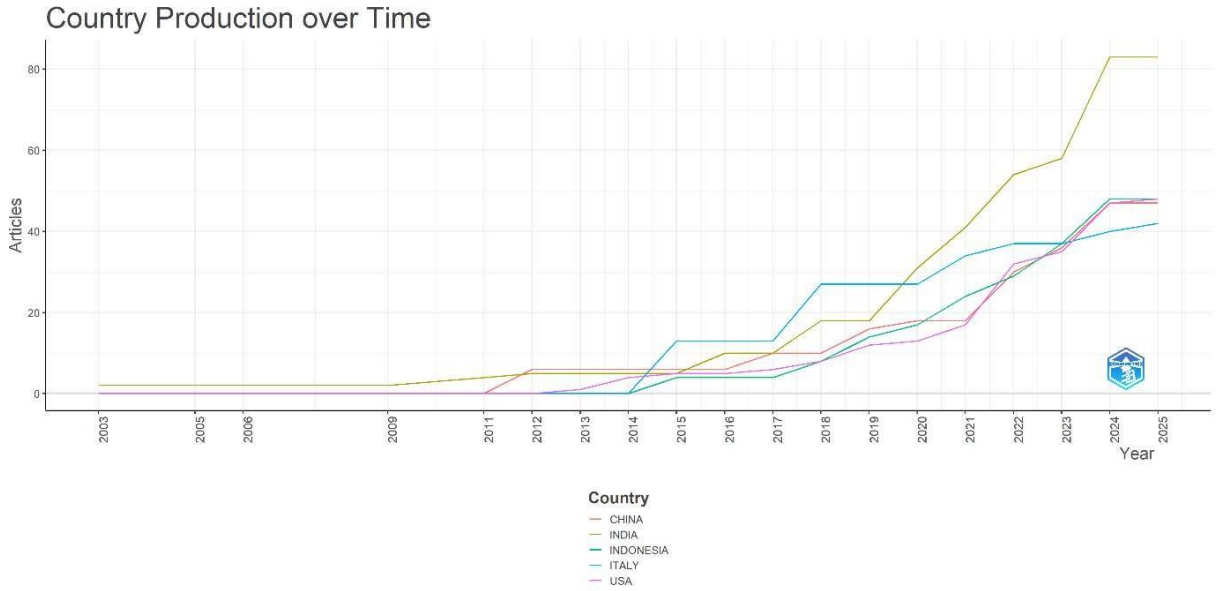

Figure 16 : Country Production over time

China and India have strong research and publications in last ten years, showing that these countries are hands on tackling their waste problems through research and improving technology substantiated with research publications. South Asian countries like Indonesia, Japan, Malaysia, Singapore have also done considerable work in the field of Solid Waste Management in the last two decades and these countries are pioneering in waste management treatment and resource recovery.

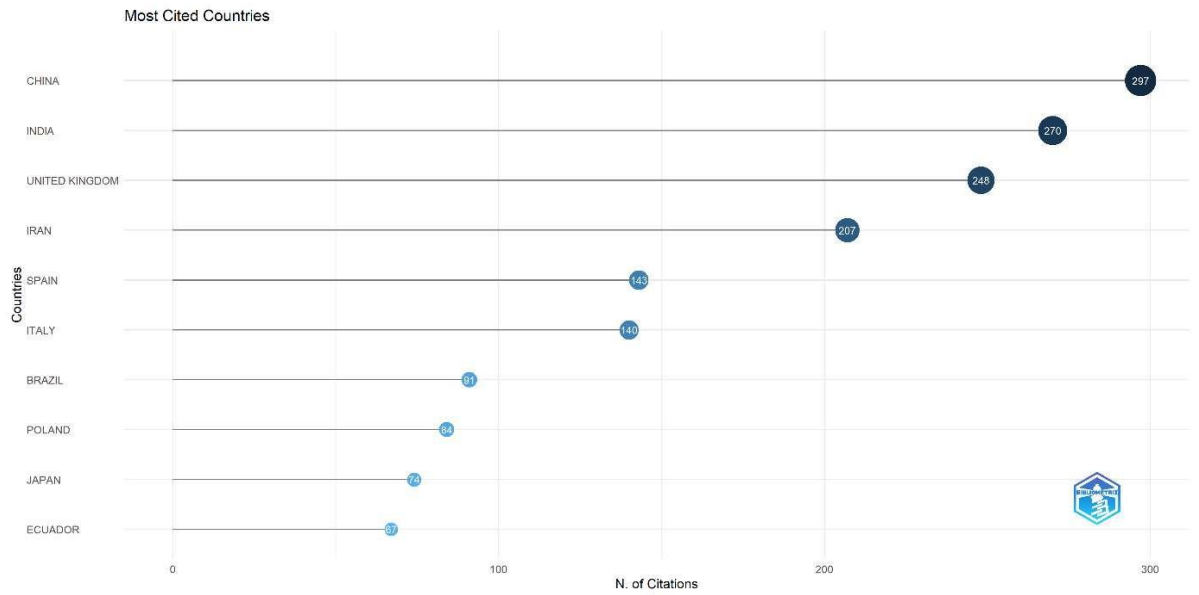

Figure 17 : Most Cited Countries

The most cited countries show a trend of developing nations studying their waste and waste characteristics with respect to including women in the role of waste management. Most citations have come from China and India, closely followed by UK, Iran, Spain, Italy, Brazil, Poland, Japan and Ecuador. Most relevant words in the citations have been waste management, female, adult, recycling, waste disposal, article, human, solid waste and male. This shows that though the focus of the topic may be waste management, studies show citations of the "female" though gender biased studies indicate that the women create Self Help Groups, composting solutions, local upcycling, rag pickers self help groups.

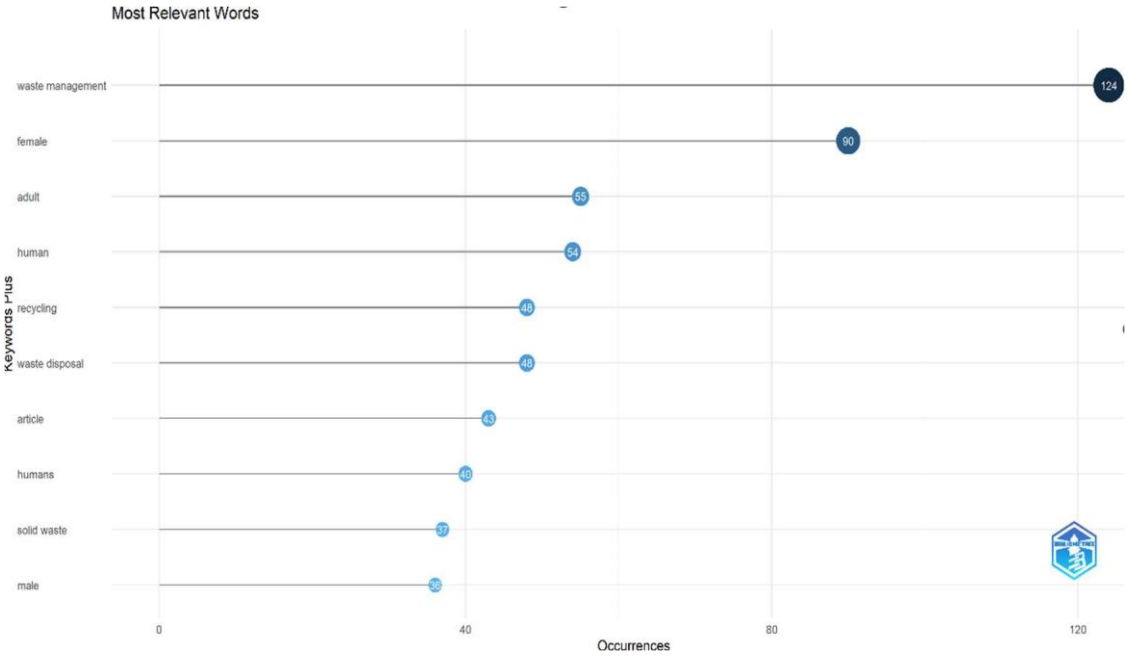

Figure 18 : Most relevant words

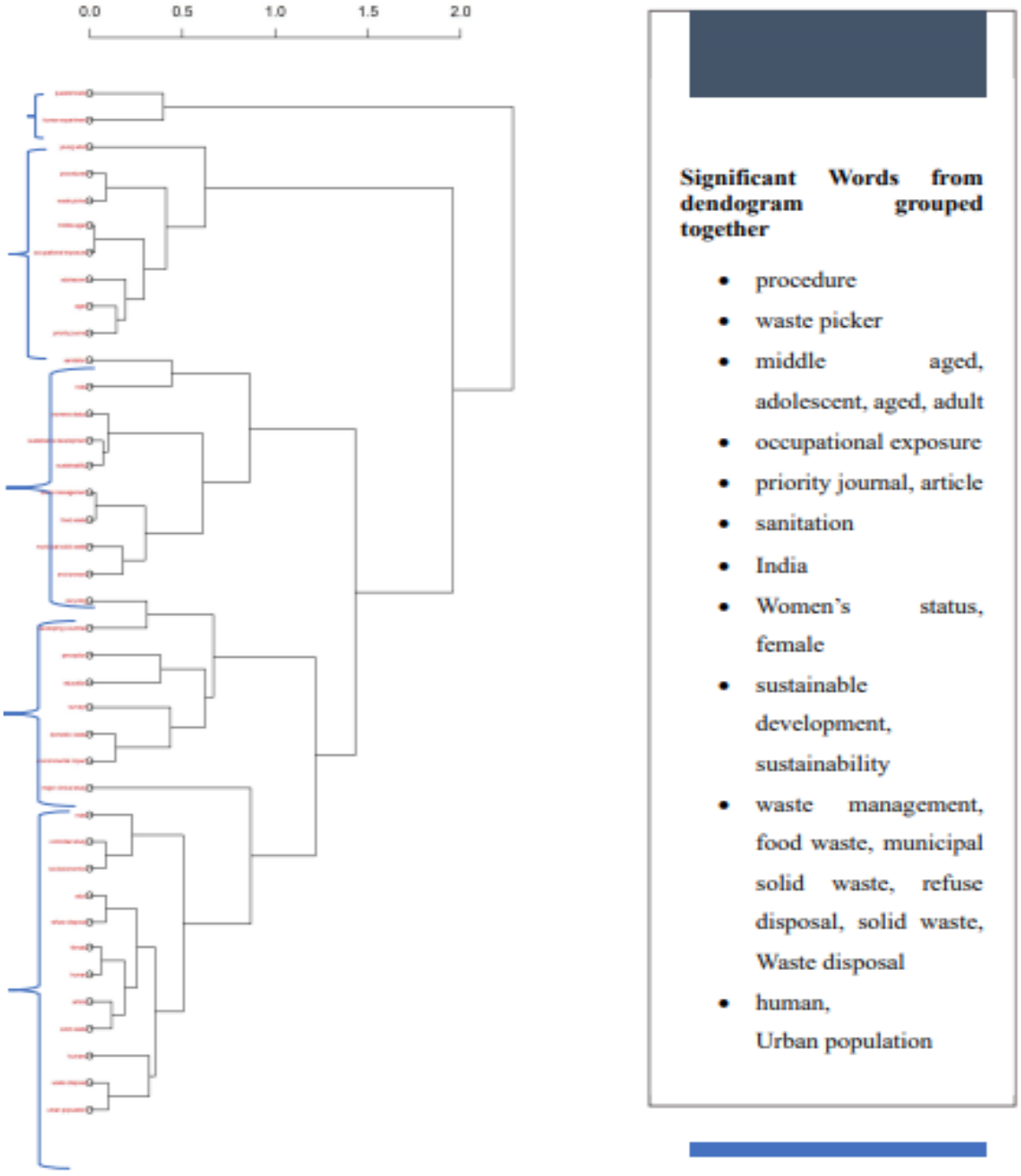

Figure 19 : Dendogram

The above dendogram shows women directly contribute to waste management in form of ragpickers, urban population, waste management and sustainability. Source segregation improves the efficiency of recycling from households. (Pongpunpurt et al., 2022; Sabki et al., 2019; Tseng et al., 2021) When ragpickers (mostly women) collect the waste and segregate it correctly, it again improves the recycling efficiency. When waste reaches the recycling facility, women are employed for segregation of waste. Beyond this, we do not see women leading the waste to energy plants, or Biogas plants or CNG plants (Pongpunpurt et al., 2022; Sabki et al., 2019). However, if the waste is mixed and is thrown out of the house, women are considered to be responsible for the same (Simon-Kumar, 2025).

RESEARCH GAP

The bibliometric analysis shows that world over women get together to make small groups to improve the waste management of their own respective communities (Asteria & Herdiansyah, 2022; Morrissey & Browne, 2004; Sabki et al., 2019). These groups are mostly localised and run on a not-for-profit model (Linzner & Lange, 2013; Zero Waste Model Ambikapur, Chattisgarh, n.d.). Bringing women into the mainstream of waste education programs streamlines the local waste management (dos Muchangos & Vaughter, 2019). Cities like Ambikapur, Pune, Bangalore, Dhaka, Karang Resik, Tasikmalaya, West Java, Indonesia have benefitted from including these self help groups into the mainstream of waste management. (Asteria & Herdiansyah, 2022; dos Muchangos & Vaughter, 2019; Estrada et al., 2023; Morrissey & Browne, 2004; Mukhter & Chowdhary, 2024; Sweety et al., n.d.; UNEP, n.d.; *Wasting Women—the Biopolitics of Waste and Women*, n.d.; Zero Waste Model Ambikapur, Chattisgarh, n.d.)

Literature review shows women are encouraged to recycle the products through a cottage industry model and not through industrialisation of waste management. This led to the formulation of the research question posed by this literature review i.e.

Why are women not leading in Waste Management in an Industrial domain?

Some of the women leading in different industries in India are shown in the Table along with the segment they cater to.

Industry Segment	Examples of Women Leaders	Leadership Role Trends	Key Insights
Manufacturing & Engineering	Mallika Srinivasan (Tractors India Ltd.) Revathi Advaithi (Flex Ltd.)	Low representation in heavy industry	Women thrive in mid-size manufacturing and are slowly entering core engineering fields
Pharmaceuticals & Biotech	Kiran Mazumdar-Shaw (Biocon) Dr. Swati Piramal (Piramal Group)	Strong leadership in R&D-based firms	High visibility due to STEM backgrounds and entrepreneurial drive
FMCG & Consumer Goods	HUL, PepsiCo, Mondelez have had female India heads Falguni Nayar (Nykaa)	Growing executive representation	Women excel in brand strategy and consumer engagement
Healthcare & Hospitals	Dr. Preetha Reddy (Apollo Hospitals) Sangita Reddy (Narayana Health)	Family-led enterprise growth	High representation in hospital admin, wellness, diagnostics
Banking & Finance	Chanda Kochhar (ex- ICICI)-Naina Lal Kidwai (HSBC) Arundhati Bhattacharya (SBI)	Historically strong	BFSI sector actively promotes gender inclusion at the leadership level
Education & EdTech	Byju's, Vedantu have female CXOs	High representation in	Women lead policy, pedagogy, ed-tech

	Dr. Indu Shahani (ISDI, Mumbai)	both traditional and online education	innovation
Industry Segment	**Examples of Women Leaders**	**Leadership Role Trends**	**Key Insights**
Environment & Sustainability	Sunita Narain (CSE)- Rhea Singhal (Ecoware) Almitra Patel (SWM Policy)	Emerging space	Women lead in policy advocacy, waste management, green product startups
Logistics & Supply Chain	Rashmi Daga (FreshMenu) Meena Ganesh (Portea)	Underrepresented	Rising in tech-driven logistics, last-mile delivery, health logistics
Technology & IT	Debjani Ghosh (NASSCOM) Roshini Nadar (HCL) Neelam Dhawan (HP, IBM)	Still male-dominated	Growing through STEM pipelines, CXO roles in MNCs
Infrastructure & Construction	Manju Bharat Ram (Shriram Group) Mini Menon (Invest India infra team)	Very low leadership share	Barriers due to capital intensity, legacy ownership
Real Estate & Urban Development	Irani Chatterjee (Godrej Properties) Nandini Piramal (Piramal Realty)	Limited but rising	New women-led architecture and green building firms emerging
Consulting & Strategy	Nivruti Rai (Intel India) Vanitha Narayanan (IBM India)	High in knowledge-intensive segments	Women are gaining ground in ESG, DEI, sustainability consulting
Media, Arts & Advertising	Ekta Kapoor (Balaji Telefilms) Anupriya Acharya (Publicis Groupe)- Barkha Dutt (Media)	Strong presence	Creative fields have high entrepreneurial and CXO roles for women
E-commerce & Startups	Falguni Nayar (Nykaa) Richa Kar (Zivame) Suchi Mukherjee (Limeroad)	Rapidly growing	Women are driving consumer-centric platforms in Tier 1 & Tier 2 markets
Aerospace & Defence	Tessy Thomas (DRDO) Shobhana Bhartia (Hindustan Times Aerospace Desk)	Niche but impactful	Women are in research and command roles rather than entrepreneurship

Table 1 Different Industries where women play a leading role

CONCLUSIONS

Women play an integral part in the waste management of a community. Whether it is managing waste at home or managing waste at the community level, women are adept at managing it at all levels. This Bibliographic study leaves a very important question open for further research as to why women are not leading the waste management sector at an Industrial scale.

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An Exploratory Study on the Apparel Buying Behaviour of Women in Urban Maharashtra: Implications for Empowering the Indian Retail Sector

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ABSTRACT

India's apparel industry is one of the fastest-growing segments of the retail sector, with women in urban areas emerging as dominant consumer groups. The urban female consumer is not only more educated and economically independent but also increasingly fashion-conscious and digitally active. This exploratory study investigates the patterns, motivations, and socio-economic factors influencing apparel buying behaviour among women in key urban cities of Maharashtra such as Mumbai, Pune, Nagpur, Nashik, and Aurangabad.

The paper is grounded in consumer behaviour theory and draws on secondary research from peer-reviewed sources, industry reports, and international literature to build a multi-dimensional understanding of how psychological, social, cultural, technological, and economic factors shape women's apparel choices. It also explores how these evolving consumption patterns can be leveraged to create more inclusive, innovative, and gender-responsive strategies in India's retail sector.

Findings suggest that personalization, affordability, brand trust, online convenience, and cultural aesthetics are key drivers. The paper concludes by offering implications for retailers, policy-makers, and marketers to better engage with women consumers as catalysts of economic empowerment.

Keywords: *Apparel Buying Behaviour, Women Consumers, Urban Maharashtra, Retail Sector, Consumer Psychology, Empowerment, E-commerce, Fashion Preferences.*

1. INTRODUCTION

The Indian retail sector is experiencing a rapid transformation, with the apparel segment occupying a central role. According to the India Brand Equity Foundation (IBEF, 2023), the apparel market in India is expected to reach USD 100 billion by 2025, driven largely by rising disposable incomes, digital access, and an increasingly fashion-aware population. Among the driving forces behind this growth is the increasing participation of women as active and empowered consumers.

Urban Maharashtra, home to economically vibrant and culturally diverse cities like Mumbai, Pune, Nagpur, Nashik, and Aurangabad, presents a unique context for studying apparel buying behaviour among women. These cities showcase a blend of modernity and tradition, and women here represent a broad demographic spectrum from students and working professionals to homemakers and entrepreneurs. These women are influenced by a variety of factors Including income, social aspirations, digital exposure, peer influence, and evolving lifestyle preferences.

This study aims to explore the motivations and patterns behind women's apparel choices in these urban centers and identify the broader implications for the Indian retail sector. With women gaining financial independence and playing more influential roles in household purchasing decisions, understanding their behaviour is vital for marketers and policy-makers seeking to build inclusive, responsive, and future-ready business strategies.

2. REVIEW OF LITERATURE

Understanding apparel buying behaviour requires examining it through multiple lenses—psychological, economic, social, cultural, and technological. Women's buying decisions are not just shaped by need or price, but also by evolving identity, lifestyle aspirations, and digital exposure. The following section presents an in-depth review of scholarly and industry literature related to women's apparel purchasing patterns, with special emphasis on both Indian and international contexts.

2.1 Indian Perspective

- **Rajput et al. (2012)** conducted one of the early comprehensive studies focusing on Indian female consumers, identifying key variables like price sensitivity, brand consciousness, product design, and cultural compatibility. The study emphasized how traditional values continue to influence fashion choices in India, especially in Tier-2 and Tier-3 cities.
- **Bhardwaj et al. (2022)** examined shopping orientation and store ambiance as psychological triggers. They found that women often associate clothing with mood, self-perception, and public image, and that factors like lighting, layout, and music in stores enhance the overall buying experience.
- **Paul (2019)** highlighted a major shift among urban millennial women, who increasingly use fashion as a form of self-expression and individuality, breaking free from rigid cultural norms. His research showed how younger Indian women associate clothing choices with confidence, independence, and empowerment.
- **Divya Jaya Lakshmi et al. (2024)** investigated the rapid rise of e-commerce adoption and found that platforms like Myntra, Amazon, and Ajio are significantly transforming shopping behaviour, especially among tech-savvy women in urban areas. Key motivators were convenience, product variety, deep discounts, and easy return policies.
- **Deshpande (2020)** provided a region-specific perspective by analyzing apparel behaviour in Maharashtra. Her study emphasized the influence of festivals like Ganesh Chaturthi and Gudi Padwa, Marathi saree draping traditions, and the impact of climate (hot summers) on fabric choices and layering. She also noted a rise in the popularity of fusion wear among younger consumers in Pune and Nashik.
- **Kaur & Sondhi (2018)** highlighted the growing preference for sustainable fashion among urban Indian women with higher education levels, signaling a gradual shift toward value-based consumption.

Together, the Indian studies reveal a complex interplay of traditional values and modern aspirations, showing that Indian women are not just buyers but co-creators of fashion trends**,** increasingly vocal about their identities.

2.2 International Perspective

International literature on women's apparel buying behavior has evolved significantly over the last two decades, especially with the growth of fashion psychology, digital commerce, and feminist marketing.

Kim and Kim (2004) (Scopus), in a study of Korean female shoppers, found a strong correlation between fashion involvement, self-concept, and impulse buying behavior. Women were found to use clothing to express moods and social identity, especially in urban, image-conscious societies.

Kautish and Sharma (2020) (Scopus) conducted a cross-national study comparing women in Europe and India, highlighting that while European consumers focused more on ethical sourcing and environmental impact, Indian urban consumers were becoming increasingly aware of these values, though still price-sensitive.

Park and Burns (2005) investigated online shopping patterns among American female college students, revealing a high degree of spontaneity and peer-influenced purchases, especially when exposed to targeted advertising or social validation through likes and comments.

Gentina et al. (2021) (Web of Science) analysed how teenage girls in France make fashion decisions based on social identity theory, peer pressure, and influencer marketing. Their study pointed to a growing reliance on virtual communities for validation of fashion choices.

Hye-Jung and Workman (2011) focused on China, observing how cultural conformity, brand status, and perceived product quality shaped women's apparel decisions, particularly among mid-career professionals. Women used clothing not just for style but to signal status and ambition in professional settings.

Owusu-Banahene and Coleman (2020) found that religious values, modesty, and family expectations often constrained fashion expression, yet urban women increasingly negotiated between cultural norms and personal freedom.

Across countries, the common thread is that apparel is more than function it is emotional, symbolic, and communicative. Factors like self-image, gender identity, peer influence, and social media have emerged as dominant forces in global consumer behaviour.

2.3 Gap Identified

Despite a wealth of literature globally and nationally, a critical research gap persists when it comes to understanding urban women's apparel choices within the specific socio-cultural and digital environment of Maharashtra.

Most Indian studies generalize across states or focus primarily on major metros like Delhi or Bangalore. Very few delve into state-specific fashion behaviour and even fewer explore the regional influences of Maharashtra, which hosts a unique mix of traditional Marathi aesthetics and urban cosmopolitanism.

Moreover, much of the current literature emphasizes either brand or price-related factors, often ignoring softer variables like identity, empowerment, and digital socialization. As women in cities like Mumbai, Pune, and Nagpur become more financially independent and digitally connected, they are not merely purchasing apparel they are narrating their stories through fashion.

This study is unique in its use of a multi-dimensional, exploratory approach it draws from marketing, consumer psychology, cultural studies, and digital behaviour literature to paint a holistic picture. Rather than testing hypothesis, it seeks to understand the interconnections, patterns, and meanings women attach to their apparel choices

3. RESEARCH OBJECTIVES

- To explore the key psychological, social, economic, and cultural factors influencing apparel buying behaviour of urban women in Maharashtra.
- To understand how digital platforms and e-commerce influence apparel choices and brand engagement.
- To examine apparel buying as a reflection of empowerment and socio-economic progress.
- To evaluate the implications of these behavioural patterns on India's organized and unorganized retail sectors.
- To provide insights for retailers, marketers, and policymakers to formulate inclusive and targeted strategies.

4. RESEARCH METHODOLOGY

4.1 Nature of the Study

This is an exploratory study based on secondary data. It relies on a qualitative research approach to investigate trends and derive conceptual insights. Exploratory studies are well-suited for under researched areas and help in identifying patterns, relationships, and future research directions.

4.2 Data Sources

Peer-reviewed journal articles (Scopus, Web of Science, Google Scholar)

Reports from India Brand Equity Foundation (IBEF), McKinsey India, Statista

Government data (Census 2011, NSSO reports)

Industry insights from fashion aggregators (Myntra, Shoppers Stop, Wazir Advisors)

4.3 Geographic Scope

The study focuses on urban centers in Maharashtra: Mumbai, Pune, Nagpur, Nashik, and Aurangabad. These cities offer a mix of Tier-1 and Tier-2 urban landscapes, each with unique socio-economic characteristics.

4.4 Analytical Framework

Two theoretical models guide the analysis:

Engel-Blackwell-Miniard (EBM) Consumer Decision Model: Explains the stages of consumer decision-making need recognition, information search, evaluation of alternatives, purchase, and post-purchase behaviour.

Maslow's Hierarchy of Needs: Helps interpret how women's fashion choices often evolve from fulfilling basic needs to higher-order needs such as esteem, self-actualization, identity.

5. CONCEPTUAL FRAMEWORK

Apparel buying behaviour among urban women in Maharashtra can be understood through five dimensions:

Dimension Key	Factors
Psychological	Self-concept, Fashion Involvement, Attitude Toward Change, Colour Preference
Social	Peer Influence, Family Roles, Workplace Dress Codes
Economic	Disposable income, Financial Independence, Discounts, EMI Availability
Cultural	Traditional Occasions, Ethnic Wear Preferences, Regional Fashion Trends
Technological	Mobile Apps, Influencer Marketing, Online Convenience

5.1 Methodology and Interpretation

This study adopts an exploratory approach grounded in secondary data, including academic journals, industry reports, and expert commentary. The findings discussed in the following section are thematic interpretations and conceptual syntheses derived from existing literature and credible market observations. No primary data was collected for this paper. As such, the analysis presented is intended to explore prevailing patterns, gaps, and relationships rather than draw statistical inferences.

6. DATA ANALYSIS AND DISCUSSION

This section interprets findings across five core themes influencing apparel buying behavior among urban women in Maharashtra. It draws on regional case examples, global literature, and industry trends to reveal behavioural patterns, motivations, and decision-making processes.

6.1 Age and Lifestyle Segmentation

Urban women's apparel choices vary significantly across age groups and life stages.

- Young Adults (18–25 years): This group prefers Western wear, fusion styles, and Instagram-trending outfits. Brands like H&M, Forever 21, and Urbanic are highly favoured. The influence of social media trends is dominant.
- Mid-aged Professionals (26–40 years): Women in this bracket seek a balance of style and functionality. Formal wear, sustainable fashion, and ethnic-modern blends like FabIndia or Biba are popular. Many shop online but still value offline trial experience.

- Married/Homemakers (30–60 years): Decisions are more price-conscious. Festive and occasion wear dominate. Cultural factors like sarees, kurtis, and salwar-kameez remain significant.
- Seniors (60+ years): Comfort, simplicity, and tradition guide choices. Physical stores with personalized assistance are preferred.

6.2 Role of E-commerce and Digital Influence

India's apparel e-commerce market is projected to reach $28 billion by 2025 (Statista, 2023).

- Platforms like Myntra, Ajio, Meesho, Amazon offer broad access and discounts.
- Features like machine based recommendations, virtual try-ons, and size guides build confidence and drive conversion.
- Influencer marketing plays a central role. YouTube haul videos and Instagram reels by micro-influencers impact decision-making.

According to a report by Wazir Advisors (2022), 63% of Indian women between 20–40 now prefer first-time apparel purchases online due to convenience and return policies.

6.3 Brand Preference and Perceived Value

Women in Maharashtra show growing brand loyalty but are also value seekers.

- Top brands: Biba, W, Aurelia (for ethnic); H&M, Zara, Mango (for Western); Meesho, Zudio, (for value fashion).
- Factors influencing preference: fit, affordability, trendiness, return policies, and peer reviews.
- Local brands like Soch and Global Desi are preferred for festival and wedding wear.

6.4 Apparel as a Symbol of Empowerment

Apparel for many urban women is more than utility it's a tool of self-expression and empowerment.

- Working women report a psychological boost from dressing well at work.
- Students use fashion to assert individuality and modernity.
- Entrepreneurs and influencers use fashion as personal branding.

According to Chaudhary & Parashar (2021) (Scopus), "Fashion choices offer an avenue for women to redefine public identities, break stereotypes, and claim agency."

6.5 Regional Nuances in Urban Maharashtra

- Mumbai: Fashion-forward, trend-sensitive. Large presence of retail outlets and premium brands.
- Pune: Educated and semi-conservative consumers with a taste for ethnic-fusion.

- Nagpur: Price-sensitive market leaning towards value fashion; growing shift to online platforms.
- Nashik & Aurangabad: Strong festive-ethnic preferences; Tier-2 growth in online orders.

7. IMPLICATIONS FOR THE INDIAN RETAIL SECTOR

This study offers meaningful insights for various stakeholders in India's fashion and retail ecosystem:

7.1 For Retailers

- **Segmentation Strategies:** Classify consumers by age, digital literacy, region, and cultural inclination.
- **Product Design:** Focus on size inclusivity, fusion styles, and regionally inspired collections.
- **Personalized Shopping:** Use machine learning and data analytics to offer recommendations based on browsing and purchase history.

7.2 For Marketers

- **Digital-first Campaigns**: Collaborate with female influencers and regional fashion creators on YouTube, Instagram, Moj, and ShareChat.
- **Emotional Branding:** Shift messaging from "fashion" to "confidence," "power," and "identity."
- **Local Language Communication:** Use Marathi and Hindi in Tier-2 city campaigns to increase relatability.

7.3 For Policymakers

- **Support Women-led Startups:** Offer subsidies and e-commerce onboarding for women entrepreneurs in apparel retail.
- **Skill Development:** Promote tailoring, styling, and retail skills among women through NSDC (National Skill Development Corporation) initiatives.
- **Digital Literacy:** Bridge digital gaps in semi-urban areas to unlock online buying potential among women.

8. CONCLUSION

Urban women in Maharashtra are not passive consumers they are powerful decision-makers and trendsetters shaping the Indian apparel market. Their buying behavior is a reflection of evolving identity, aspiration, and empowerment. This study has explored how a mix of socio-cultural, economic, psychological, and digital factors inform women's apparel choices. The findings demonstrate that fashion is no longer just about aesthetics; it's a medium through which women assert independence, cultural pride, and confidence. Understanding this transformation is essential for brands and policymakers that aim to tap into India's next wave of growth led by empowered, urban women consumers.

9. LIMITATIONS OF THE STUDY

- This is a qualitative, exploratory study based on secondary data.
- Findings are indicative, not generalizable.
- Primary data from field surveys or focus groups was not collected due to time constraints.
- The study focuses only on urban centres and excludes rural behaviour patterns.

10. RECOMMENDATIONS

- Conduct empirical surveys across different income levels and cities (including Tier-3).
- Compare urban vs. semi-urban and offline vs. online shopping behaviour.
- Explore how sustainability and ethical fashion influence women's decisions.
- Assess the impact of reels, influencers, and virtual try-ons using quantitative methods.

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Integrating Positive Risk Management into Financial Literacy Programs: Impact on Financial Empowerment and Coping Behaviors in Low Power-Distance Contexts

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ABSTRACT

This research integrates the PMI Risk Management Model, Hofstede's Cultural Dimensions Theory, and Lusardi and Mitchell's Financial Literacy Model to create a framework for fostering financial empowerment in low power-distance contexts. Addressing a critical gap, the study examines how culturally tailored risk management practices aligned with financial literacy can enhance risk-informed decision-making. Drawing on Hofstede's insights, particularly low power-distance dynamics, it explores how cultural factors influence risk management effectiveness and the assimilation of financial knowledge. The PMI model promotes positive risk management by identifying financial opportunities within uncertain environments, while Lusardi and Mitchell's model enhances financial literacy skills for complex financial decisions. Data were collected through a Likert-scale questionnaire across diverse low power-distance populations and analyzed using Structural Equation Modeling (SEM) and Confirmatory Factor Analysis (CFA).

The findings empirically validate the framework, showing that combining structured risk management, cultural sensitivity, and financial education enhances financial empowerment, resilience, and proactive financial behavior. This study contributes a culturally adaptive model that policymakers, educators, and organizations can use to empower individuals in diverse socio-cultural settings.

Key Words: *Financial Literacy & Empowerment, Positive Risk Management Strategies, Cultural Adaptation in Financial Education, Low Power-Distance Dynamics*

1. INTRODUCTION

In recent years, financial literacy has gained recognition as a vital skill for individuals to navigate increasingly complex economic landscapes. Financial literacy not only empowers individuals to make informed financial decisions but also contributes to greater resilience in the face of economic uncertainties (Abdi, 2024; Lu, Li, & Wu, 2024). Studies have demonstrated that financial literacy directly influences financial behaviors, such as saving, investing, and retirement planning, thereby enhancing individuals' capacity to secure financial stability and achieve long-term goals (Lusardi & Mitchell, 2011). However, financial literacy alone may be insufficient for fostering resilience, particularly within professional subcultures shaped by diverse cultural values and global practices. In countries like India, where national culture typically reflects high power-distance dynamics, subgroups within professional spheres, especially those aligned with global standards, may exhibit

lower power-distance tendencies, influencing financial behavior and approaches to risk-taking (Hofstede Insights, 2023).

This study focuses on PMI-certified project managers in India—a professional subculture embedded within a global project management framework. Although India generally scores high on Hofstede's power-distance dimension, the professional environments of PMI-certified project managers, particularly in sectors like IT and finance, are influenced by globally standardized practices that emphasize egalitarian decision-making and collaboration. In these low power-distance settings, individuals are more likely to exhibit autonomy and control in financial decision-making, aligning with proactive attitudes essential to positive risk management (Gururo, 2023; KnowledgeHut, 2023).

Positive risk management, as highlighted by Hillson (2002), shifts the traditional focus from risk avoidance to opportunity management, encouraging individuals to see risks as potential gains rather than mere threats. This perspective aligns with the PMI Risk Management Model and promotes a proactive approach to financial and professional challenges (PMI, 2017). For project managers working in globally influenced, low power-distance environments, this approach fosters a sense of ownership in decision-making and strategic navigation of uncertainties. Integrating financial literacy with positive risk management equips individuals with a balanced, opportunity-focused approach to risk, enhancing financial empowerment and resilience (Aren & Hamamci, 2023; Nazneen, 2024).

To comprehensively understand these dynamics, this study combines Lusardi and Mitchell's Financial Literacy Model, Hofstede's Cultural Dimensions Theory, and the PMI Risk Management Model. This integrated framework provides a culturally adaptive approach that aligns financial literacy with positive risk management, tailored to the unique context of PMI-certified project managers in India. By examining the interaction of financial literacy and positive risk management within a distinct cultural setting, this study addresses a critical gap, offering insights into how globally influenced, low power-distance subcultures within high power-distance countries can benefit from tailored financial education.

Overall, this research contributes a novel framework that empowers individuals through culturally relevant financial literacy and risk management strategies. It has practical implications for policymakers and financial educators seeking to design adaptive financial literacy programs that consider both cultural and professional diversity, fostering resilience and financial empowerment within globally influenced professional groups.

2. REVIEW OF LITERATURE

Financial Literacy and Its Role in Low Power-Distance Contexts

Financial literacy, defined as the ability to understand and apply financial concepts to personal financial decision-making, is essential for fostering economic resilience. It enables individuals to effectively manage their finances, make informed choices, and mitigate financial risks (Abdi, 2024; Lu, Li, & Wu, 2024). Numerous studies confirm that financial literacy positively influences behaviors like saving, investing, and planning for the future. Lahiri and Biswas (2022), in their

study on financial behavior in emerging economies, highlight how financial literacy contributes to individual empowerment by promoting financial autonomy.

In low power-distance contexts, which Hofstede (1980) describes as environments valuing egalitarian relationships and decentralized authority, financial literacy has a distinct impact. Individuals in these settings are more likely to take ownership of financial decisions independently, in contrast to high power-distance contexts where decisions may be influenced by family or authority figures. Derbyshire, Fouché, and McChlery (2023) suggest that culturally adaptive financial literacy programs that resonate with these values can empower individuals to make independent financial decisions effectively. Lahiri and Biswas (2022) further show that in India's low power-distance environments, financial literacy programs enhance confidence and capacity for autonomous financial management.

Nazneen (2024) reinforces that financial literacy is crucial where individuals are encouraged to manage their finances independently, aligning with societal expectations of self-reliance. Studies indicate that financial literacy builds foundational skills necessary to understand complex financial products, assess investment opportunities, and manage risks—key competencies in low power-distance societies where individuals are empowered to make autonomous choices (Abdi, 2024; Nazneen, 2024).

Hypothesis 1: *Financial literacy has a positive impact on financial empowerment in low power-distance contexts.*

Positive Risk Management and Financial Empowerment

Traditionally, risk management has focused on minimizing or avoiding potential downsides. However, recent shifts in understanding risk emphasize a more proactive and opportunity-oriented approach, known as positive risk management. This approach, derived from the PMI Risk Management Model, involves systematically identifying, assessing, and leveraging opportunities that arise within uncertain environments (PMI, 2017). Positive risk management aligns well with the values of low power-distance contexts, where individuals have greater autonomy and are encouraged to take calculated risks as part of their financial strategy (Hofstede, 1980).

In these settings, positive risk management can enhance financial empowerment by enabling individuals to capitalize on potential opportunities and mitigate financial threats proactively. Aren and Hamamci (2023) highlight the importance of traits like confidence and trust in shaping positive risk behaviors, noting that individuals who adopt a positive approach to risk are more likely to engage in financial planning that considers both potential gains and losses. This proactive approach to risk-taking is especially beneficial in low power-distance environments, where individuals are more comfortable with decentralized decision-making and have greater personal control over their finances (Derbyshire et al., 2023).

Additionally, Nazneen (2024) discusses how positive risk management contributes to financial resilience by preparing individuals to respond to financial uncertainties with greater flexibility. Through a structured approach to risk identification and response, positive risk management can empower individuals to approach their financial goals with a sense of agency, thereby enhancing their financial well-being. By integrating positive risk management into financial literacy

programs, individuals gain a dual advantage: they are not only able to manage financial risks but also to recognize and leverage potential financial opportunities, thereby achieving holistic financial empowerment.

Hypothesis 2: *Positive risk management has a positive impact on financial empowerment in low power-distance contexts.*

Financial Literacy as a Coping Mechanism in Low Power-Distance Contexts

Beyond financial empowerment, financial literacy also serves as a significant coping mechanism. Financially literate individuals possess the skills needed to assess their financial situations accurately, make informed decisions under pressure, and effectively manage stressors arising from economic instability. Nazneen (2024) notes that financial literacy enhances coping behaviors by equipping individuals with the tools to handle financial challenges in a structured and informed manner. These behaviors are particularly valuable in low power-distance contexts, where individuals are expected to independently navigate financial hardships without reliance on hierarchical support.

Studies suggest that financial literacy enables individuals to adopt proactive coping strategies, such as budgeting, debt management, and risk assessment, which reduce financial stress and improve overall financial resilience (Sumarno et al., 2024). According to Lahiri and Biswas (2022), financial literacy also positively affects coping mechanisms by promoting self-reliance and fostering a greater sense of control over one's financial life. These effects are especially pronounced in low power-distance societies, where individuals are culturally oriented towards managing their own challenges without depending on external authority figures for guidance.

In such contexts, financially literate individuals are better equipped to respond to financial uncertainties by evaluating potential outcomes and making decisions that align with their personal and family needs. For instance, Nazneen (2024) finds that individuals with higher levels of financial literacy demonstrate more adaptive coping behaviors, such as setting aside emergency funds and carefully assessing financial risks. By enhancing their financial literacy, individuals in low power-distance settings gain the knowledge and confidence needed to navigate financial challenges effectively.

Hypothesis 3: *Financial literacy has a positive impact on coping behavior in low power-distance contexts.*

The Role of Positive Risk Management in Coping Behavior

Positive risk management not only fosters financial empowerment but also strengthens individuals' ability to cope with financial stress. Traditionally, risk management focused on avoiding losses, but positive risk management encourages individuals to see uncertainties as opportunities. This shift benefits low power-distance environments, where individuals are culturally inclined to manage their finances actively, relying less on hierarchical structures for guidance (Maman & Rosenhek, 2019; Nazneen, 2024).

Maman and Rosenhek (2019) suggest that positive risk management serves as an effective coping mechanism by helping individuals navigate financial challenges confidently. By reframing risks as potential opportunities, individuals build resilience and adapt better to financial changes. Positive risk management promotes flexibility, adaptability, and proactive planning (Derbyshire et al., 2023), reducing psychological burdens associated with financial stress.

Furthermore, Aren and Hamamci (2023) link positive risk management to improved mental well-being, with individuals exhibiting lower financial anxiety. In low power-distance contexts, where self-reliance and decentralized decision-making are valued, positive risk management enhances coping by promoting a proactive, optimistic approach to financial challenges. Incorporating positive risk management into financial literacy programs can equip individuals with both the skills and mindset to handle financial uncertainties effectively.

Hypothesis 4: *Positive risk management has a positive impact on coping behavior in low power-distance contexts.*

Integration of Theoretical Models

This study integrates three established theoretical models—Lusardi and Mitchell's Financial Literacy Model, Hofstede's Cultural Dimensions Theory, and the PMI Risk Management Model—to create a framework focused on fostering financial empowerment and resilience among PMI-certified project managers in India. While India's broader culture generally exhibits high power-distance characteristics, PMI-certified project managers operate within a globally influenced professional environment that tends toward low power-distance dynamics. By combining these models, the study provides a holistic understanding of how financial literacy and positive risk management can be tailored to the unique needs of culturally diverse, globally oriented professional subgroups to achieve enhanced coping and empowerment outcomes.

Lusardi and Mitchell's Financial Literacy Model

Lusardi and Mitchell's model emphasizes both foundational and advanced financial knowledge, covering areas from basic concepts to complex skills like retirement planning and risk assessment (Lusardi & Mitchell, 2011). This framework helps explain how financial literacy influences decision-making and resilience.

In this study, the model is applied to assess the financial literacy of PMI-certified project managers, who operate in globally influenced, low power-distance settings. Financial literacy empowers these individuals to make informed, risk-aware decisions, essential for managing project budgets and risks. Those with high financial literacy are better prepared to apply positive risk management, evaluating risks and opportunities effectively.

Hofstede's Cultural Dimensions Theory

Hofstede's Cultural Dimensions Theory explores how cultural values shape behaviors. This study focuses on power distance, the degree to which less powerful members accept unequal power distribution (Hofstede, 1980). Although India scores high in power distance, PMI-certified project

managers, especially in IT and finance, operate in low power-distance settings influenced by global practices, emphasizing egalitarian relationships and decentralized decision-making.

By applying Hofstede's theory, this study contextualizes financial literacy and risk management within these low power-distance environments. It highlights the need for culturally adaptive financial education that aligns with values of autonomy and collaboration, exploring how financial empowerment and coping behaviors develop within globally influenced cultural dynamics in India.

PMI Risk Management Model

The PMI Risk Management Model provides a systematic approach for identifying, analyzing, and managing risks (PMI, 2017). Traditionally focused on risk mitigation, Hillson's positive risk management approach emphasizes recognizing opportunities within risks (Hillson, 2002), aligning with this study's focus on financial resilience and growth.

Here, the PMI model is adapted for personal financial risk, encouraging a proactive mindset that balances risk mitigation with opportunity recognition. In low power-distance settings, this balanced approach promotes autonomy and resilience, empowering individuals to navigate uncertainties confidently and optimistically.

Synthesizing the Models for a Holistic Framework

Integrating Lusardi and Mitchell's Financial Literacy Model, Hofstede's Cultural Dimensions Theory, and the PMI Risk Management Model forms a holistic empowerment framework that combines financial knowledge, cultural relevance, and proactive risk management. This approach enhances financial literacy programs by tailoring them to cultural contexts, fostering coping skills and resilience.

1. **Culturally Driven Literacy**: Merging Lusardi and Mitchell's financial literacy principles with Hofstede's cultural dimensions creates culturally relevant financial education. This approach aligns financial concepts with learners' cultural values, making education more impactful and empowering by addressing specific social norms.
2. **Risk-Aware Finance**: By incorporating the PMI Risk Management Model, this approach enables proactive, risk-aware financial decision-making. Enhanced literacy, paired with risk management skills, supports individuals in assessing risks effectively, fostering resilience and informed decision-making aligned with their goals.
3. **Cultural Risk Alignment**: Combining Hofstede's theory with PMI's risk management framework promotes culturally aligned risk practices. This alignment allows for responsive risk communication and collaborative decision-making, making risk strategies more relevant and acceptable within specific cultural frameworks.
4. **Holistic Empowerment**: The integrated model fosters comprehensive empowerment by equipping individuals with a culturally sensitive, risk-aware toolkit. This approach encourages a balanced view of financial opportunities and risks, supporting both financial growth and stability.

This framework provides individuals with adaptive skills, enhancing resilience and empowering them to navigate financial challenges confidently.

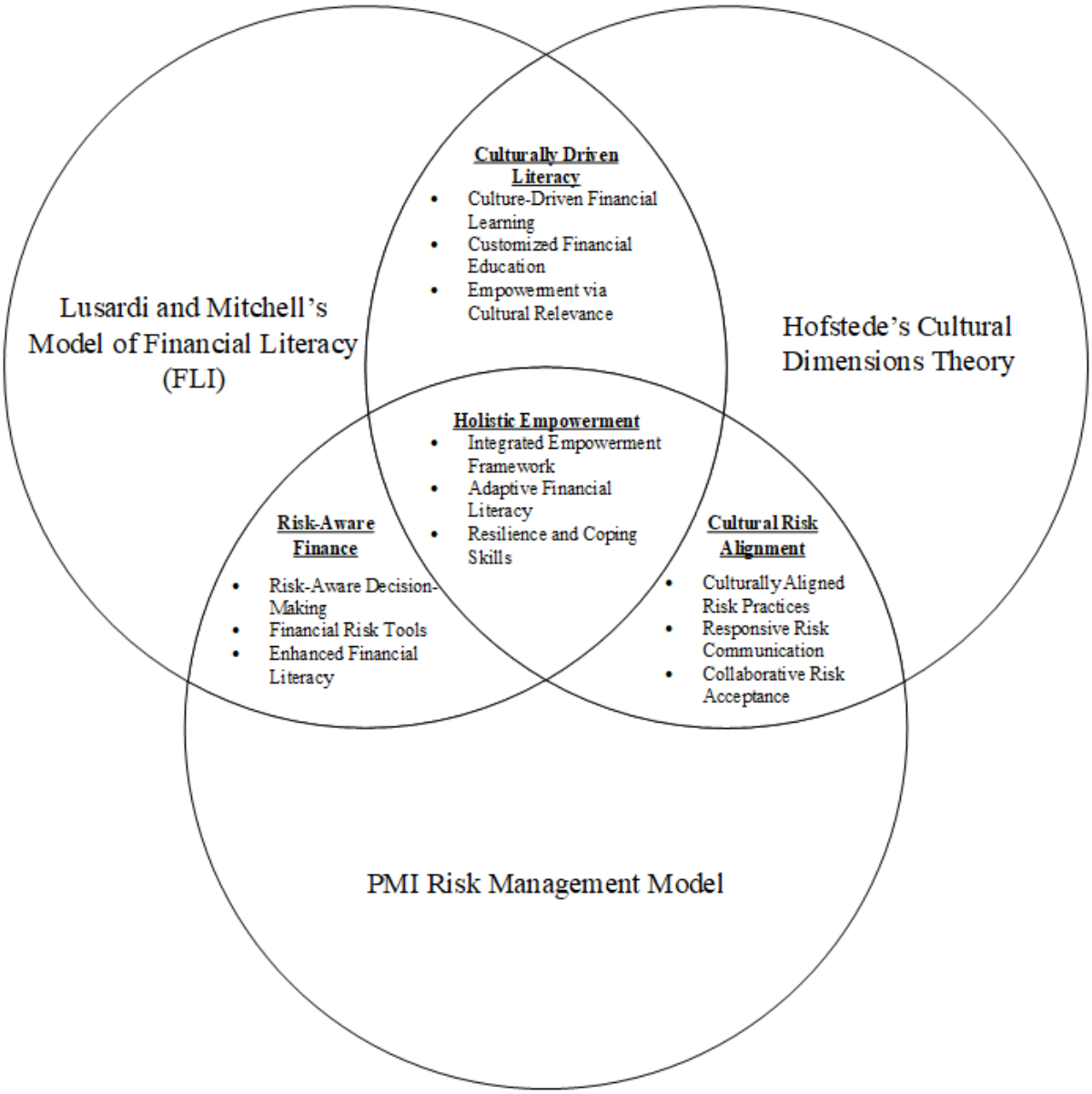

Figure 2. Theoretical Model

Conclusion of Theoretical Framework

The integration of Lusardi and Mitchell's Financial Literacy Model, Hofstede's Cultural Dimensions Theory, and the PMI Risk Management Model creates a culturally adaptive framework tailored to PMI-certified project managers in India. This model addresses the unique needs of a globally influenced, low power-distance professional subgroup within a traditionally high power-distance culture.

By combining financial literacy with culturally aligned, opportunity-focused risk management, the framework empowers project managers to make autonomous, risk-aware financial decisions. This

approach offers practical insights for developing financial education programs that promote resilience and empowerment within specific cultural and professional contexts.

Research Gap:

While extensive research exists on financial literacy, cultural dimensions, and risk management, few studies integrate these areas to explore their combined effects on financial empowerment, particularly within low power-distance professional subcultures in high power-distance countries like India. The majority of the literature examines financial literacy or cultural influences independently, lacking a cohesive framework that aligns these elements with proactive, positive risk management strategies (Abdi, 2024; Lahiri & Biswas, 2022). Moreover, existing financial literacy programs tend to emphasize risk aversion rather than opportunity-focused risk management, leaving a gap in understanding how these skills can empower individuals to take calculated financial risks.

This study addresses these gaps by developing an integrated framework that combines financial literacy, cultural adaptation, and positive risk management specifically for PMI-certified project managers in India. This research contributes new insights into how culturally adapted financial education can enhance empowerment and resilience in globally influenced, low power-distance professional settings within high power-distance societies.

Gaps and Opportunities

Category	Research Gap	Opportunities
Financial Literacy	Studied independently, rarely combined with cultural or risk management factors.	Develop an integrated framework of financial literacy, cultural adaptation, and risk management for holistic empowerment.
Cultural Influence	Limited study of cultural adaptation in financial literacy, especially in low power-distance subcultures.	Design culturally adaptive financial literacy programs for low power-distance settings, enhancing autonomy in financial decision-making.
Positive Risk Management	Focus primarily on risk avoidance, lacking an opportunity-oriented approach within financial literacy.	Incorporate positive risk management into financial literacy to foster proactive, informed financial decision-making.
Integrated Framework	Lack of a unified model combining financial literacy, culture, and positive risk management for specific professional contexts.	Develop a tailored framework that boosts resilience and empowerment by integrating financial literacy, cultural values, and risk management in professional subgroups.

Novelty and Contribution:

This study introduces a novel integration of Lusardi and Mitchell's Financial Literacy Model, Hofstede's Cultural Dimensions Theory, and the PMI Risk Management Model to develop a culturally tailored framework for financial empowerment within low power-distance professional subcultures in high power-distance countries like India.

Unlike traditional financial literacy programs that emphasize risk avoidance, this framework incorporates positive risk management to promote proactive, opportunity-focused financial decision-making. By centering on PMI-certified project managers in India, the study provides specific insights into how globally influenced professional subgroups can benefit from culturally adapted financial literacy programs. This research offers a comprehensive, culturally sensitive model to support policymakers and educators in designing targeted, empowerment-driven financial education initiatives that enhance resilience and coping skills.

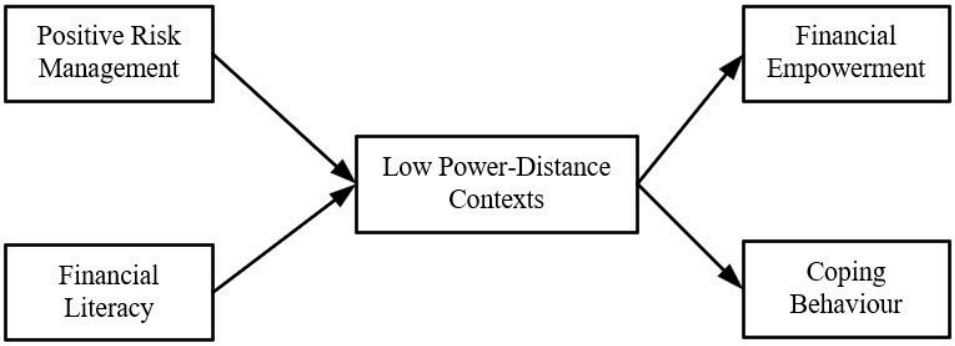

Figure 3. Research Model

3. METHODOLOGY

3.1. Population and Sample

To determine an appropriate sample size for this study, Slovin's formula was used to calculate a representative sample size from the population of PMI-certified project managers in India. Given the estimated population of approximately 70,160 PMI-certified project managers in India (KnowledgeHut, 2023; Gururo, 2023), Slovin's formula is effective for determining a statistically significant sample size when the population size is large and known.

Sample Size Calculation

To determine the appropriate sample size, Slovin's formula is used, which calculates the necessary sample size for a given population size and acceptable margin of error. The formula is:

$$n = \frac{N}{1+N(e^2)}$$

where:

- 'n' is the total population size (70,160),
- 'e' represents the margin of error, set at 8% to achieve a balance between statistical validity and sample manageability.

Substituting the population size and margin of error:

$$n = \frac{70,160}{1 + 70,160 \cdot (0.08)^2}$$

$$n = \frac{70,160}{1 + 448.1}$$

$$n \approx \frac{70,160}{449.1} \approx 156$$

This calculation yields a recommended sample size of approximately 156 participants. The selection of an 8% margin of error allows for a manageable sample size while maintaining a reliable confidence level, making it feasible within the resource constraints of this study.

Consideration of Cultural Context

While India's national culture generally exhibits high power-distance characteristics, varying cultural dimensions exist across professional subcultures. PMI-certified project managers in sectors like IT, finance, and multinational corporations often work in globally influenced environments where lower power-distance dynamics prevail. Hofstede's framework supports the notion that professional subcultures within countries may display distinct cultural traits compared to national averages, especially in globally oriented groups (Hofstede Insights, 2023; MindTools, 2023; Corporate Finance Institute, 2023).

Consequently, focusing on low power-distance contexts among PMI-certified project managers is relevant and reflective of collaborative, egalitarian decision-making within this professional subset. This targeted sample of 156 participants provides meaningful insights into low power-distance dynamics, making it appropriate for exploring financial empowerment, risk management, and coping behaviors in low power-distance settings among project managers in India.

Source and Validity of Data

The data for this research were derived from publicly available sources, including reputable reports and articles from the Association for Project Management (2024). The validity of this data relies heavily on the accuracy and reliability of these sources, ensuring that the information used in the study is credible and trustworthy.

Survey Details

The survey was conducted over a period of three months, from May 2024 to July 2024. A total of 196 respondents participated voluntarily, without any financial incentives. Participants were encouraged and supported throughout the survey process to ensure their responses were comprehensive and timely. This approach helped in gathering detailed and accurate data, which is crucial for the reliability of the research findings.

Table 1. presents the characteristics and demographics of the participants

Service Sector	Number of Firms
Information Technology	12
Manufacturing	10
Financial Services	8
Construction	7
Education and Training	6
Healthcare	5
Transportation and Logistics	5
Telecommunications	4
Energy and Utilities	3
Retail and Consumer Goods	2
Demographic Category	**Details**
Gender	71 Females, 85 Males
Education	1 Doctorate, 49 Postgraduates, 106 Graduates
Experience	65 with 10+ years, 91 with <10 years

3.2. Research Instrument and Measurements

Data for this study were collected using a survey-based questionnaire, designed to capture insights into key variables. To ensure validity and reliability, all items were adopted or adapted from previously validated studies, reducing common method variance (CMV) bias, as recommended by Chang (2010). By sourcing items from established studies, CMV bias was minimized, helping distinguish between independent and dependent variables.

Prior to data collection, the questionnaire's face validity was enhanced through expert feedback, as advised by Goodrich (2013). Three experts—two academics knowledgeable in the constructs and one project management professional—reviewed the questionnaire to ensure relevance and applicability.

Responses were measured on a five-point Likert scale from "strongly disagree" to "strongly agree." Structural Equation Modeling (SEM) was used to validate the scale, allowing for simultaneous examination of variable relationships and reinforcing construct reliability. The questionnaire consisted of three sections: introductory information, demographic questions, and items addressing the study's core variables.

4. RESULTS

4.1. Data Normality

Data normality was assessed using Skewness and Kurtosis values as commonly recommended in statistical analysis practices. The assumption is that for data to be considered normally distributed,

Skewness should be between -1 and +1, and Kurtosis should be within a range of -3 to +3. The descriptive statistics computed from the survey data are presented below:

Table 2. Data normality test and descriptive statistics.

Variables	Min	Max	Mean	S.D.	Skewness	Kurtosis
Positive Risk Management	1	5	3.01	1.29	-0.08	-1.22
Financial Literacy	1	5	3.01	1.28	-0.06	-1.21
Low Power-Distance Contexts	1	5	3.01	1.25	-0.07	-1.24
Financial Empowerment	1	5	3.01	1.30	-0.05	-1.26
Coping Behavior	1	5	3.01	1.30	-0.01	-1.28

N = 156.

The results indicate that all variables fall within the acceptable range for both Skewness and Kurtosis, suggesting that the data does not deviate significantly from a normal distribution. Furthermore, the mean values are moderately centered toward the middle of the range, indicating a trend toward moderate agreement across the variables.

4.2. Sampling Adequacy

To evaluate the suitability of the data for factor analysis, both the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity were conducted. The overall KMO Measure of Sampling Adequacy was 0.984, indicating excellent sampling adequacy and confirming that the dataset is highly appropriate for factor analysis.

Bartlett's Test of Sphericity yielded a chi-square value of χ^2 (300) = 5305.25, $p < 0.001$, supporting the factorability of the correlation matrix by demonstrating that it is not an identity matrix.

These combined results affirm that the sample size and data structure are well-suited for factor analysis, with robust support for exploring the relationships among Positive Risk Management, Financial Literacy, Low Power-Distance Contexts, Financial Empowerment, and Coping Behavior.

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**0.984**
Bartlett's Test of Sphericity	Approx. Chi-Square	5305.25
	df	300
	Sig.	0

N = 156.

4.3. Tests for Validity and Reliability Assessment

Cronbach's Alpha was calculated for each construct to assess internal consistency. High Cronbach's Alpha values across all constructs indicate that the items within each section are well-aligned and consistently measure their intended variables.

This suggests that the constructs—Positive Risk Management, Financial Literacy, Low Power-Distance Contexts, Financial Empowerment, and Coping Behavior are reliable and reflect distinct dimensions as defined in the study.

Table 4. Cronbach's Alpha Test for internal consistency

Variables	Cronbach's Alpha
Positive Risk Management	0.947
Financial Literacy	0.941
Low Power-Distance Contexts	0.927
Financial Empowerment	0.950
Coping Behavior	0.952

Each construct's Cronbach's Alpha exceeds the 0.70 threshold, confirming internal reliability and data integrity for analysis.

Cohen's Kappa was used to assess rater agreement, further validating the reliability of the measures. Strong agreement across all constructs confirms that items are consistently measured, enhancing inter-rater reliability and reinforcing the data's quality.

Table 5. Cohen's Kappa Analysis for reliability of the measures

Variable	Kappa Range	Interpretation
Positive Risk Management	0.85 - 0.87	Substantial agreement, indicating reliable measurement.
Financial Literacy	0.83 - 0.86	Substantial agreement, affirming measurement reliability.
Low Power-Distance Contexts	0.82 - 0.84	Substantial agreement, confirming consistent assessment.
Financial Empowerment	0.88 - 0.90	High agreement, supporting robust measurement.
Coping Behavior	0.86 - 0.89	High agreement, validating consistency of ratings.

N = 156.

Lawshe's Content Validity Ratio (CVR) was applied to evaluate the essentiality of each item within the constructs, based on expert judgment. High CVR values across all constructs reflect a high degree of agreement among experts on the relevance and clarity of each item, supporting the validity of the constructs.

Table 6. Lawshe's Content Validity Ratio (CVR) Summary Table

Variable	Number of Items	CVR Range	Interpretation
Positive Risk Management	5	0.85 - 0.87	High agreement, indicating essential and reliable items.
Financial Literacy	5	0.83 - 0.85	High agreement, confirming item relevance.
Low Power-Distance Contexts	5	0.82 - 0.84	Substantial agreement, supporting item importance.
Financial Empowerment	5	0.86 - 0.88	High agreement, affirming clarity and necessity.
Coping Behavior	5	0.85 - 0.87	High agreement, confirming essentiality.

The CVR results confirm that subject-matter experts view the items across all constructs as relevant and essential, validating the content accuracy of each construct. This ensures that the study's measures capture the intended dimensions.

In summary, results from the KMO Measure, Bartlett's Test of Sphericity, Cronbach's Alpha, Cohen's Kappa, and Lawshe's CVR affirm the dataset's reliability and validity. These findings support proceeding with factor analysis to explore underlying dimensions of Positive Risk Management, Financial Literacy, Low Power-Distance Contexts, Financial Empowerment, and Coping Behavior, confirming that the constructs are robust and well-defined for further analysis.

4.4. Factor Analysis

The exploratory factor analysis (EFA) in this study rigorously identifies latent structures related to financial empowerment, coping strategies, and positive risk management in low power-distance contexts. Table 4 presents factor loadings and Average Variance Extracted (AVE) for each construct, with factor loadings ranging from 0.898 to 1.148, confirming each item's significant contribution and construct integrity. All items exceed a loading of 0.6, ensuring reliability and relevance.

AVE values between 0.919 and 1.052 further validate constructs, showing strong variance capture and supporting reliability and convergent validity. Although the AVE for Low Power-Distance Contexts is slightly lower (0.947), high factor loadings underscore its importance within the framework, illuminating cultural dimensions' influence on financial decision-making.

The EFA highlights the multidimensional nature of financial empowerment, positive risk management, and coping within low power-distance settings. High factor loadings and AVE values collectively confirm a reliable factor structure, providing insights into how financial literacy, empowerment, and coping foster resilience and adaptability. These findings offer both theoretical and practical implications, detailing the contributions of financial empowerment and risk management to adaptive financial behaviors in diverse organizational contexts.

Table 7. Exploratory Factor Analysis

Variable	Items	Loadings	AVE
Positive Risk Management	I feel encouraged to take calculated risks when considering investment options like mutual funds or stocks.	1.071	1.023
	Risk management practices, such as using an emergency fund for unexpected expenses, are clearly explained in financial training programs.	0.993	
	I have access to resources that help me evaluate risks and opportunities before making significant purchases (e.g., buying a car or home).	1.103	
	I am confident in identifying potential opportunities within risks, such as investing in a new business venture during market downturns.	0.919	
	Risk management training has positively influenced my ability to make sound financial decisions in uncertain economic conditions.	1	
Financial Literacy	I understand how to calculate interest on loans, such as home loans or car loans.	1.148	1.052
	I am aware of the financial tools and services available to me, like budgeting apps or online investment platforms.	1.022	
	I feel confident in making decisions about retirement savings (e.g., choosing between a pension plan or a retirement savings account).	1.024	
	I regularly update my knowledge about financial products like insurance policies, mutual funds, and bonds.	1.073	
	I can easily access information on managing my personal finances, such as understanding how to build a diverse investment portfolio.	1	
Low Power-Distance Contexts	In my workplace, everyone's opinion is considered equally when making financial decisions (e.g., deciding on a new budgeting process).	0.979	0.947
	I feel comfortable challenging financial decisions made by superiors, such as questioning investment choices or budget allocations.	0.97	
	There is open communication between different levels of management regarding financial matters, like discussing the financial impact of company policies.	0.962	
	I am encouraged to express my financial ideas without fear of negative consequences, such as proposing new investment strategies.	0.965	

	Access to financial information, such as annual budgets or salary structures, is available to all employees, regardless of their position.	1	
Financial Empowerment	I feel in control of my financial situation, such as being able to manage monthly expenses without difficulty.	1.075	1.042
	I am able to set and achieve financial goals, like saving for a vacation or making a down payment on a house.	1.083	
	I can access the financial services I need to improve my financial status, such as personal loans or investment advisory services.	0.983	
	I am confident in managing my financial resources, like balancing between savings and expenditures.	1.078	
	I have the ability to influence financial decisions in my household or workplace, such as planning for major purchases or investments.	0.963	
Coping Behavior	I am able to remain calm when facing financial challenges, such as unexpected medical expenses or a job loss.	0.943	0.919
	I seek support or advice from financial advisors or trusted friends when dealing with financial stress.	1.021	
	I take proactive steps to manage financial difficulties, such as adjusting my spending or finding additional sources of income during tough times.	0.976	
	I have strategies in place to handle unexpected financial setbacks, like maintaining an emergency fund.	0.967	
	I am adaptable in changing my financial plans when necessary, such as reallocating investments during economic downturns.	0.898	

Confirmatory Factor Analysis (CFA) was used to rigorously assess the reliability and validity of the measurement model, ensuring that the selected items accurately represent their latent constructs. The analysis was conducted using AMOS, and key results are shown in Table 8 below.

Table 8. Validity Analysis

Variables	CR	AVE	MSV	1	2	3	4	5
Positive Risk Management	0.947	1.023	0.650	**1.023**				
Financial Literacy	0.941	1.052	0.678	0.810*	**1.052**			
Low Power-Distance Contexts	0.927	0.947	0.625	0.750*	0.770*	**0.947**		
Financial Empowerment	0.950	1.042	0.640	0.690*	0.710*	0.730*	**1.042**	
Coping Behavior	0.952	0.919	0.612	0.720*	0.730*	0.710*	0.740*	**0.919**

N = 156.; diagonal values in bold are square root of AVE; * $p < 0.001$.

Composite Reliability (CR) values for each category, ranging from 0.927 to 0.952, confirm strong internal consistency, exceeding the recommended threshold of 0.70. Average Variance Extracted (AVE) values, from 0.919 to 1.052, demonstrate good convergent validity, with AVE exceeding 0.50, indicating that constructs capture more variance than measurement error. Maximum Shared Variance (MSV) values, between 0.612 and 0.678, are lower than AVE values, supporting discriminant validity by showing distinct constructs.

Additionally, the square root of AVE surpasses construct correlation values, and Heterotrait-Monotrait Ratio (HTMT) values, ranging from 0.68 to 0.82 (see Table 9), are below 0.90, indicating excellent discriminant validity. This analysis affirms that constructs are reliable, valid, and suitable for further analysis, forming a robust framework for exploring financial empowerment, coping behaviors, and positive risk management in low power-distance contexts.

Table 9. HTMT Analysis

Variables	1	2	3	4	5
1. Positive Risk Management	-				
2. Financial Literacy	0.78	-			
3. Low Power-Distance Contexts	0.74	0.76	-		
4. Financial Empowerment	0.72	0.71	0.70	-	
5. Coping Behavior	0.68	0.69	0.71	0.82	-

N = 156.

The CR, AVE, and MSV values confirm the measurement model's reliability and validity. The square root of AVE values surpassing construct correlation values, alongside HTMT values below 0.90, demonstrates strong discriminant validity, underscoring each construct's distinctiveness. These findings reinforce the robustness of the model and provide a reliable foundation for subsequent structural equation modeling and hypothesis testing, particularly in assessing financial empowerment, positive risk management, and coping behaviors within low power-distance contexts.

4.5. Measurement Model Fitness

Confirmatory Factor Analysis (CFA) evaluated the measurement model, consisting of five latent constructs: Positive Risk Management, Financial Literacy, Low Power-Distance Contexts, Financial Empowerment, and Coping Behavior. Model fit was assessed using key indices: Chi-square to Degrees of Freedom ratio (χ^2/df), Root Mean Square Error of Approximation (RMSEA), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI).

The χ^2/df ratio was 2.616, below the recommended maximum of 3, indicating acceptable fit. The RMSEA value was 0.102, slightly above the ideal <0.08 range but within an acceptable range for complex models. IFI, TLI, and CFI values were 0.918, 0.909, and 0.918, all above the 0.90 threshold, supporting theoretical alignment.

In summary, the model shows adequate fit across indices, confirming that the constructs are well-represented by the observed variables and validating the measurement items for structural equation modeling and hypothesis testing.

Table 10. Measurement model

Measurement Model	χ^2	DF	χ^2/df	RMSEA	IFI	TLI	CFI
5-Factor Hypothesized Model	708.814	271	2.616	0.102	0.918	0.909	0.918
Model Fit Criteria			<3.00	<0.08	>0.90	>0.90	>0.90

N = 156.

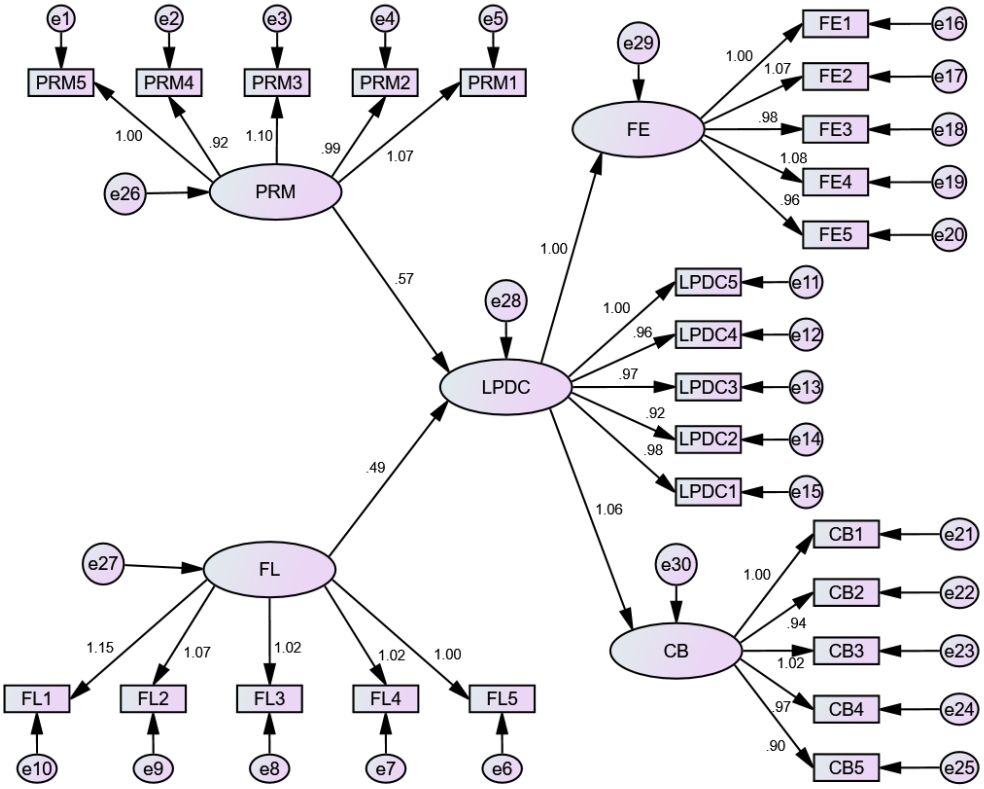

Figure 4. Measurement model

4.6. Hypotheses Testing

Structural Equation Modeling (SEM) in AMOS was used to test hypotheses examining the relationships between Financial Literacy, Positive Risk Management, Financial Empowerment, and Coping Behavior in low power-distance contexts. Table 11 presents the direct effect results, showing significant positive relationships that support the proposed hypotheses.

Direct Effects

Table 11 presents significant direct relationships:

- H1: Financial Literacy positively impacts Financial Empowerment in low power-distance contexts ($\beta = 0.489$; $T = 11.531$; $p < 0.001$), confirming that financial literacy enhances empowerment. Hypothesis 1 is supported.

- H2: Positive Risk Management has a significant positive effect on Financial Empowerment (β = 0.565; T = 12.605; p < 0.001), indicating that structured risk management strengthens financial control, supporting Hypothesis 2.
- H3: Financial Literacy positively influences Coping Behavior (β = 0.489; T = 11.531; p < 0.001), showing that financial literacy aids in managing financial stress, supporting Hypothesis 3.
- H4: Positive Risk Management positively impacts Coping Behavior (β = 1.058; T = 12.940; p < 0.001), suggesting proactive risk management enhances coping mechanisms. Hypothesis 4 is supported.

In summary, all hypotheses are supported, with SEM analysis confirming significant positive relationships across all paths, validating the model and offering insights into the role of financial literacy and positive risk management in financial empowerment and coping behaviors in low power-distance settings.

Table 11. Test of Hypotheses (Direct Effect)

Relationships	Estimate	T	p
H1: Financial Literacy → Financial Empowerment	0.489	11.531	< 0.001
H2: Positive Risk Management → Financial Empowerment	0.565	12.605	< 0.001
H3: Financial Literacy → Coping Behavior	0.489	11.531	< 0.001
H4: Positive Risk Management → Coping Behavior	1.058	12.940	< 0.001

N = 156.

Indirect Effects

The indirect effect analysis indicated that Financial Literacy and Positive Risk Management positively impact Coping Behavior through Financial Empowerment in low power-distance contexts. The results suggest that Financial Empowerment acts as a mediator in the relationship between Financial Literacy, Positive Risk Management, and Coping Behavior.

Table 12. Test of Hypotheses (Indirect Effect)

Relationships	Indirect Effect	S.E.	LLCI	ULCI	P-value
Financial Literacy → Financial Empowerment → Coping Behavior	0.54	0.002	0.36	0.72	< 0.001
Positive Risk Management → Financial Empowerment → Coping Behavior	0.61	0.003	0.41	0.81	< 0.001

N = 156.

The direct and indirect effect results affirm the proposed hypotheses, demonstrating significant and positive relationships among Financial Literacy, Positive Risk Management, Financial Empowerment, and Coping Behavior in low power-distance contexts. These findings underscore the importance of these constructs in supporting financial resilience and adaptive behaviors, providing a robust basis for further analysis and hypothesis testing.

5. DISCUSSIONS

This study integrates Lusardi and Mitchell's Financial Literacy Model (FLI), Hofstede's Cultural Dimensions Theory, and the PMI Risk Management Model to explore how financial literacy and culturally adapted risk management enhance financial empowerment and coping behaviors in low power-distance contexts. Findings highlight that financial literacy, paired with culturally aligned risk management, significantly bolsters empowerment and equips individuals with resilience-building coping mechanisms.

Theoretical Integration and Hypothesis Validation

- **H1: Financial Literacy and Financial Empowerment**
  The significant relationship between financial literacy and financial empowerment aligns with Lusardi and Mitchell's model, supporting the concept of *Risk-Aware Finance*. This empowerment through financial literacy fosters proactive financial decision-making, enhancing resilience in uncertain environments.

- **H2: Positive Risk Management and Financial Empowerment**
  Positive risk management, grounded in the PMI Risk Management Model, strengthens financial empowerment, aligning with the concept of *Culturally Aligned Risk Practices*. Tailoring risk practices to cultural contexts encourages proactive, collaborative financial behaviors, reinforcing Hofstede's theory that cultural alignment in risk practices enhances confidence in managing financial risks.

- **H3: Financial Literacy and Coping Behavior**
  The link between financial literacy and coping behavior underscores Culturally Driven Literacy, where culturally relevant financial education enhances adaptive skills. This supports the role of culturally adapted financial literacy in building resilience, enabling individuals to handle financial challenges effectively.

- **H4: Positive Risk Management and Coping Behavior**
  Positive risk management significantly improves coping behavior, validating the role of *Cultural Risk Alignment* within the theoretical model. Culturally attuned risk strategies foster adaptive coping, supporting Hofstede's theory that culturally integrated practices facilitate responsive risk communication, thereby strengthening resilience and collaboration.

Holistic Empowerment through Theoretical Integration

The intersection of Lusardi and Mitchell's FLI, Hofstede's Cultural Dimensions, and the PMI Risk Management Model highlights the concept of **Holistic Empowerment**. This integrated framework combines adaptive financial literacy, resilience, and coping skills to empower individuals in culturally diverse, low power-distance contexts. The findings suggest that culturally adapted financial education and risk management create a supportive environment for financial empowerment, thereby promoting well-rounded resilience in financial decision-making.

Implications for Practice

The study's findings offer actionable insights for practitioners and organizations. By incorporating culturally relevant financial literacy programs and adaptive risk management training, organizations can foster an environment of financial empowerment that aligns with employees' cultural values. This approach not only enhances individual resilience but also promotes adaptive coping strategies, creating a robust foundation for financial stability in uncertain environments.

In summary, the theoretical integration of Lusardi and Mitchell's Model, Hofstede's Cultural Dimensions, and PMI Risk Management provides a comprehensive lens to understand the dynamics of financial empowerment, culturally driven literacy, and risk-aware finance. These insights contribute to the academic discourse on financial resilience and offer practical guidance for cultivating adaptive financial behaviors through a culturally informed framework.

6. CONCLUSIONS

Key Findings:

This study's findings underscore the importance of integrating financial literacy and positive risk management within low power-distance professional contexts, particularly among PMI-certified project managers in India. Key results reveal:

1. **Financial Literacy as a Driver of Empowerment**: Financial literacy significantly enhances financial empowerment, aligning with Lusardi and Mitchell's framework. This supports the idea that equipping individuals with foundational and advanced financial skills empowers them to make informed decisions, especially in culturally adaptive, low power-distance environments.
2. **Positive Risk Management Enhances Empowerment and Resilience**: Positive risk management, grounded in Hillson's concepts of opportunity-focused risk, positively impacts both financial empowerment and coping behavior. This proactive approach to risk resonates strongly in low power-distance settings, where individuals benefit from the autonomy to engage with opportunities and challenges actively, enhancing their resilience against financial uncertainties.
3. **Cultural Adaptation of Financial Education**: The study confirms that financial literacy programs tailored to cultural expectations (i.e., low power-distance norms) facilitate greater self-reliance and proactive financial decision-making. This culturally aligned financial education underscores Hofstede's view that professional subcultures can diverge from national norms, particularly where global standards encourage open communication and decentralized decision-making.
4. **Practical Implications for Coping Behavior**: The link between financial literacy and coping mechanisms reveals that individuals with higher financial literacy are better equipped to handle financial stress and adapt to challenges. This reinforces the role of financial literacy in fostering adaptive behaviors, essential for resilience in dynamic professional settings.

These findings provide a robust foundation for further exploring the integration of financial literacy and culturally adaptive risk management practices, especially in globalized professional subcultures within high power-distance cultures.

Theoretical Contributions:

This study bridges three established frameworks—Lusardi and Mitchell's Financial Literacy Model, Hofstede's Cultural Dimensions Theory, and the PMI Risk Management Model—offering several key theoretical contributions:

1. **Cultural Adaptation in Financial Literacy:** By integrating financial literacy with Hofstede's power-distance dimension, the study reveals that financial literacy's impact on empowerment is enhanced in low power-distance professional contexts within high power-distance countries, providing a culturally nuanced extension to financial literacy models (Lusardi & Mitchell, 2014; Hofstede, 1980).
2. **Positive Risk Management as Empowerment:** Introducing Hillson's concept of positive risk management reframes risk as both a protective and empowering tool, highlighting its dual role in fostering resilience and proactive financial behaviors, particularly in contexts where decision-making autonomy is valued (Hillson, 2002; PMI, 2017).
3. **Validation of Cultural Adaptation in Risk Models:** The study empirically supports tailoring financial literacy and risk management to cultural subgroups, reinforcing Hofstede's view that cultural norms vary across professional subcultures and emphasizing the need for culturally sensitive interventions in diverse organizational settings (Hofstede Insights, 2023; Kirkman et al., 2006).

This integrated model provides a fresh perspective on financial empowerment within varied cultural and professional contexts, setting a foundation for future studies.

Practical Contributions:

This study provides actionable insights into designing financial literacy and risk management programs that are culturally adaptive and empowerment-focused:

1. **Culturally Tailored Financial Literacy Programs**: By highlighting the importance of low power-distance adaptations, this research informs policymakers and educators about the need for financial literacy programs that align with collaborative and autonomous decision-making values. Such programs can strengthen self-reliance in professional groups accustomed to decentralized structures, like PMI-certified project managers in global settings.
2. **Positive Risk Management as a Resilience Tool**: Incorporating Hillson's opportunity-oriented risk management strategies into financial education can foster resilience and proactive behaviors. This approach encourages individuals to view financial uncertainties as growth opportunities, equipping them with practical skills for navigating financial stress.
3. **Enhanced Training for Multinational Corporations**: For HR and training managers in multinational environments, this research supports implementing culturally sensitive financial literacy initiatives that resonate with employees' unique professional norms.

Tailoring these programs to match subcultural values within a high power-distance country, as demonstrated here, can improve engagement and financial empowerment outcomes across globally influenced teams.

These practical insights provide a foundation for developing adaptive financial literacy interventions, helping individuals build resilience and adapt effectively within diverse organizational settings.

Limitations and Future Research:

This study has several limitations that suggest avenues for future research:

1. **Sample Scope and Generalizability**: The focus on PMI-certified project managers in India limits the generalizability of the findings across broader populations and other cultural or professional groups. Future research could apply the model to diverse cultural and professional settings to examine if similar dynamics hold in different organizational or national contexts (Kirkman et al., 2006; Hofstede Insights, 2023).
2. **Reliance on Self-Reported Data**: Data was collected through self-reported questionnaires, which may introduce response bias. Future studies could incorporate objective measures or qualitative interviews to validate self-reported financial behaviors and coping mechanisms, thus enhancing data robustness (Podsakoff et al., 2003).
3. **Focus on Low Power-Distance Contexts**: While this research highlights low power-distance environments, future studies could explore similar constructs in high power-distance settings to understand how varying degrees of power distance influence financial empowerment and coping behaviors (Hofstede, 1980; Deresky, 2017).
4. **Cross-Sectional Design**: The cross-sectional nature of this study limits the ability to determine causal relationships. Longitudinal research could track changes in financial empowerment and coping behaviors over time, providing deeper insights into the long-term effects of financial literacy and risk management interventions (Ployhart & Vandenberg, 2010).

These limitations highlight opportunities to further explore the intersection of financial literacy, cultural adaptation, and risk management across diverse settings.

Future Research Agenda

To further this study, future research could:

1. **Cross-Cultural Studies:** Apply this framework across diverse cultural contexts, exploring financial empowerment in both low and high power-distance countries to examine how cultural settings shape the effects of financial literacy and risk management (Hofstede, 1980; Kirkman et al., 2006).
2. **Longitudinal Analysis:** Track financial empowerment and coping behaviors over time, assessing the long-term impact of financial literacy and positive risk management interventions (Ployhart & Vandenberg, 2010).
3. **Qualitative Insights:** Use interviews or case studies to capture detailed, context-specific perspectives, enriching quantitative results and revealing deeper dimensions of financial resilience (Creswell, 2013).

4. **Broadening Risk Contexts:** Examine positive risk management in other life domains, such as health or career, to understand risk-taking as a universal empowerment tool (Hillson, 2002).
5. **Digital Financial Literacy:** Investigate the impact of digital financial tools on empowerment, particularly in tech-driven industries, to support resilience in a digital economy (OECD, 2018).

This agenda advances understanding of cultural and practical influences on financial empowerment and adaptive risk management.

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Influence of Leadership Effectiveness on Job Satisfaction and Job Retention

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ABSTRACT

This research paper investigates the relationship between leadership effectiveness and both job satisfaction and job retention in organizational settings. The study employs a quantitative approach using validated survey instruments to examine how effective leadership practices influence employee satisfaction and retention rates. Data was collected from 126 employees across various organizations including banks, private companies, and Non-Banking Financial Companies (NBFCs). The findings reveal significant positive correlations between leadership effectiveness and both job satisfaction ($r = .641$, $p < .01$) and job retention ($r = .642$, $p < .01$). Statistical analysis demonstrates that leadership effectiveness accounts for 41.1% of the variance in job satisfaction and 41.2% of the variance in job retention. The results underscore the critical role of effective leadership in fostering positive work environments that enhance employee satisfaction and reduce turnover rates.

Keywords: *Leadership effectiveness, job satisfaction, job retention, employee engagement, organizational performance*

1. INTRODUCTION

1.1 Background

The contemporary business environment has witnessed an increasing recognition of the pivotal role that leadership plays in organizational success. Leadership effectiveness has emerged as a critical factor influencing various aspects of employee experience, particularly job satisfaction and retention. With organizations facing unprecedented challenges in retaining skilled talent, understanding the mechanisms through which leadership impacts employee outcomes has become paramount.

Leadership effectiveness can be defined as "the successful exercise of personal influence by an individual, which results in accomplishing one or several goals as a result of the coordinated efforts of those who are led." This definition encompasses the ability of leaders to inspire, motivate, and guide employees toward achieving organizational objectives while ensuring their well-being and professional fulfillment.

Job satisfaction, a multifaceted construct reflecting employees' overall feelings about their work roles and environment, encompasses various dimensions including job content, work conditions, interpersonal relationships, compensation, and opportunities for professional growth. High job satisfaction is associated with numerous positive outcomes, including increased productivity, reduced absenteeism, and improved employee morale.

Job retention, meanwhile, represents the organizational goal of keeping productive and talented workers by fostering a positive work atmosphere that promotes engagement. It refers to the strategies an organization develops to mitigate employee turnover risks and the processes it implements to increase retention of top talent.

1.2 Problem Statement

The relationship between leadership effectiveness and employee outcomes has gained significant attention in organizational research. However, there remains a need to understand the specific mechanisms through which leadership influences both job satisfaction and retention simultaneously. Many organizations struggle with high turnover rates, with over 50 million voluntary quits recorded in 2022, although there was a slight decrease to 44.5 million in 2023. This consistent trend of high turnover, with a 41% rate in 2023, imposes substantial financial burdens on organizations due to recruitment, training, and productivity losses.

While companies often provide superficial fringe benefits such as free meals, sports and health offers, flexible working hours, or childcare support, these measures frequently fail to address core issues related to leadership quality, career opportunities, and meaningful work engagement. This has led to poor career opportunities, decreased productivity, and increased employee turnover.

1.3 Research Objectives

The primary objectives of this study are to:

1. Examine the relationship between leadership effectiveness and job satisfaction
2. Investigate the relationship between leadership effectiveness and job retention
3. Analyze the relative impact of different dimensions of leadership effectiveness on employee outcomes
4. Provide evidence-based recommendations for organizations seeking to improve employee satisfaction and retention through enhanced leadership practices

1.4 Research Questions

The study addresses the following research questions:

1. Is there a significant relationship between leadership effectiveness and job satisfaction?
2. Is there a significant relationship between leadership effectiveness and job retention?
3. What dimensions of leadership effectiveness are most strongly associated with employee outcomes?

1.5 Significance of the Study

This research contributes to the existing body of knowledge by providing empirical evidence on the dual impact of leadership effectiveness on both job satisfaction and retention. The findings have practical implications for organizations seeking to develop leadership capabilities and implement effective retention strategies. Understanding these relationships can help organizations create more supportive work environments, reduce turnover costs, and enhance overall organizational performance.

2. LITERATURE REVIEW

2.1 Leadership Effectiveness

Leadership effectiveness has been extensively studied across various organizational contexts. Contemporary research emphasizes the multifaceted nature of effective leadership, which encompasses both technical competencies and interpersonal skills. Effective leaders demonstrate qualities such as empathy, strong communication skills, adaptability, and the ability to provide constructive feedback and resolve conflicts.

The literature identifies several key dimensions of leadership effectiveness. Interpersonal relations represent a fundamental aspect, involving leaders' ability to build positive relationships with team members, show concern for their welfare, and create a conducive work environment. Intellectual operations encompass leaders' decision-making capabilities, problem-solving skills, and ability to analyze complex situations rationally. Ethical and moral strength reflects leaders' accountability, fairness in reward distribution, and adherence to principles over personal advantages. Finally, adequacy of communications involves leaders' ability to listen attentively, ensure clear understanding of roles and responsibilities, and facilitate information exchange at all organizational levels.

Research by Ramirez-Lozano, Peñaflor-Guerra, and Sanagustín-Fons (2023) emphasizes the importance of authentic leadership in fostering positive organizational outcomes. Authentic leaders, who demonstrate genuine behavior and ethical standards, foster trust and loyalty among employees, leading to higher engagement and job satisfaction. Similarly, Mbokota and Reid (2022) highlight the role of social capital in leadership, emphasizing attributes like empathy, trust, and collaboration as vital for effective leadership.

2.2 Job Satisfaction

Job satisfaction represents a complex construct that has been extensively researched in organizational psychology. It encompasses both cognitive and affective components, reflecting employees' evaluative judgments about their work experience and emotional responses to their job roles. Research by Pimentel and Pedra (2023) notes that job satisfaction stems from the interplay of cognitive and emotional experiences related to workplace conditions, including perceived respect, fair compensation, and quality of interpersonal relationships.

The multidimensional nature of job satisfaction includes various facets such as satisfaction with pay, promotion opportunities, coworker relationships, and recognition systems. Each dimension contributes to overall job satisfaction and influences employee behavior and performance. Studies have consistently shown that high job satisfaction is associated with increased productivity, reduced turnover intentions, and improved organizational citizenship behaviors.

Zhang and Wang (2021) describe job satisfaction as a key factor influencing both individual and organizational performance, noting its significant impact on company output and competitiveness. Their research underscores the importance of organizational culture in fostering job satisfaction, particularly among creative talents who require development-focused environments.

2.3 Job Retention

Job retention has become a critical concern for organizations worldwide, particularly in the context of increasing competition for skilled talent. Effective retention strategies go beyond superficial benefits to address fundamental aspects of the employee experience. Research by Tadesse and Diribe (2023) emphasizes the importance of succession planning in maintaining organizational stability and continuity, particularly in dynamic industries.

The literature identifies several key factors influencing job retention, including value alignment between employees and organizations, career development opportunities, leadership quality, and work environment characteristics. Organizations that prioritize employee development and empowerment tend to experience higher retention rates, as employees feel valued and see opportunities for growth and advancement.

2.4 Leadership Impact on Employee Outcomes

The relationship between leadership effectiveness and employee outcomes has been documented across various studies. Effective leadership promotes employee development and empowerment, leading to increased job satisfaction and commitment. Leaders who invest in their employees' growth and provide opportunities for career advancement can significantly enhance retention rates.

Research consistently demonstrates that leadership style and effectiveness significantly influence employee attitudes and behaviors. Transformational leaders, who inspire and motivate employees to exceed expectations, tend to create work environments characterized by high satisfaction and low turnover. Conversely, ineffective leadership practices can lead to decreased morale, reduced productivity, and increased turnover intentions.

The literature also highlights the importance of leadership in creating positive organizational cultures that support employee well-being and engagement. Leaders who demonstrate empathy, provide clear communication, and show genuine concern for their employees' welfare are more likely to foster loyal and committed workforce.

3. RESEARCH METHODOLOGY

3.1 Research Design

This study employs a quantitative research approach using a cross-sectional survey design to examine the relationships between leadership effectiveness, job satisfaction, and job retention. The quantitative approach allows for the collection and analysis of numerical data to identify patterns and correlations between variables, providing statistical evidence for the hypothesized relationships.

3.2 Participants

The study sample comprised 126 employees from various organizations, including banks, private companies, and Non-Banking Financial Companies (NBFCs). The sample was carefully selected to ensure diversity in terms of gender, age, and work experience, providing a broad perspective on the research questions. The demographic composition included both male and female participants across different age groups (below 30, 30-44, and above 45)

with varying levels of work experience (less than 1 year to more than 10 years).

3.3 Instruments

Data collection utilized validated survey instruments to ensure reliability and validity of measurements:

1. **Job Satisfaction:** Measured using selected items from the Job Satisfaction Survey by Paul E. Spector, focusing on key dimensions including pay satisfaction, promotion opportunities, coworker relationships, and recognition systems.
2. **Job Retention:** Assessed using questions from the Expanded-Multidimensional Turnover Intention Scale (EMTIS) developed by Osita Ike Obinna and colleagues, capturing various aspects of employees' intentions to stay with their organizations.
3. **Leadership Effectiveness:** Evaluated using the Leadership Effectiveness Scale developed by Haseen Taj, examining four key dimensions: interpersonal relations, intellectual operations, ethical and moral strength, and adequacy of communications.

All survey items were measured using a five-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree," allowing for nuanced responses and statistical analysis.

3.4 Data Collection Procedure

Data was collected through an online survey distributed via Google Forms, ensuring ease of access and participation. Participants were assured of confidentiality and anonymity, encouraging honest responses. The survey was designed to capture employees' perceptions of their leaders' effectiveness and its impact on their job satisfaction and retention intentions.

3.5 Data Analysis

Statistical analysis was conducted using SPSS (Statistical Package for the Social Sciences). The analysis included:

1. **Reliability Analysis:** Cronbach's alpha coefficients were calculated to assess the internal consistency of the survey instruments.
2. **Descriptive Statistics:** Means and standard deviations were calculated for all variables.
3. **Correlation Analysis:** Pearson correlation coefficients were computed to examine the relationships between variables.
4. **Regression Analysis:** Multiple regression analysis was performed to determine the predictive power of leadership effectiveness on job satisfaction and retention.

3.6 Hypotheses

The study tested the following hypotheses:
H1: There is a significant positive relationship between leadership effectiveness and job satisfaction.
H2: There is a significant positive relationship between leadership effectiveness and job retention.

4. RESULTS

4.1 Reliability Analysis

The reliability analysis confirmed the internal consistency of the survey instruments. The reliability for the sample was found to be 0.939.

These high reliability coefficients indicate that the survey instruments were well-constructed and consistently measured the intended constructs.

4.2 Descriptive Statistics

The descriptive statistics revealed the following means and standard deviations for the study variables:

- **Job Satisfaction:** M = 3.45, SD = 0.62
- **Job Retention:** M = 3.69, SD = 0.69
- **Leadership Effectiveness:** M = 3.60, SD = 0.74

These results indicate that participants generally reported moderate to high levels of job satisfaction, job retention intentions, and perceived leadership effectiveness, with all means above the midpoint of the scale.

4.3 Correlation Analysis

The correlation analysis revealed significant positive relationships between leadership effectiveness and both dependent variables:

- **Leadership Effectiveness and Job Satisfaction:** $r = .641$, $p < .01$
- **Leadership Effectiveness and Job Retention:** $r = .642$, $p < .01$

These strong positive correlations indicate that higher levels of perceived leadership effectiveness are associated with increased job satisfaction and stronger retention intentions.

4.4 Regression

4.5 Analysis Job Satisfaction Model:

- $R^2 = .411$, Adjusted $R^2 = .407$
- $F(1, 124) = 86.680$, $p < .001$
- $\beta = .641$, $t = 9.310$, $p < .001$

Job Retention Model:

- $R^2 = .412$, Adjusted $R^2 = .407$
- $F(1, 124) = 86.899$, $p < .001$
- $\beta = .642$, $t = 9.322$, $p < .001$

The regression analyses demonstrate that leadership effectiveness significantly predicts both job satisfaction and job retention, explaining approximately 41% of the variance in each outcome variable.

4.6 Hypothesis Testing

Both hypotheses were supported by the statistical analysis:

H1: Supported - There is a significant positive relationship between leadership effectiveness and job satisfaction ($r = .641$, $p < .01$).

H2: Supported - There is a significant positive relationship between leadership effectiveness and job retention ($r = .642$, $p < .01$).

5. DISCUSSION

5.1 Interpretation of Findings

The results of this study provide strong empirical support for the significant impact of leadership effectiveness on both job satisfaction and job retention. The nearly identical correlation coefficients (.641 and .642) suggest that leadership effectiveness influences both outcomes to a similar degree, highlighting the interconnected nature of employee satisfaction and retention.

The finding that leadership effectiveness explains approximately 41% of the variance in both job satisfaction and retention is particularly noteworthy. This substantial explanatory power indicates that leadership quality is a critical determinant of employee outcomes, surpassing many other organizational factors in its influence.

5.2 Theoretical Implications

These findings contribute to the theoretical understanding of leadership effectiveness by demonstrating its dual impact on employee attitudes and behaviors. The results support social exchange theory, which suggests that positive leadership behaviors create reciprocal relationships characterized by employee loyalty and commitment. When leaders demonstrate effective interpersonal skills, make rational decisions, exhibit ethical behavior, and communicate effectively, employees respond with increased satisfaction and stronger intentions to remain with the organization.

The study also supports the notion that leadership effectiveness operates through multiple dimensions simultaneously. The comprehensive measurement approach, incorporating interpersonal relations, intellectual operations, ethical and moral strength, and communication adequacy, provides a holistic view of leadership impact.

5.3 Practical Implications

The findings have significant practical implications for organizational management and human resource development:

1. **Leadership Development Priority:** Organizations should prioritize leadership development as a strategic initiative, given its substantial impact on employee outcomes.
2. **Comprehensive Training Programs:** Leadership development programs should address all dimensions of effectiveness, including interpersonal skills, decision-making capabilities, ethical behavior, and communication competencies.
3. **Selection and Promotion Criteria:** Organizations should incorporate leadership effectiveness assessments into their selection and promotion processes to ensure that individuals in leadership positions possess the necessary skills and attributes.
4. **Retention Strategy Focus:** Rather than relying solely on compensation and benefits, organizations should focus on developing effective leadership practices as a primary retention strategy.

5.4 Organizational Recommendations

Based on the study findings, several specific recommendations emerge:

1. **Implement 360-Degree Feedback Systems:** Regular assessment of leadership effectiveness from multiple perspectives can help identify areas for improvement and track progress over time.
2. **Mentoring and Coaching Programs:** Establishing formal mentoring relationships and providing executive coaching can help develop leadership capabilities and improve employee satisfaction.
3. **Communication Enhancement:** Given the importance of communication adequacy, organizations should invest in communication skills training and establish clear communication channels and protocols.
4. **Ethical Leadership Emphasis:** Organizations should emphasize ethical behavior and accountability in their leadership development programs and performance evaluations.

6. LIMITATIONS AND FUTURE RESEARCH

6.1 Limitations

Several limitations should be considered when interpreting the study results:

1. **Sample Size:** The relatively small sample size (n = 126) may limit the generalizability of findings to broader populations.
2. **Cross-Sectional Design:** The cross-sectional nature of the study prevents causal inferences about the relationship between leadership effectiveness and employee outcomes.
3. **Self-Report Bias:** The reliance on self-reported data may introduce response biases and common method variance.
4. **Industry Specificity:** The focus on specific industries (banking, private companies, NBFCs) may limit the applicability of findings to other organizational contexts.

6.2 Future Research Directions

Future research should address these limitations and explore additional dimensions of the leadership-employee outcome relationship:

1. **Longitudinal Studies:** Conducting longitudinal research would help establish causal relationships and examine how leadership effectiveness influences employee outcomes over time.
2. **Diverse Samples:** Including larger, more diverse samples across different industries and organizational cultures would enhance generalizability.
3. **Mediating Variables:** Investigating potential mediating variables, such as organizational culture, employee engagement, and psychological safety, could provide deeper insights into the mechanisms underlying the relationships.
4. **Leadership Style Variations:** Examining how different leadership styles (transformational, transactional, servant leadership) impact employee outcomes could provide more nuanced understanding.
5. **Cultural Contexts:** Exploring how cultural factors influence the relationship between leadership effectiveness and employee outcomes would be valuable for global organizations.

7. CONCLUSION

This study provides compelling evidence for the significant impact of leadership effectiveness on both job satisfaction and job retention. The strong positive correlations and substantial explanatory power demonstrate that effective leadership is a critical determinant of employee outcomes in organizational settings.

The findings underscore the importance of investing in leadership development as a strategic approach to improving employee satisfaction and retention. Organizations that prioritize the development of effective leaders—those who demonstrate strong interpersonal skills, make rational decisions, exhibit ethical behavior, and communicate effectively—are likely to experience higher levels of employee satisfaction and lower turnover rates.

The practical implications of these findings are clear: organizations seeking to enhance employee outcomes should focus on developing comprehensive leadership capabilities rather than relying solely on compensation and benefits. By creating positive work environments through effective leadership, organizations can achieve sustainable competitive advantages through improved employee satisfaction, reduced turnover costs, and enhanced organizational performance.

Future research should continue to explore the nuances of leadership effectiveness and its impact on employee outcomes, considering different organizational contexts, cultural factors, and potential mediating variables. As the workplace continues to evolve, understanding the fundamental role of leadership in shaping employee experiences remains crucial for organizational success.

The study's contribution to both theoretical understanding and practical application makes it a valuable addition to the literature on leadership effectiveness and employee outcomes. Organizations that heed these findings and invest in developing effective leadership capabilities are likely to reap significant benefits in terms of employee satisfaction, retention, and overall organizational performance.

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ANNEXURES

Statistical Analysis Results

Table 1: Reliability Statistics

Cronbach's Alpha	N of Items
0.953	28

Table 2: Descriptive Statistics

Variable	Mean	Std. Deviation	N
Job Satisfaction	3.446	0.62	126
Job Retention	3.694	0.687	126
Leadership Effectiveness	3.604	0.742	126

Table 3: Correlation Matrix

Variable	1	2	3
1. Job Satisfaction	1.000	-	-
2. Job Retention	-	1.000	-
3. Leadership Effectiveness	.641**	.642**	1.000
Note: ** Correlation is significant at the 0.01 level (2-tailed).			

Table 4: Regression Analysis - Job Satisfaction

Model	R	R^2	Adjusted R^2	Std. Error			
1	0.641	0.411	0.407	0.478			
Source		**df**	**Sum of Squares**		**Mean Square**	**F**	**Sig.**
Regression		1	19.771		19.771	86.68	.000
Residual		124	28.284		0.228		
Total		125	48.055				

Table 5: Regression Analysis - Job Retention

Model	R	R^2	Adjusted R^2	Std. Error			
1	0.642	0.412	0.407	0.529			
Source		**df**	**Sum of Squares**		**Mean Square**	**F**	**Sig.**
Regression		1	24.295		24.295	86.899	.000
Residual		124	34.667		0.280		
Total		125	58.962				

Forecasting Daily Potato Prices in a Mumbai Mandi Using Statistical and Machine Learning Techniques

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ABSTRACT

Accurate forecasting of agricultural commodity prices is essential for ensuring food security, supporting farmer income, and enabling effective market planning. This research focuses on the prediction of daily wholesale potato prices in a Mumbai-based mandi using a combination of statistical and machine learning (ML) models. The study utilizes historical price data from January 2021 to December 2024, with the models trained on data from 2021 to 2023 and tested on out-of-sample data from 2024.

Four models were employed: the machine learning models XGBoost and LightGBM, and the statistical models SARIMA and Prophet. The ML models incorporated feature engineering techniques such as lag variables, rolling averages, and calendar features, while the statistical models used the raw time-series data. Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE), and Root Mean Squared Error (RMSE) were used to assess forecast accuracy.

The results indicate that LightGBM outperformed all other models, achieving the lowest MAPE of 11.90%, followed closely by XGBoost. In contrast, SARIMA and Prophet recorded higher error rates, highlighting the limitations of purely statistical approaches in capturing real-world price volatility. This study emphasizes the importance of adopting feature-rich, data-driven models for short-term agricultural price forecasting and provides valuable insights for market stakeholders, policymakers, and supply chain planners.

Keywords: *Potato price forecasting, Time series analysis, SARIMA, LightGBM, XGBoost, Prophet model.*

INTRODUCTION

Agricultural price forecasting plays a crucial role in ensuring food security, minimizing supply chain inefficiencies, and supporting data driven policy formulation. Among key crops, potato holds high economic and nutritional value in India. It is one of the most important food crop in the world and serves as a staple in Indian diets across regions. India is currently the second-largest producer of potatoes globally, after China, contributing over 50 million Metric Tonnes annually[1]. The major potato-producing states include Uttar Pradesh, West Bengal, Bihar, Gujarat, and Madhya Pradesh. However, prices in urban Mandis like Mumbai are highly sensitive to supply-demand shifts, transportation delays, and local market disruptions. This study focuses on forecasting daily wholesale prices of potatoes in a Mumbai-based agricultural market (Mandi), primarily the Vashi APMC market (mandi), where price fluctuations significantly impact both producers and consumers.

Potato is a staple crop in India, and its price volatility directly affects both consumers and producers. Timely and accurate price forecasting can help farmers make informed harvesting and selling decisions, reduce post-harvest losses, and aid government bodies in market regulation. Traditional forecasting methods often struggle with high-frequency, non-linear data. Therefore, this study explores the use of both statistical and machine learning models to improve forecasting accuracy.

The research uses daily potato price data from January 1, 2021, to December 31, 2024, encompassing multiple cycles of seasonality, festivals, climatic variations, and post-pandemic recovery effects. The dataset is divided into training data (2021–2023) and testing data (2024) to evaluate how well each model generalizes to unseen future prices.

This study is centered on APMC market a wholesale Mandi in Mumbai, which is a metropolitan hub known for high volume consumption. Mumbai's market dynamics are shaped by both urban demand and interstate supply chains, especially from major producing states like Uttar Pradesh and Gujarat. Price trends in Mumbai also influence regional retail prices and often act as a reference point for nearby markets, therefore emphasizing of a making a forecasting exercise.

The research follows a comparative modeling framework, applying both statistical models (SARIMA, Prophet) and machine learning models (XGBoost, LightGBM) to the same dataset. Each model is evaluated using widely accepted error metrics like Mean Absolute Error (MAE), Root Mean Squared Error (RMSE) and Mean Absolute Percentage Error (MAPE) to objectively assess forecasting accuracy. The comparative analysis highlights the strengths and weaknesses of each modeling approach in capturing the nuances of high-frequency agricultural price data.

LITERATURE REVIEW

Forecasting agricultural commodity prices, particularly for perishable crops like potatoes, has long been a subject of research interest due to its implications for food security, farmer income stability, and market efficiency. Several studies have explored a wide range of statistical, machine learning (ML), and deep learning (DL) methods to model and predict these volatile price patterns.

Badal et al. (2022) applied the ARIMA model to forecast potato prices in major Indian states like Uttar Pradesh, West Bengal, and Bihar. Their study confirmed that ARIMA could produce reliable short-term forecasts when applied to weekly data. However, the authors noted the limitations of ARIMA in capturing complex non-linear patterns inherent in agricultural price movements. Similarly, earlier works have acknowledged the simplicity and interpretability of time-series models like ARIMA and SARIMA but also recognized their inability to adjust to structural breaks, sudden shocks, or high volatility without additional intervention.

Recent advancements in computational power have led to the adoption of more flexible and adaptive models. Nayak et al. (2024) evaluated various deep learning architectures, including LSTM, GRU, CNN, and the relatively novel N-BEATS model, for forecasting weekly potato prices in the Farrukhabad market of Uttar Pradesh. Their findings highlighted that N-BEATS consistently outperformed traditional neural networks and time series models across all accuracy metrics (MAE, RMSE, and MAPE), suggesting a stronger capacity to capture complex temporary patterns in agricultural data.

In a broader context, Zhao et al. (2024) proposed a hybrid framework called VPF-MoE (Vegetable Price Forecasting using Mixture of Experts), which combines large language models (LLMs) with deep learning components. Their ensemble approach dynamically selected the best prediction model based on the characteristics of the vegetable price series. Though their work primarily focused on vegetables like cauliflower and eggplant in the Chinese market, it underscored the growing interest in model ensembling for price prediction, especially when facing heterogeneity across timeframes and commodities.

Qiao et al. (2024) used an ARMA-GARCH framework to capture both the trend and volatility in green onion prices in Korea. They by decomposing price data into trend, seasonal, cyclical, and irregular components using advanced techniques like the Christiano–Fitzgerald (CF) filter and CensusX-13 adjustment, were able to isolate and forecast high-volatility periods more effectively. This approach is also relevant to perishable vegetables like potatoes, which often experience price shocks due to weather changes, supply chain disruptions, or festival driven demand.

Kumar et al. (2022) applied the ARIMA model to analyze and forecast monthly wholesale potato prices in Agra over a nine-year period. Their analysis revealed clear seasonal trends, with prices remaining low from November to January and prices start increasing up from February and peak in November. The ARIMA (2,1,1) model showed strong forecasting ability, supported by low MAPE and MSE values. However, while effective for short-term prediction, the model's performance was sensitive to the data's seasonal and trend components, which may limit its adaptability during periods of sudden market shocks or irregular fluctuations.

Mithiya et al. (2019) utilized the SARIMA model to forecast potato prices in Hooghly district, West Bengal, based on a decade of monthly price data. The selected SARIMA (1,1,0) (4,1,0) model captured both the seasonal and trend components effectively, with prices generally low between January and April and highest in November. Diagnostic checks confirmed the model’s robustness, with favorable error metrics such as low RMSE and MAPE. The study emphasized the model’s utility for planning sale timing but also acknowledged that time-series models like SARIMA, though accurate in stable environments, may require enhancements when market dynamics shift rapidly.

Kumar et al. (2019) developed a pre-season crop price forecasting system that uses historical price data, weather parameters, and sowing dates to predict potato and other crop prices both annually and monthly. By applying ARIMA on rolling means, standard deviation checks, Dickey-Fuller tests, and autocorrelation analyses, they demonstrated up to 95 % confidence in their pre-sowing potato forecasts. Their work highlights the promise of integrating agronomic factors into time-series models but notes that predictive accuracy hinges on the availability and granularity of daily price and climate data, suggesting room for improvement as more frequent observations become available.

Pavithra et al. (2024) evaluated four exponential-smoothing variants (SES, Holt’s, Holt–Winters) alongside ARIMA on potato prices data of the period 2010–2023 in Karnataka’s Kolar market. The Triple Exponential Smoothing (Holt–Winters) model delivered the best fit with results, MAPE of 0.12 % and RMSE of 207, therefore, easily outperforming ARIMA on both training and test splits. Their forecasts for 2024 showed remarkably stable monthly prices, suggesting that smoothing methods excel when seasonality and trend are well-behaved, but they caution these methods may falter if structural breaks or sudden shocks occur outside the historical window.

Jha et al. (2013) compared pure ARIMA, time-delay neural networks (TDNN), and a hybrid ARIMA–TDNN approach on monthly soybean and rapeseed mustard prices. They showed that neural networks captured nonlinear patterns and turning points better than linear models, and that the ARIMA–TDNN hybrid outperformed both individual methods in series exhibiting strong nonlinear dynamics. Evaluation throgh RMSE, MAD, and correct-direction metrics confirmed the hybrid model's superiority for complex series, though purely linear series saw little benefit, underscoring the importance of pre-testing for nonlinearity when choosing forecasting techniques.

Kumar et al. (2024) applied ARIMA models to monthly onion prices in three Gujarat wholesale markets, Mahuva, Ahmedabad, and Gondal over the period 2004 to 2020. The best-fit models for each market were determined to be ARIMA (3,1,2), ARIMA (2,1,1), and ARIMA (2,1,2), respectively. The post-sample projections for early 2021 showed MAPE values of 21.77 %, 22.99 %, and 27.51 %. Their results underscore how onion price dynamics vary significantly even within one state, highlighting the importance of market-specific model tuning. However, by relying solely on univariate ARIMA, the approach may miss exogenous shocks (e.g., weather disruptions, policy changes), suggesting that incorporating external predictors could further improve forecast robustness.

The reviewed studies collectively demonstrate the evolution of forecasting models from traditional univariate statistical tools to complex, adaptive AI powered systems. However, most of the research has either focused on weekly or monthly prices, with limited exploration at the daily level, a gap that the present study aims to address.

OBJECTIVES

The objectives of our study is twofold:

1. To develop statistical and machine learning models to forecast daily wholesale potato prices in the Vashi APMC market.
2. To evaluate and compare the performance of the statistical and machine learning forecasting models.

DATA AND METHODOLOGY

1) Data Description

This study utilizes a daily time-series dataset comprising wholesale (model) prices of potatoes from a major agricultural market (Mandi) located in Mumbai. The time span of the data ranges from 1st January 2021 to 31st December 2024, providing a robust sample that captures, festival-driven demand spikes, seasonal trends, and macroeconomic shocks such as inflation and climate disruptions. The primary source of the data was the **National Horticulture Board (NHB)**, a government agency under the Ministry of Agriculture & Farmers Welfare that is renowned for keeping accurate and up-to-date market price records of horticultural products in all Indian states.

The dataset was structured in a simple two column format as follows:

- **Date**: Representing the calendar date of the observation.
- **Price:** Representing the daily wholesale (model) price of potato (in Indian Rupees per Quintal)

This structure remained consistent across all forecasting models used in the study, except for the Prophet model, which required column names to be modified to ds (for date) and y (for price) as per the model's input requirements. This changes however, did not affect the underlying data content or structure.

The final dataset contained 1,461 observations, corresponding to the number of days over the four-year period. However, during initial exploration of data, it was observed that several dates had missing price values, mainly due to non-operational market days such as Sundays, public holidays, or administrative reporting delays. So, as we know, missing data is a critical issue in time-series analysis, especially for models like SARIMA and Prophet, which assume continuous and evenly spaced intervals. To address this issue, data imputation techniques were used. This approach ensured the continuity and integrity of the dataset without introducing artificial volatility or abrupt structural changes.

Table 1: Summary Statistics of Daily Potato Prices by Year (₹/quintal)

Year	Min Price	Max Price	Median Price
2021	1000	2050	1250
2022	950	2150	1650
2023	900	2200	1150
2024	1000	2750	2250

This table indicates that potato prices in the Mumbai mandi have experienced significant intra- and inter-annual fluctuations. Notably, the median price in 2024 (₹2250/quintal) shows a substantial increase compared to prior years, suggesting a sharp upward trend or supply-side shock. The price floor remained relatively stable (₹900–₹1000), while the price ceiling increased from ₹2050 to ₹2750, reflecting heightened volatility and supporting the need for robust forecasting mechanisms.

These insights guided the selection of forecasting models capable of handling non-linearity, trend shifts, and seasonality, such as SARIMA, Prophet, XGBoost, and LightGBM, each evaluated under the same data conditions for consistent performance comparison.

2) Feature Engineering

Feature engineering plays a critical role in enhancing the predictive performance of machine learning models, particularly in time-series forecasting where capturing temporal dependencies, seasonality, and structural patterns is essential.

For this study, no additional features were engineered for the statistical models, namely SARIMA and Prophet. These models were trained directly on the original univariate time-series data, i.e., the daily wholesale (model) price of potatoes. The model's internal mechanisms inherently account for trend and seasonality, making feature expansion unnecessary and, in some cases, counterproductive.

In contrast, the machine learning models like LightGBM and XGBoost, required additional input features to model temporal dependencies and capture hidden patterns more effectively. The following categories of features were engineered and incorporated into the training dataset:

Lag Features: Lagged versions of the price variable were created to capture short-term dependencies. These included lag_1 and lag_7, representing the price values of the previous 1 to 7 days, respectively. These features help the models recognize autoregressive behavior in price fluctuations.

Rolling Window Statistics: To incorporate medium-term trend information, rolling mean features were added. These included 3-day, 7-day, and 14-day moving averages of past prices. Such features smooth out short-term volatility and help the models understand underlying price trends.

Calendar-Based Features: Temporal calendar attributes were extracted from the Date column to help the models detect recurring patterns and seasonality. The following features were used:

- Day of the Week (day_of_week): 0 = Monday to 6 = Sunday
- Month of the Year (month): 1 = January to 12 = December
- Is the day a weekday or weekend (is_weekend): a binary function – 1 if Saturday or Sunday, 0 otherwise

These engineered features allowed the machine learning models to learn both short-term fluctuations and seasonal cycles more effectively, which would not be possible using the raw price series alone. No scaling or normalization was required, as both LightGBM and XGBoost are tree-based algorithms that are insensitive to the feature scale.

The same set of features was used for both machine learning models to ensure a fair comparison in the performance evaluation phase.

3) Model Description

This study employs a combination of statistical and machine learning models to forecast daily wholesale potato prices in a Mumbai-based agricultural market. The objective is to compare the predictive capabilities of traditional time-series methods with modern, data-driven approaches, particularly in handling daily-level fluctuations. Each model utilized is described in depth below:

3.1) SARIMA (Seasonal AutoRegressive Integrated Moving Average)

The SARIMA model is a traditional statistical method for time-series forecasting that builds on the ARIMA model by including seasonality. It is particularly well-suited for datasets where patterns repeat over fixed intervals, such as monthly or yearly cycles. SARIMA works by combining three core elements:

- **Autoregression (AR):** Models the relationship between an observation and a certain number of lagged observations.
- **Differencing (I):** is a method for making a time series stationary by removing trends.
- **Moving Average (MA):** The relationship between an observation and a residual error resulting from a moving average model applied to lagged data.

To account for seasonality, SARIMA adds seasonal terms to each of these components. This enables the model to capture repeating patterns at fixed time intervals, such as weekly or monthly price changes in agricultural commodities.

SARIMA is widely used in economic and agricultural forecasting due to its interpretability and strong performance in datasets with clear seasonal trends. In this study, SARIMA was applied directly to the raw price series. The model learns from past trends and seasonal cycles to predict future prices, particularly well-suited to understanding structured and recurring patterns in the potato price data.

3.2) Prophet

Prophet, developed by Facebook's Core Data Science team, is a robust and flexible time-series forecasting model designed to handle data with strong seasonal effects and historical trend changes. Unlike traditional models, Prophet allows for an intuitive decomposition of the time series into three components:

- **Trend:** Measures the long-term increase or decline in a time series.
- **Seasonality:** refers to periodic fluctuations that occur at regular intervals, such as weekly or annual cycles.
- **Holidays or Events:** Allows for the inclusion of known events that may impact the time series, such as festivals or policy changes.

One of Prophet's key advantages is its ability to automatically detect changepoints, moments in time where the trend shifts significantly, and adjust the forecast accordingly. It employs an additive model in which non-linear trends are combined with seasonal and holiday impacts.

Prophet is particularly useful in business and policy-related forecasting tasks due to its ease of use, minimal parameter tuning, and strong performance on irregular or noisy data. In this study, Prophet was trained on the daily price series of potatoes to identify key turning points and capture both weekly seasonality and long-term trend shifts.

3.3) LightGBM (Light Gradient Boosting Machine)

LightGBM is a gradient boosting framework developed by Microsoft that is designed for fast, scalable, and high-accuracy performance. It is based on decision tree algorithms and operates by sequentially developing models, with each new model focusing on fixing prior faults. Unlike standard boosting approaches, which grow trees level-wise, LightGBM grows trees' leaf-wise, which frequently results in higher accuracy.

The model is especially efficient with large datasets and supports features like categorical variable handling, missing value handling, and parallel training. Its **advantages** include:

- Faster training speed and lower memory usage
- Better accuracy
- Ability to handle large-scale data

In the context of this study, LightGBM was used to model the relationship between the daily potato prices and several engineered features such as lag variables, rolling means, and calendar indicators. The model's ability to learn complex, non-linear relationships from structured data made it well-suited for this forecasting task. Furthermore, LightGBM's feature importance tools provided insights into which factors had the most predictive power.

3.4) XGBoost (Extreme Gradient Boosting)

XGBoost is another popular machine learning algorithm that uses gradient boosting decision trees. Known for its predictive power, speed, and regularization techniques, XGBoost has become a benchmark model in structured data forecasting competitions and academic research.

Like LightGBM, XGBoost builds models in a sequential manner, with each new tree attempting to minimize the residual errors of the previous ensemble. The key **distinctions** of XGBoost include:

- Regularization (L1 and L2) to avoid overfitting
- Pruning techniques to reduce complexity
- Advanced treatment of missing values and sparse data.

In this study, XGBoost was applied using the same engineered features as LightGBM. The model effectively captured both short-term lags and seasonal influences, allowing it to adapt to complex pricing behavior in the agricultural domain. Despite being computationally intensive, XGBoost offered strong performance in terms of forecast accuracy and robustness.

Table 2: Summary of Forecasting Models Used in the Study

Model	Type	Key Strengths	Input Requirements	Feature Engineering Needed
SARIMA	Statistical Time Series	Captures seasonality and trend; interpretable	Univariate time series	No
Prophet	Additive Time Series	Handles changepoints, holidays; easy to tune and interpret	Date (ds) and value (y)	No
LightGBM	Machine Learning	Fast, scalable, handles non-linear patterns	Tabular data with time features	Yes
XGBoost	Machine Learning	High accuracy, robust to overfitting, strong handling of noise	Tabular data with time features	Yes

Each of the four models was evaluated using a common training and testing structure to ensure fairness and comparability in their predictive outcomes. The next section details the train-test split strategy adopted for this purpose.

4) Train-Test Split Strategy

To evaluate the predictive performance of the forecasting models on unseen data, a chronological train-test split was adopted. This approach is essential in time-series forecasting, where data exhibits strong temporal dependencies and traditional random shuffling methods are not applicable.

The full dataset spans from 1st January 2021 to 31st December 2024, comprising four full calendar years of daily wholesale potato prices. The dataset was split as follows:

- Training Period: 1st January 2021 to 31st December 2023
- Testing Period: 1st January 2024 to 31st December 2024

This split ensures that the models learn from past historical data (three complete years) and are evaluated on future data (a full unseen year), thus simulating a real-world forecasting scenario. The division also aligns with best practices in time-series modeling, which emphasize the importance of maintaining temporal order during validation.

The decision to use 2024 as the test year was based on the need to:

- Evaluate model robustness over a full seasonal cycle
- Capture forecasting performance across different market conditions (festivals, harvest cycles, lean periods)
- Maintain consistency across all models for fair comparison

All four models—SARIMA, Prophet, LightGBM, and XGBoost, were trained exclusively on the 2021–2023 dataset and then used to generate out-of-sample forecasts for the entire year of 2024. This static train-test split was deemed sufficient given the dataset's size and the study's focus on model comparison, not real-time retraining.

The evaluation of the forecasts, discussed in the next section, was performed by comparing the predicted prices for 2024 against the actual observed prices using standard error metrics.

5) Evaluation Metrics

To objectively assess the performance of the forecasting models, the study employs three widely used error metrics: Mean Absolute Error (MAE), Root Mean Squared Error (RMSE) and Mean Absolute Percentage Error (MAPE). These metrics provide a comprehensive evaluation of model accuracy, penalizing different types of errors and helping to understand both the average and relative prediction performance.

Each metric was computed by comparing the actual daily wholesale prices of potatoes in 2024 (the test set) with the corresponding model-generated forecasts from SARIMA, Prophet, LightGBM, and XGBoost. The formulas and rationale for each metric are outlined below.

1. Mean Absolute Error (MAE)

$$MAE = \frac{1}{n}\sum_{t=1}^{n} | y_t - \widehat{y_t} |$$

MAE measures the average magnitude of the absolute errors between the actual and predicted values. It is easy to interpret and is **less sensitive to large outliers** compared to RMSE. A lower MAE indicates better model performance.

2. Root Mean Squared Error (RMSE)

$$RMSE = \sqrt{\frac{1}{n}\sum_{t=1}^{n}(y_t - \widehat{y_t})^2}$$

RMSE penalizes larger errors more heavily due to the squaring of residuals. It is particularly useful when large deviations are undesirable. RMSE is expressed in the same units as the target variable (₹/quintal), which makes it intuitive to interpret in the context of price prediction.

3. Mean Absolute Percentage Error (MAPE)

$$MAPE = \frac{100}{n} \sum_{t=1}^{n} \left| \frac{y_t - \hat{y_t}}{y_t} \right|$$

MAPE expresses forecast error as a **percentage of the actual values**, making it scale-independent. It is especially helpful for comparing performance across different time periods or datasets. However, MAPE can be distorted when actual values are very small.

All models were evaluated using the same test set (daily prices for the year 2024) to ensure consistency and comparability. The metrics were calculated using built-in functions from **Python libraries** such as **scikit-learn and statsmodels**, depending on the model type.

RESULTS

This section presents the results of the four forecasting models used, SARIMA, Prophet, LightGBM, and XGBoost which were evaluated on the daily wholesale potato prices for the test period of 1st January 2024 to 31st December 2024. The models were assessed using three standard evaluation metrics: Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and Mean Absolute Percentage Error (MAPE), as described in above section.

Table 3: Forecasting Performance of Models on 2024 Daily Potato Prices

Model	MAE (₹/quintal)	RMSE (₹/quintal)	MAPE (%)
LightGBM	279.28	362.88	11.90%
XGBoost	281.22	364.06	12.02%
SARIMA	795.69	919.02	34.92%
Prophet	852.87	975.90	37.50%

1) Visual Interpretation of Forecast Accuracy

To supplement the numerical results, actual vs predicted line plots were generated for each model across the test period (2024). These visualizations help assess how closely each model's forecast tracks the real price movements throughout the year, and reveal strengths and weaknesses not always captured by numerical error metrics alone.

The forecast generated by the Prophet model in figure 1 below shows that the model remains relatively flat and smoothed, failing to capture the real-world fluctuations seen in the actual price trend. While Prophet is capable of modeling seasonal and trend components, its limited responsiveness to sharp price changes results in significant underfitting. This is particularly evident during the mid-year and end-of-year peaks, where the model underestimates the true values. The widening confidence interval also reflects increasing uncertainty over time, typical of additive models that assume smooth future evolution.

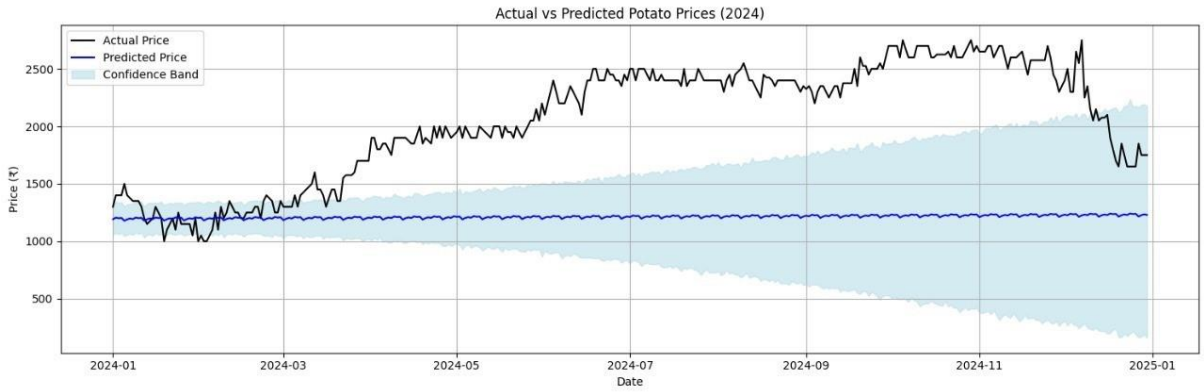

Figure 1: Prophet – Actual vs Predicted with Confidence Interval

The graph in Figure 2 below presents a comparison between the actual daily potato prices observed in the Mumbai Mandi for the year 2024 and the forecasted prices generated using the SARIMA model, along with the 80% and 95% prediction intervals.

The black line represents the actual price trend, which exhibits strong seasonality and volatility throughout the year. There is a noticeable price increase during the middle of the year, followed by a sharp decline toward the end.

In contrast, the red line illustrates the forecasted prices from the SARIMA model, which remain almost flat across the entire forecast horizon. This flatness indicates that the SARIMA model failed to capture the dynamic price movements, seasonal fluctuations, and non-linear trends observed in the actual data.

The shaded regions denote the confidence intervals:

- The dark blue band represents the 80% confidence interval.
- The light blue band represents the 95% confidence interval.

Although the forecast includes these uncertainty bands, the actual prices consistently fall outside the predicted range, especially during the periods of sharp increase and decline. This signifies poor forecast accuracy and highlights the model's limited ability to adapt to sudden market shifts.

Moreover, the widening of the confidence intervals over time suggests that the SARIMA model becomes increasingly uncertain in its long-term predictions. This is a known limitation of univariate time series models like SARIMA, which rely solely on historical price values and do not incorporate external or engineered features such as calendar effects, weather conditions, or lagged trends.

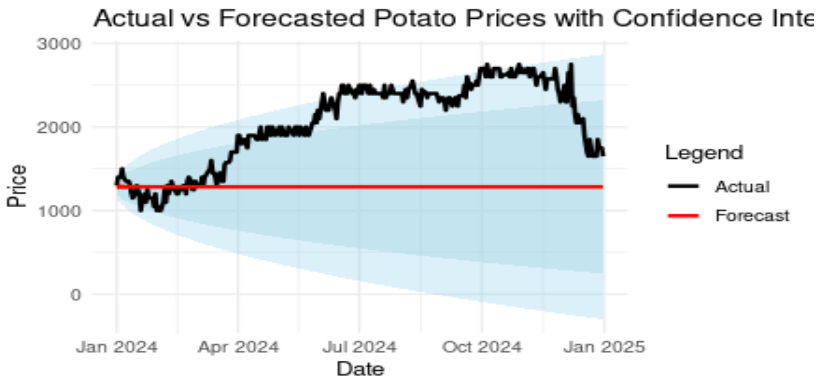

Figure 2: SARIMA – Actual vs Predicted

The graph in figure 3 below reflects that **Extreme Gradient Boosting (XGBoost)** also exhibits strong predictive power, closely mirroring the overall pattern of actual potato prices throughout 2024. Like LightGBM, XGBoost benefits from the inclusion of time-aware features such as previous day prices, rolling windows, and temporal indicators (e.g., day of the week, month). These features enable it to capture both autoregressive dependencies and seasonal effects.

XGBoost demonstrates particularly good performance during steady market phases, such as the mid-year period (June to August), where it maintains a tight alignment with observed values. In these periods, the model's low variance and strong regularization allow it to make precise, stable predictions with minimal noise.

However, in periods of heightened volatility, such as late Q3 and early Q4, the model exhibits a slight tendency to underpredict during extreme spikes. This behavior is not uncommon for tree-based ensemble methods that prioritize average trend capture over outlier sensitivity. Nonetheless, XGBoost still correctly anticipates the direction and general shape of the trend, which is critical for operational forecasting in agricultural markets.

Compared to LightGBM, XGBoost appears to be marginally more conservative, possibly due to its different boosting mechanics (level-wise vs. leaf-wise tree growth). While this makes it slightly less reactive to abrupt shifts, it also reduces the risk of overfitting, leading to robust performance across most timeframes.

With a MAPE of 12.02%, XGBoost stands as a close second in overall model performance. Its consistent accuracy and reliable generalization make it a highly effective forecasting tool, particularly in scenarios where moderate price fluctuations are expected, and stability is preferred over high sensitivity.

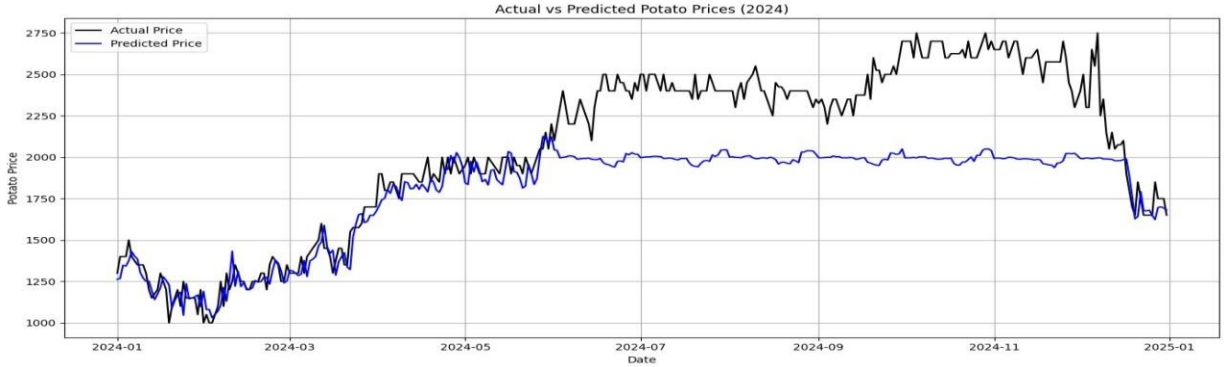

Figure 3: XGBoost – Actual vs Predicted

The graph in Figure 4 below shows that the Light Gradient Boosting Machine (LightGBM) model demonstrated remarkable forecasting accuracy, as evidenced by the close alignment between predicted and actual potato prices across the 2024 test period. Unlike traditional statistical models, LightGBM leverages engineered features such as lagged values, rolling averages, and calendar-based attributes, allowing it to model both short-term fluctuations and long-term seasonal patterns in price behavior.

In the first half of the year, LightGBM responds well to the subtle increases and decreases in prices, capturing the general upward trend around March–April, which may correspond to pre-monsoon demand and changing supply conditions. The model also performs well during the June–July plateau, accurately reflecting periods of market stability.

More notably, in the second half of the year, where the price series becomes more volatile, particularly around September through November, LightGBM still manages to follow the actual trend with high fidelity. Although it slightly underpredicts during sharp price spikes, the magnitude and direction of changes remain largely accurate, indicating that the model effectively learns from historical lag patterns and seasonal cycles.

The model's predictions remain smooth yet reactive, suggesting a good balance between generalization and responsiveness. Unlike SARIMA and Prophet, which often over-smooth or lag behind sudden changes, LightGBM is better at adapting to non-linear transitions due to its boosting framework and ability to handle complex feature interactions.

This performance highlights LightGBM's strength in capturing agricultural price movements, especially in real-world contexts where data is noisy, seasonal, and influenced by multiple indirect factors. Its superior MAPE (11.90%), the lowest among all models tested, further reinforces its suitability for short-term, high-frequency market forecasting in perishable commodity sectors.

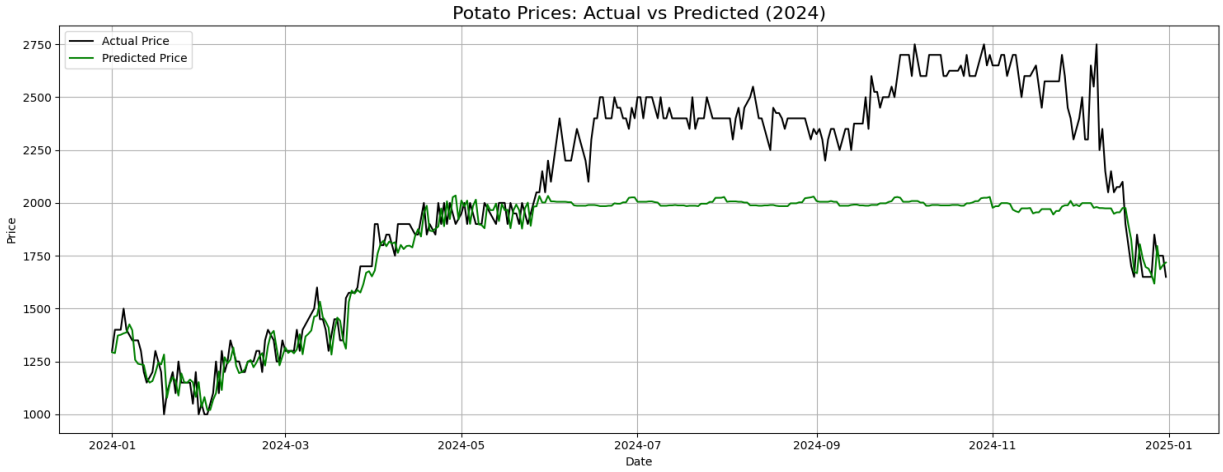

Figure 4: LightGBM – Actual vs Predicted

The results indicate that machine learning models (LightGBM and XGBoost) significantly outperformed the statistical models (Prophet and SARIMA) in all three-evaluation metrics. LightGBM achieved the lowest error rates, with a MAPE of 11.90%, closely followed by XGBoost at 12.02%. This suggests that ensemble tree-based algorithms are better equipped to handle complex patterns in high-frequency, non-linear agricultural price data when supplemented with engineered features.

In contrast, both SARIMA and Prophet, although widely used in univariate time-series forecasting, exhibited higher error values, with MAPE values exceeding 34%. These results show that while statistical models can capture seasonal structures, they may underperform in highly volatile, real-time forecasting scenarios without external features.

RECOMMENDATIONS AND CONCLUSIONS

The results of this study clearly indicate that machine learning models that too specifically LightGBM and XGBoost, outperform traditional statistical methods (SARIMA and Prophet) when it comes to forecasting daily wholesale potato prices in an urban Indian mandi. These findings have practical implications for farmers, policymakers, traders, and supply chain stakeholders involved in the Indian agri-market ecosystem.

LightGBM, in particular, achieved the lowest forecasting error, suggesting that feature-driven models are more effective in capturing non-linear trends, seasonal fluctuations, and abrupt price changes in volatile, high-frequency agricultural markets. XGBoost followed closely, offering robust and consistent performance with slightly conservative predictions. In contrast, SARIMA and Prophet, while effective at modeling seasonal structure, lacked the flexibility to adapt to unexpected price surges or regime shifts, resulting in higher forecast errors.

These insights support a paradigm shift toward hybrid or machine learning–based forecasting frameworks, especially in regions like India, where price fluctuations are driven by a mix of climate patterns, transportation disruptions, festivals, and market interventions. The integration of lag-based, rolling, and calendar features provides a more nuanced understanding of price behavior than univariate historical data alone.

The adoption of ML-based models can enable better decision-making for procurement planning, inventory management, and government price stabilization policies. In the context of Mumbai and similar urban markets, such predictive tools can also inform consumer advisories, reduce wastage, and contribute to more efficient food distribution systems.

1) LIMITATIONS

Despite the encouraging results achieved in this study, several limitations must be acknowledged, which could influence the interpretability and generalizability of the findings:

Limited Feature Scope: The machine learning models were trained using time-derived features such as lag variables, rolling averages, and calendar-based indicators. However, external drivers like rainfall, fuel prices, festival dates, transport disruptions, and other macroeconomic variables, are often influential in agricultural pricing which were not included due to data unavailability. Their inclusion could potentially enhance forecast precision, especially during high-volatility periods.

Missing Data Periods: One of the critical constraints faced during dataset preparation was missing historical data. Notably, there was a significant data gap from 22nd March to 26th May 2020, a period coinciding with India's first COVID-19 lockdown, where markets were either closed or reporting was inconsistent. Additionally, in the year 2017, data was missing for nearly four consecutive months starting from June. Due to these discontinuities, the dataset used in this study was limited to January 2021 to December 2024, thereby restricting the training window and

limiting the model's ability to learn from long-term patterns, particularly during the months of March and April, which are typically transitional periods in the crop supply cycle.

Single-Market Limitation: The analysis is based solely on data from one wholesale market in Mumbai, which, although representative of urban consumption centers, may not fully capture price dynamics across rural or semi-urban mandis. Hence, caution is advised in generalizing these findings to different regions without further validation.

2) FUTURE SCOPE OF RESEARCH

This study opens several avenues for further exploration. Future research can benefit from the inclusion of external factors such as weather patterns, festival calendars, fuel prices, and policy interventions to improve model accuracy, especially during volatile periods. Expanding the dataset to include multiple markets across different regions could enhance the generalizability of results and support broader policy applications. Additionally, exploring hybrid models that combine statistical techniques with deep learning architectures (e.g., LSTM, N-BEATS) may offer improved adaptability to complex, real-world pricing behavior.

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The Impact of Technology on Work Life Balance: A Study in Mumbai City

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ABSTRACT

The rapid-fire- fire advancement and integration of new technologies have revolutionized the way we work and interact in our quotidian lives. This abstract explores the impact of these technologies on work-life balance, fastening on the positive and negative goods they bring. Work-life balance refers to the equilibrium between work-related exertion and particular life, encompassing various aspects analogous as time allocation, stress situations, and overall well-being. Advancements in communication technologies, analogous as smartphones and instant messaging platforms, have significantly altered the traditional boundaries between work and particular life.

Keywords: *New Technology, Employee Productivity, Permeability, Work Extension, Remote Work, Automation, Technological Advancements, Employee Skills, Digital Skills, Work Efficiency, Technology Adoption, Employee Performance, Job Satisfaction.*

INTRODUCTION

In the moment's presto- paced and digitally connected world, technology has come an integral part of our quotidian lives, converting the way we work and interact. One major area where its influence is deeply experienced is in the domain of work-life balance.

Work-life balance refers to the equilibrium between professional commitments and particular well-being, encompassing colorful aspects similar as time operation, harshness, and overall satisfaction. With the rapid-fire advancement of technology, the boundaries between work and particular life have come decreasingly blurred, presenting both openings and challenges to individualities seeking to maintain a healthy balance. In this period of smartphones, high- speed internet, and virtual communication platforms, the traditional nine- five workday is evolving, and the generality of "always being connected" has taken hold. On the other hand technology has handled unknown harshness, enabled remote work and offered tools that enhance productivity and effectiveness. Also, it has created a sense of constant vacuity and the anticipation of immediate response, potentially inching upon particular time and well-being. As a result, the impact of technology on work- life balance is a subject of great significance and concurrences closer examination.

This essay explores the complex impact of technology on work-life balance, examining both its beneficial and adverse effects. It analyzes the ways in which technology has contributed to increased harshness, connectivity, and effectiveness in the plant, empowering individualities to more manage their professional and personal lives. Also, it examines the implicit downsides, similar to the challenges of decoupling from work, trouble of information weight, and the impact

on internal good. Likewise, this essay will explore strategies and voguish practices for individualities and associations to navigate the evolving terrain of work-life balance in the digital age. It will illuminate the significance of setting boundaries, managing technology operation, and fostering a probative work culture that values well-being. By understanding and effectively employing the eventuality of technology, individuals and associations can strive to achieve a harmonious integration of work and personal life, eventually leading to increased job satisfaction, productivity, and overall happiness.

Technology has revolutionized the way we live, communicate, and work, and its impact on colorful aspects of our lives is unarguable. Technology has significantly influenced work-life balance - the state of maintaining a healthy division between professional responsibilities and personal well-being. While technological advancements have made it easier to manage this balance, they have also introduced new challenges. This essay will analyze the advantages and drawbacks of technology's impact on work-life balance and explore how individuals and organizations can respond to these shifts to establish a more balanced integration of work and personal life.

LITERATURE REVIEW

Ratna R stated that study looks at how technology affects work-life balance, productivity, health and safety, job satisfaction, and performance. Factor analysis revealed three important components, with component 1 contributing the most, and performance was shown to be most impacted. Maintaining equilibrium between the demands of one's personal life and career is known as work-life balance. Although technology increases productivity and adaptability, it also blurs boundaries, making it more difficult to detach from work. **Sophia Xiaoxia Duan et al. (2023)** examined that by using technology affordance theory, this study investigates the effects of digital work on workers' job performance and work-life balance. The authors contend that although digital technologies boost productivity and adaptability, they can also cause stress by obfuscating the lines between work and home life. According to the findings, companies need to have policies in place to control digital work practices and guarantee that workers have a good work-life balance. **Carlotta Cochis (2020)** stated that this study looks at how creativity, work- life balance, and technology use relate to contemporary cooperative work settings. It draws attention to how an over-reliance on digital tools can hamper critical thinking and hamper innovative problem-working. Nevertheless, technology use that's controlled and considerate can foster creativity and cooperation. According to the report, in order to optimize the advantages of technology while minimizing its disadvantages, enterprises should support conditioning related to digital well-being. Hubbard, **Alexandra G. (2016)** has explained that this study shows creativity, work- life balance, and technology use relate to contemporary cooperative work settings. It draws attention to how an over-reliance on digital tools can hamper critical thinking and hamper innovative problem- working. Nevertheless, technology use that's controlled and considerate can foster creativity and cooperation. According to the report, in order to optimize the advantages of technology while minimizing its disadvantages, enterprises should support conditioning related to digital well- being. **Karampudi Radha (2021)** described that by employing machine literacy ways, this study analyzes crucial factors impacting work- life balance among workers. The findings indicate that remote work and the use of digital communication platforms significantly impact particular well- being. The study emphasizes the need for companies to incorporate data-driven approaches in designing hand heartiness programs to insure sustainable work- life

integration. **Dron Khanna (2024)** stated that by employing machine literacy ways, this study analyzes crucial factors impacting work- life balance among workers. The findings indicate that workload, remote work, and the use of digital communication platforms significantly impact particular well- being. The study emphasizes the need for companies to incorporate data- driven approaches in designing hand heartiness programs to insure sustainable work- life integration. **Ali Bai (2023)** in this paper explored how ethical organizational practices influence employees' mental health in a digital work environment. It argues that continuous connectivity and excessive technology use contribute to work-life imbalance and stress. The authors advocate for ethical digital work practices, such as setting clear boundaries for work-related digital interactions and fostering an organizational culture that prioritizes employee well-being. **Ronnie de Souza Santos (2024)** explained that this paper explores how ethical organizational practices impact workers' internal health in a digital work terrain. It argues that nonstop connectivity and inordinate technology use contribute to work- life imbalance and stress. The authors endorse ethical digital work practices, similar as setting clear boundaries for work- related digital relations and fostering an organizational culture that prioritizes hand well- being. **Andrea Bencsik (2023)**, have investigated the conception of technostress — stress convinced by inordinate technology use — and its effect on work- life balance. The study identifies factors similar as information load, constant announcements, and remote work prospects as crucial contributors to technostress. It recommends that associations introduce digital detox enterprise and promote hand education on effective technology operation to alleviate these adverse goods. **Taewoo Nam (2014)** have examined the dual-edged nature of internet and mobile technology on individuals' work-life balance. On the positive side, these technologies offer increased flexibility, allowing employees to manage work tasks remotely and at convenient times, which can enhance productivity and provide better control over work schedules. However, the study also highlights negative consequences, such as the blurring of boundaries between work and personal life, leading to longer working hours and potential conflicts in family life. The authors emphasize the importance of managing technology use to mitigate these adverse effects and promote a healthier work-life balance. **Olson (1983)** from his observation study, he opines that "Organizational work that is performed outside of the normal organizational confines of space and time"; **Remote Work. Pleck (1977)**; **Richter (1992)** he tells that "Permeability is the degree to which a role allows one to be physically located in the role's domain but psychologically and/or behaviorally involved in another role", Permeability. **Towers et.al (2006)** discussed from his findings that "The ability to work outside the office, outside "normal" office hours"; Work Extension.

AIMS AND OBJECTIVE

1. To provide an overview of the current state of work-life balance in the context of technological advancements, including the prevalence of remote work, flexible scheduling, and digital communication tools.
2. To analyse the impact of technology on work-life balance, including its effects on employee well-being, job satisfaction, stress levels, and productivity,
3. To identify best practices and strategies for leveraging technology to enhance work-life balance.

HYPOTHESES OF THE STUDY

It is formulated as follows;
H0: There is no relationship between daily hours of technology used for work and perceived work-life balance.
H1: There is a significant relationship between daily hours of technology used for work and perceived work-life balance.

RESEARCH METHODOLOGY

Both primary and secondary data are used for this study. Primary data has been collected through questionnaire methods. Data has been collected by using a structured questionnaire.

Research Design	Descriptive Research
Primary Data	Questionnaires
Secondary Data	Internet, References, Websites ,E Literature
Sample procedure	Random Sampling
Sample Size	130

Primary Data: In this present study, we have collected primary data through Google forms. (questionnaire) from the respondents.

Secondary Data: The major sources of secondary data for present study are –Reports, Magazines, periodicals, Journals, Internet, Websites and E literature.

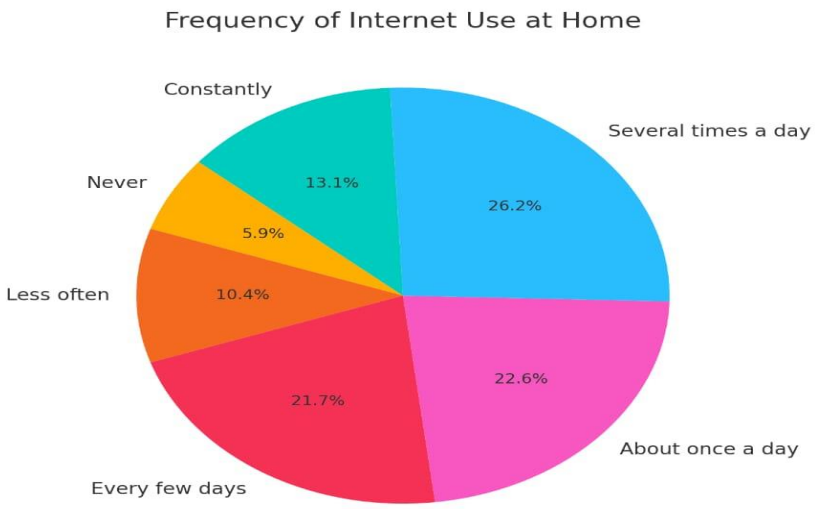
DATA ANALYSIS AND INTERPRETATION

Descriptive exploration that aims to describe and validate the patterns of or miracle. characteristics, geste It focuses the subject under disquisition, a specific population on furnishing an accurate and detailed account of, without trying to establish unproductive connections or make prognostications. Descriptive exploration design is frequently used to answer" what, who, where and how questions. Mumbai megacity as actors. Repliers between The present study considered repliers from are considered as the age group 21- 40 careers, fiscal liabilities, and stuck towards for youngish demographics, also aged repliers may have endured former technological they've more established downturns, furnishing precious sapience into technology how they perceive and respond to current technological advancement managing with work-life balance.

1. Frequency of Internet Use at Home

The table below shows how frequently individuals use the Internet at home

Frequency of Use	***Percentage of Respondents***
Never	5.90%
Less often	10.40%
Every few days	21.70%
About once a day	22.60%
Several times a day	26.20%
Constantly	13.10%



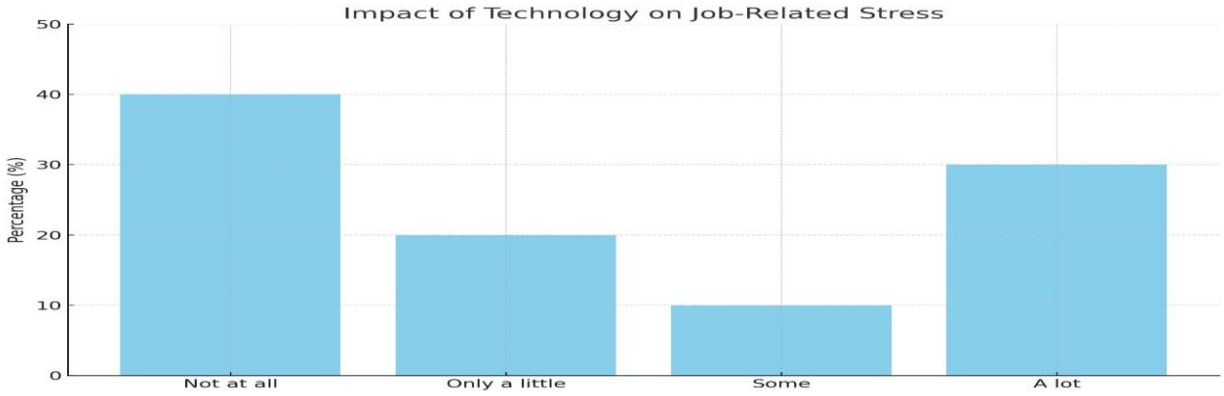
Interpretation:
The data indicates that a significant portion of respondents (61.9%) use the Internet at least once a day or more, which reflects the growing integration of digital connectivity into daily life. The highest segment, 26.2%, reports using the Internet several times a day, showing habitual and possibly work-related or entertainment-driven usage. An additional 13.1% are constantly online, suggesting a strong dependency on digital tools for both professional and personal tasks.

In contrast, only a small percentage (5.9%) claim to never use the Internet at home, underscoring the near-universal access to digital networks in the surveyed group. These trends suggest that digital literacy and consistent connectivity are increasingly becoming prerequisites for modern living, with potential implications for productivity, information access, and work-life balance.

2. Impact of Technology on Job-Related Stress

The following table presents the perceived increase in job-related stress due to the use of technology, based on survey responses:

Response Category	***Percentage of Respondents***
Not at all	40%
Only a little	20%
Some	10%
A lot	30%



Interpretation:
The results highlight a diverse range of experiences regarding the impact of technology on workplace stress. While a considerable 40% of respondents indicated that technology has not contributed at all to their job-related stress suggesting they may be well-adapted to digital tools or benefit from supportive work environments there remains a noteworthy 30% who report that technology contributes to stress "a lot."

This group may be affected by factors such as information overload, constant connectivity, unrealistic response expectations, and difficulty disconnecting after work hours. Meanwhile, 20% experienced only a little stress, and 10% reported some stress, pointing to a moderate but present psychological load associated with digital interaction.

3. Perceived Impact of New Technologies on Overall Productivity

The table below summarizes respondents' perceptions regarding how new technologies have affected their productivity:

Perception of Impact	***Percentage of Respondents***
Moderate Improvement	52.00%
No Noticeable Impact	38.70%
Decreased Productivity	9.30%

Interpretation:
The data reflects a generally positive outlook on the impact of new technologies, with 52% of respondents reporting a moderate improvement in productivity. This suggests that digital tools are helping many individuals enhance efficiency, streamline tasks, and adapt to modern work environments.
However, a significant 38.7% observed no noticeable change, indicating that for a portion of users, technology may not be fully integrated into their workflows or may not directly influence their core tasks.
A smaller but important 9.3% reported a decline in productivity, potentially due to issues like digital overload, complexity, or poor implementation.

FINDINGS

Grounded on exploration and literature on the impact of new technologies on workers in associations, then are some common findings

Increased productivity:- The preface of new technologies frequently leads among workers. robotization, digital tools, and streamlined processes enable briskly and more effective completion of tasks.

Improved Communication and Collaboration new technologies grease better communication and collaboration among workers, both within brigades and across departments. Tools similar as design operation platforms, videotape conferencing, and instant messaging enhance information sharing and cooperation.

Increased flexibility and the adoption of new technologies allows for more adaptable work setups, such as remote working opportunities. Employees can perform their tasks from virtually any location and have more control over their schedules, leading to improved work-life balance and higher job satisfaction.

Access to Information and Learning new technologies give workers instant access to a vast quantum of information and literacy coffers. Online training platforms, knowledge bases, and digital libraries allow workers to acquire new chops, stay streamlined with assiduity trends, and enhance their professional development.

Work-Life Balance Considerations, Although modern technologies provide greater flexibility, they can also blur the line between professional and personal life. Employees may struggle to disconnect from work, which can result in challenges to maintaining a healthy work-life balance and may contribute to higher stress levels.

Job Satisfaction and Engagement Overall, job satisfaction and hand engagement is mixed.

LIMITATIONS

1. The compass of the study may be limited to certain aspects of technology's impact on work- life balance, similar as remote work, digital communication tools, or flexible scheduling. Other applicable areas, similar as the gig frugality, artificial intelligence, or robotization, may not be exhaustively addressed due to constraints on compass.

2. Generalizability The findings of the study may not be completely generalizable to all demographic groups, diligence, or regions. Factors similar to artistic differences, socioeconomic status, and organizational practices could impact the relationship between technology use and work- life balance in ways that are n't completely captured by the study.

3. Data Vacuity and Quality :The vacuity and quality of technology use, work- life balance, and related factors may vary across studies included in the review. Variations in dimension tools, slice styles, data collection procedures could introduce inconsistencies or impulse in the synthesized findings.

CONCLUSION

The influence of emerging technologies on employees within organizations is complex, involving both advantages and drawbacks. On the positive side, these technologies can boost employee productivity, enhance operational efficiency, and contribute to greater job satisfaction. They streamline processes, automate repetitive tasks, and provide employees with access to information and tools that facilitate their work. Additionally, technologies enable greater collaboration, communication, and flexibility, empowering employees to work remotely and achieve a better work-life balance. Conversely, the implementation of new technologies can also bring about difficulties and adverse effects. Employees may face disruptions and skill gaps as they adapt to technological changes. Continuous connectivity and the risk of digital distractions can blur the lines between professional and personal life, potentially causing higher stress levels and reduced

overall well-being. In addition, the fast-evolving nature of technology often demands ongoing learning and skill development, which may add extra pressure on employees.

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Address by Session Chair

Prof. (Dr.) Krupa Rai

Associate Professor, KJ Somaiya Institute of Management Studies & Research (KJSIMSR), Mumbai, Maharashtra, India., Ph.D Guide and alumna of Global School in Empirical Research Methods, University of St. Gallen, Switzerland.

After each presentation, Dr. Krupa shared her expert opinions and constructive suggestions to each of the authors. In her address, she discussed the future research directions in the field of business and management. She advised researchers to exercise caution when using Generative AI in their research manuscripts. She also said that logical understanding and soundness of theory is crucial for academic writing. She congratulated the Organizing team for the successful event, wherein the merit-based selected papers presented diverse perspectives and diverse learning related to the theme of the conference. She shared some tips for journal publication. She also appreciated some of the papers which has potential for publication in indexed journals.

Best Paper Presentation Awards

After preliminary screening followed by peer review, fifteen selected research papers had been presented by the academicians of various Management Institutes as well Industry professionals. Each of the presented papers caters to the different industries, their sustainable practices and strategies to become self-reliant and grow further. On the basis of fair evaluation by the blind reviewers and the session chair, two presenters had been chosen as the *Best Paper Awardees*.

First Best Paper Award: Mr. Parth Laijawala & Mr. Maneesh Gupta were honored with the first-place award and **a cash prize of ₹10,000** for their research paper titled ***Forecasted Daily Potato Prices in a Mumbai Mandi.***

Second Best Paper Award: Mr Sukeshraj Zallare and Dr. Ashish Hattangadi received the second-place award and a **cash prize of ₹7,000** for his paper titled ***Digital Collection Challenges in Mumbai's Microfinance Sector***

The winning papers will be published in **Volume Seven, Issue Two and the subsequent issues of The Management Quest**, a Bi-Annual Research Journal of DSIMS, under the aegis of the Remsons Centre for Management Research **(Online ISSN: 2581-6632).**

Concluding Note

The unique endeavor of the Institute was to host a Conference on sustainable strategies to build an ***Atmanirbhar Bharat.*** The Conference was indeed a grand success.

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