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Analysis of Responsible Entrepreneurship Skill Development for Urban Development through Bridging the Gap Between Classrooms to Community

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Abstract: Urban Development has been always associated with developing economic and social infrastructure. But there is much more beyond infrastructure when state is looking for inclusive and sustainable development in the heart of nation. The role of youth and potential socially responsible entrepreneurs is vital in this process of community development. This study aims to understand whether, there is association between the exposure for skill development and internships at commercial entities and development of attitude for being responsible entrepreneur. It further also explores perception of respondents on being associated with socially awaken businesses in terms of inclusiveness and sustainability. The researchers collected primary data from 176 respondents through a structured questionnaire using nonprobability sampling method. The data was analyzed through descriptive tools such as frequency and percentage and inferential analysis was done through nonparametric tests such as one sample Wilcoxon Signed Rank Test, Chi square Test and Kruskal Wallis Test. The analysis suggests that majority respondents believe inclusive growth can be achieved through responsible entrepreneurship. Also, there is significant difference in perception across the faculty of the learners as the exposure levels are different. At the same time the frequency of such exposure changes attitude of learners towards contributing to nation building through community development. In conclusion, the opportunities created by New Education Policy,2020 has been impacting positively in achieving its fundamental goal to leas India towards the Vikasit Bharat by 2047.

Keywords: Social Inclusion, Urban Development, Responsible Entrepreneurship and Community Development

1. INTRODUCTION

Urban development is beyond just development of infrastructure. It goes beyond housing, transport, sanitation, and commercial facilities. There is a broader horizon to the terminology. The comprehensiveness of urban development today includes social inclusion, sustainable development and entrepreneurial innovation. Growth in the entrepreneurial space enhances the overall growth in the urban scale-up.

Youth involvement through transformative entrepreneurship boosts economies. This makes responsible entrepreneurship a critical element for modern urban development agendas. Skill Development and Internship acts as catalysts for Entrepreneurial Mindset Formation. Skill development programs, internships, and hands-on training strengthens entrepreneurial ventures. Experiential grounding influences entrepreneurial attitudes more significantly than classroom instruction alone. Students through enrolment in subjects of varied disciplines get exposure to simulation patterns through

internships and on-the-job training programs.

Higher education institutions serve as crucial platforms for nurturing such responsible entrepreneurs. However, there still exists a traditional gap between classroom-based learning and community realities. Bridging this gap between skill development programs, internships, and engagement with socially conscious enterprises has become essential for shaping entrepreneurial mindsets aligned with inclusiveness and sustainability.

2. REVIEW OF LITERATURE

Igwe, Madichie, et al. (2022) analyzed that responsible entrepreneurship education often fails to sufficiently enhance social and environmental values in undergraduates. The Author stated that there is a "4Rs" model including re-imagining, reconfiguring, reshaping, and reforming that needs to be included in the curricula. It was also argued that the pedagogical strategies need to be reoriented. It was mentioned that there needs to be awareness of social and environmental enterprises amongst students and simulations needs to be developed. It was stated that emphasis on experiential, process-oriented learning bridges the gap between classroom and community.

Barth, Godemann, Rieckmann, and Stoltenberg (2007) analyzed that identifying and articulating skill sets required sustainable development can be enhanced through higher education. It was also stated that not just formal education but also informal engagements through social projects go a long way in building entrepreneurs.

The Author stated that competencies can be grouped into four categories specialized methodological, personal, social/communicative, and action-oriented The Author stated that integrating formal curricula and informal experiences can help achieve sustainable development.

Bhandari, Sharma, Kunwar, and Han (2022) emphasized that community-based entrepreneurship education collaborated with practical skills enhances productivity amongst undergraduates. The Author stated that the existing skill sets helps to strengthen the base, while attributing this success to the direct engagement between academic institutions and community members. The findings also suggested that participatory and co-creative educational model fosters deeper entrepreneurial knowledge, builds social capital, and promotes sustainable local impact—offering compelling evidence that community-anchored pedagogy can be a powerful mechanism for inclusive economic development.

Bhandari, Sharma, Kunwar, and Han (2022) stated that community-based entrepreneurship education is of utmost importance for the overall development of entrepreneurs. The research also stated that collaborating entrepreneurship education directly within marginalized communities especially among low-income women brings tangible development outcomes. It was found that participants gain entrepreneurial knowledge, develop or expand enterprises, and adopt locally appropriate technologies that helps in boosting productivity The authors argue that the university-community collaboration strengthens social capital but also enhances local livelihoods thereby demonstrating that experiential learning.

3. OBJECTIVES

To understand the landscape of higher education in the context of skills development for community upliftment.

To measure the impact of including skill development and exposure for entrepreneurial opportunities for community upliftment.

To evaluate perception of learners towards being responsible entrepreneur for inclusive growth

To suggest measures for developing a model of community development.

4. HYPOTHESES

H0: There is no significant difference in perception of learners towards being responsible entrepreneur for inclusive growth

H0: There is no association between exposure to skill development and entrepreneurial opportunities and attitude of learners towards urban upliftment

1) H0: The impact of inclusion of skill development and exposure for entrepreneurial opportunities for community upliftment is different across the faculty

5. RESEARCH METHODOLOGY

Data Collection:

In the study, data is taken from both primary as well as secondary sources and further analysis of the same was done.

For collecting information as source of primary data, a structured questionnaire was circulated amongst the learners from different faculties viz. Arts, Science and Commerce to understand their perceptions and opinions. The secondary data was obtained from published sources such as articles, research papers, government websites and blogs.

Sampling:

Sampling Frame: The sampling frame of the learners is not available as the data is scattered across the higher education institutions.

Type of Population: As sampling frame is not available, the population is treated as indefinite population.

Type of Sampling: The sampling is done through Non-Probability Sampling as population is indefinite.

Sampling Method: Sampling method was chosen to be a mix Convenience sampling and snowball sampling.

Population and Sample:

Universe: Undergraduate learners under NEP

Population: Undergraduate learners under NEP from Arts, Science and Commerce

Sample Size: 213

6. SCOPE OF THE STUDY

The researchers have taken perceptions from undergraduate students studying under NEP from the faculty of Arts, Science and Commerce

The study focuses on community and urban development through entrepreneurship and skill development

The analysis is for opportunities under NEP and not any other specific mechanism developed by a particular HEI

Interpretations and Inferential Analysis:

Key interpretations:

- Decision making is the highest voted entrepreneurial skill followed by sustainability and innovation.
- Classroom learning under NEP, 2020 has motivated or strongly motivated to majority of the respondents.
- The respondents have mixed opinions on the status of entrepreneurial state of affairs
- There is strong case for i integrating entrepreneurship skill development into higher education for urban development as it has social and economic measurable outcomes
- Innovation and creativity and financial and business management have emerged to be key skills that learners have learnt for commitment to community development
- Majority of the respondents have participated in community-based projects through their institutes at least once
- Incubation centres focusing social innovations, community-based research projects can be replicated to link education to urban development

A) Inferential Analysis:

Hypothesis 1:

Researchers have used one sample Wilcoxon signed rank test for understanding whether the perception of respondents is different than assumed median of the ranks of the data.

a) NEP reshaping the thinking

Variable	N	Z	p value
	223	**-3.08**	**0.0021**

The test value is -3.08 and p value is 0.0021 where negative z value suggests that median of the data is less than assumed median of 3. This means that majority of the respondents agree to the variable above. p value is less than 0.05 reconfirms the same.

b) Community engagement leading to Urban development

Variable	N	Z	p value
	223	**-2.74**	**0.0061**

The test value is -2.74 and p value is 0.0061 where negative z value suggests that median of the data is less than assumed median of 3. This means that majority of the respondents agree to the variable above. p value is less than 0.05 reconfirms the same.

c) Community development leads to sustainable growth

Variable	N	Z value	p value
	223	**-2.52**	**0.0118**

The test value is -2.52 and p value is 0.0118 where negative z value suggests that median of the data is less than assumed median of 3. This means that majority of the respondents agree to the variable above. p value is less than 0.05 reconfirms the same.

Conclusion:

We can reject null hypothesis as all variables have p value less than 0.05.

Hypothesis 2:

Frequency of initiatives and impact on urban development

Variable	N	df	Test value	p value
	223	**8**	**26.78**	**0.044**

Researchers have used Chi square test to check the association between frequency of initiatives and urban development. The test value was 26.78 and p value was found to be 0.044. The high positive value suggests strong association between the two which is confirmed by p value too.

Conclusion: We can reject null hypothesis.

Hypothesis 3:

Researchers have used Perason's correlation between the variables and the faculty of respondents

1. Community driven Technology improves standard of living

Variable	N	p value
	223	**0.0245**

Based on 223 samples, the p value is 0.0245 which is less than 0.05, suggesting there is statistically significant correlation between the variable and faculty of the respondents.

2. Community engagement results in urban infrastructure development

Variable	N	p value
	223	0.089

Based on 223 samples, the p value is 0.089 which is more than 0.05, suggesting there is no statistically significant correlation between the variable and faculty of the respondents.

3. **Community engagement leads to urban development**

Variable	N	p value
	223	0.0451

Based on 223 samples, the p value is 0.00451 which is less than 0.05, suggesting there is statistically significant correlation between the variable and faculty of the respondents.

Conclusion: We can reject the null hypothesis as 2 out the 3 variables have p value less than 0.05.

Suggestions

- Institutions should encourage field projects based on understanding of urban development challenges.
- Social innovation, and community development should be embedded within various academic programs
- Community-Based Learning Models should be provided in colleges.
- Colleges can integrate the curriculum to leverage NEP 2020 for Structured Implementation.
- Mentors should encourage research on Urban Social Issues.
- Support for Social Start-ups will ensure community development in specific and overall urban development at large.

7. CONCLUSION

It is quite evident that there is a crucial influence of responsible entrepreneurship in advancing inclusive and sustainable urban development. Although infrastructure remains one of the most significant indicators of urban progress, the findings affirm that genuine development occurs when the right skill sets are imparted alongside experiential learning so that the right mindset can be sharpened.

It is also extremely important to understand that students with more frequent practical exposure demonstrate stronger motivation to contribute to community development and nation-building. Resonating with the goals of the National Education Policy (NEP) 2020, it is evident that multi-disciplinary education has to be collaborated with community engagement for pre-decided outcomes across courses in case of both undergraduates and post graduates.

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Digital Transformation and Entrepreneurial Pathways in Multi-Level Marketing: A Conceptual Study of the Indian Context

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Abstract: Multilevel marketing is now proving to be one of the most easily accessible entrepreneurship opportunities in India, especially for individuals with limited capital and limited formal business training. Digital technology is changing the nature of MLM networks' operations across recruiting, selling, training, and compliance. The authors of this paper address how digital transformation alters the MLM model as an entrepreneurial model in India. It uses mobile phones, social media, and internet banking to reach more people and minimize barriers to entry. It is also helpful in introducing new governance models for legitimacy, accountability, and entrepreneurial performance.

The article outlines an abstract theoretical scheme that connects the adoption of digital technologies, transparency, and entrepreneurial power in an MLM system.

At the end of the paper, policy and managerial recommendations are provided to ensure this sector grows ethically, inclusively, and through technology.

Keywords: Multilevel marketing, Digital transformation, Entrepreneurship, Governance, Legitimacy, Direct selling, India.

1. INTRODUCTION

Entrepreneurship in India has been practiced in a wide range of forms, including technology start-ups and the informal sector. Direct selling is also referred to as multilevel marketing because it reduces barriers to entry and enables individuals with limited capital, only basic skills, or who are formally employed to engage in income-generating activities. Over the past few years, this business model has changed as digital technologies have become the basis for recruitment, communication, training, and customer interaction.

The Multi-Level Marketing industry in India has been rapidly growing, as a critical element of Indian retail transactions and providing millions of people with self-employment opportunities (Banerjee & Banerjee, 2022). According to Bordoloi (2019)

India is characterized by a substantial middle class and an entrepreneurial culture and disposition. The capacity of Multilevel Marketing to earn income for a broad group of people, youth and the unskilled correlates with national promotion such as the Skill India campaign. The model provides a chance for the population to become micro-entrepreneurs, develop their skills, and integrate into the workforce (Kumar & Satsangi, 2018).

India has the largest concentration of the direct selling industry in the world, with the number of active direct sellers increasing by 2.2 per cent year-on-year between FY 2022-23 and FY 2023-24, to 86.2 lakh and 88 lakhs, respectively.

Moreover, the Indian direct selling market was estimated at around INR 22,142 crores in FY 2023-24, up 4.04% year on year from INR 21,282 crores in FY 2022-23. The industry is projected to grow at a CAGR of 7.15% over the next five years (FY 2019-20 to FY 2023-24), with an increase in INR 16,776 crores and INR 22,142 crores (Indian Direct Selling Association, 2024). Moreover, this industry has remained resilient even during economic uncertainty, despite some distributors shifting to online work and remote customer contact as part of the digital transformation (Indian Direct Selling Association (IDSA, 2023).

Meanwhile, governance has been placed at the center stage in building trust with people. MLM has always been criticised for scams, pyramid schemes and false promises. The Indian government enacted the Consumer Protection (Direct Selling) Rules, 2021, and made them applicable to all models of MLM and direct selling, encompassing the need to be transparent, capable of complaint handling, and accountable before the law (Rajput, 2023).

This study discusses the mutual relationship among digital transformation, entrepreneurship, and governance by developing a conceptual model based on the Indian MLM ecosystem. It describes the effectiveness of digital sites in maintaining entrepreneurship, the role of governance in stabilising the industry, and the contribution of these two variables to legitimacy and livelihood success.

2. LITERATURE REVIEW

Entrepreneurship Theory in Emerging Markets

Foo, M. D., Vissa, B., and Wu, B. (2020) suggest that these emerging economies are central to the expansion and contextualization of entrepreneurship theory, as such contexts require alternative assumptions regarding resource mobilization, opportunities, and constraints. Resource constraints and institutional weaknesses tend to define these markets, and new conceptualizations of entrepreneurial success are required. This is one of the concepts of Entrepreneurial Adaptation, which entails derived, cognitively and action-driven strategic decisions that can enhance adaptive abilities to sustain entrepreneurship in these settings (Basu et al., 2021).

India has strong social entrepreneurship and offers a good breeding ground for research on value creation in such settings (Sundaramurthy et al., 2013). Additionally, the networked economy and the idea of frugal, flexible, and inclusive innovation, known as Jugaad, enable entrepreneurs to develop despite a lack of resources (Baporikar, 2013; Chatterjee et al., 2023; Prabhu & Jain, 2015), which contributes to the further development of the entrepreneurial environment in India. This is the capacity to be innovative and adapt, even in situations where these firms are late entrants with fewer resources, and this is essential for firms that wish to become credible international players in emerging economies (Surana et al., 2024).

3. DIGITAL TRANSFORMATION

Digital transformation has enhanced vital functionality within MLM ecosystems, such as social selling, onboarding, payments and performance management. Distributors use social media to create personal brands, target audiences, and increase credibility by engaging in influence through influencers, capturing attention through visual and user-generated content to interact and create loyalty to the community (Masrianto et al., 2022; Yadav & Seranmadevi, 2024). Moreover, onboarding is conducted via webinars, e-learning, and virtual mentorship to provide uniform training, and automation based on CRM enhances the process, and mobile-friendly materials and feedback programs allow engagement and enhancement of the process (Kanojia & Rathore, 2025; Singh et al., 2024). In addition, UPI allows real-time transactions that decrease transaction friction and increase financial access for distributors in

rural locations. Conversely, it is easier to track commissions and introduce incentives for UPI use (Joel et al., 2024). Data analytics are applicable to tracking sales trends, customer preferences, and distributor performance, which would facilitate one-to-one marketing, enhanced customer relationships, improve retention, and clear performance standards that increase accountability (Asbeetah et al., 2025; Miklosik et al., 2019). In general, digitalization has assisted MLM organizations in enhancing their interactions, sales, and operational efficiency in the following areas.

In conclusion, integrating digital technological applications for social selling, onboarding, payments, and data handling in the MLM ecosystem has increased engagement with distributors, customers, sales, and growth.

4. MLM AS A HYBRID BUSINESS MODEL

Multi-Level Marketing, network marketing, or direct selling, is a business approach that is a hybrid of business models. Products or services are sold directly to consumers through a network of independent distributors (Egenhofer et al., 1994; Patharia et al., 2023). This model stands out as the one that allows distributors to earn income not only from their individual sales but also from the sales made by people recruited into their downline network (Patharia et al., 2023; Reingewertz, 2021). Essentially, the channel of distribution is built on a network of individuals who consume and sell products, and in many instances, are recruited and sold using personal connections. Although it is a highly influential player in the Indian retail industry, it is often not highly visible in mainstream marketing discourse (Banerjee & Banerjee, 2022). One of the most important aspects of the MLM model is the prospect of self-employment, which has also rendered it particularly attractive during economic uncertainty and fits the definition of the gig economy. (Banerjee & Banerjee, 2022; Kumar & Satsangi, 2018). It is also commonly combined with legal MLM activity and pyramid schemes, which are both illegal in India. Interferences must demonstrate their capacity to reintegrate into society, and it is necessary to increase social capital along with rehabilitation efforts. They need to show that they can reintegrate into society, and that social capital and rehabilitation should be expanded accordingly. (Pant et al., 2024).

5. GOVERNANCE AND REGULATORY PERSPECTIVES

Multilevel Marketing (MLM) requires governance and legitimacy to maintain the trust and integrity of its operations, mainly due to regulatory scrutiny and public concerns about the practice. Sound governance systems will ensure that MLM businesses are run openly, in compliance with legal requirements, and that the interests of consumers are safeguarded.

Regulatory Issues and Evolution: MLM businesses are facing evolving regulatory issues as governments seek to differentiate legitimate from fraudulent businesses. Regulatory authorities worldwide are continually revising guidelines to focus on new digital retail channels and sophisticated compensation models (Masrianto et al., 2022).

Adaptive governance is necessary to deal with the threats of misrepresentation, unfair recruitment strategies, and financial transparency owing to the dynamic character of the digital transformation of MLM ecosystems.

Consumer Protection (Direct Selling): One of the consumer protection regulations is the Direct Selling Guidelines, which aims to protect consumers and distributors by providing them with clear disclosures, fair contractual terms, and fair marketing practices. These laws mandate more disclosure of product representations, earnings prospects, and money-back guarantees, making the act of exploitation

less likely to occur (Yadav & Seranmadevi, 2024). Digital onboarding and training materials that are digital can be useful in compliance because they can standardize the delivery of information and make distributors aware of regulatory requirements (Kanojia & Rathore, 2025). Uniqueness of MLM and the Illegal Pyramid Scheme. One pillar of governance is the ability to distinguish between legitimate and illegitimate pyramid scheme. The difference between the legitimate MLM models and the pyramid schemes is that the former is centered on product sales and customer acquisition, and the latter is centered on rewarding recruiting that does not involve a real transfer of products, thus making the practices non-sustainable and fraudulent (Joel et al., 2024)

Regulatory measures tend to establish that product sales, open compensation schemes, and the right of consumers to understand what they are engaging in are verifiable to ensure the legitimacy of MLM companies' operations (Asbeetah et al., 2025).

Technology of Transparency and Governance: Technology enhances transparency and legal regulation of the MLM ecosystem. Data analytics systems also allow for monitoring sales operations and distributors' performance in real-time and point out deviations and possible fraud at the initial stages (Miklosik et al., 2019). UPI Systems of commission payment avoid conflicts of finances and increase accountability as the payment can be traced and is transparent (Joel et al., 2024). Moreover, compliance training can be distributed uniformly through the digital onboarding platform, and CRM systems can computerize record-keeping and reporting procedures demanded by regulators (Singh et al., 2024).

Altogether, the problems of governance and legitimacy in MLM can be addressed through a robust regulatory framework with a primary focus on consumer protection, a clear distinction between legal and illegal programs, and the utilization of digital technologies that foster transparency and compliance.

Digital Tools of Transparency and Compliance: Transparency and regulatory compliance in MLM ecosystems can be improved through the integration of digital tools. Data analytics systems allow sales operations and distributor performance to be tracked in real time and mark irregularities and possible fraud early (Miklosik et al., 2019). Commission payments made through systems such as UPI are clear and traceable, and they minimize financial conflicts and enhance accountability (Joel et al., 2024). Moreover, compliance training can be distributed uniformly through the digital onboarding platform, and CRM systems can computerize record-keeping and reporting procedures demanded by the regulators (Singh et al., 2024).

Overall, the issue of governance and legitimacy in MLM can be strengthened with the help of the dynamic regulation system that centers on consumer protection, a sharp distinction between legal and illegal programs, and the use of digital technologies that encourage transparency and adherence.

6. CONCEPTUAL FRAMEWORK AND HYPOTHESISED RELATIONSHIPS:

This section introduces the conceptual framework, that incorporates Digital Enablement and Governance Clarity as determinants of Entrepreneurial Outcomes in the Indian multilevel marketing (MLM) sector. The model conveys two direct and one moderating effect, based on recent empirical research conducted in India and is justified by recent theories of digital entrepreneurship and institutional governance. The framework will help describe the relationship between the two constructs: as a result of the combination of technology adoption

and regulatory frameworks, the entrepreneurial potential of participants in MLM is formed.

6.1 Overview of the Conceptual Framework

Digital Enablement involves the use of technology, such as social media, online training platforms, mobile payments, and app-based customer engagement systems. Governance Clarity refers to the clarity and recognition of the regulatory environment, particularly the Consumer Protection (Direct Selling) Rules, 2021. Entrepreneurial Outcomes are multidimensional outcomes based on income, autonomy, scalability, and the inclusion of MLM distributors.

The relationship between these constructs is shown in the figure below.

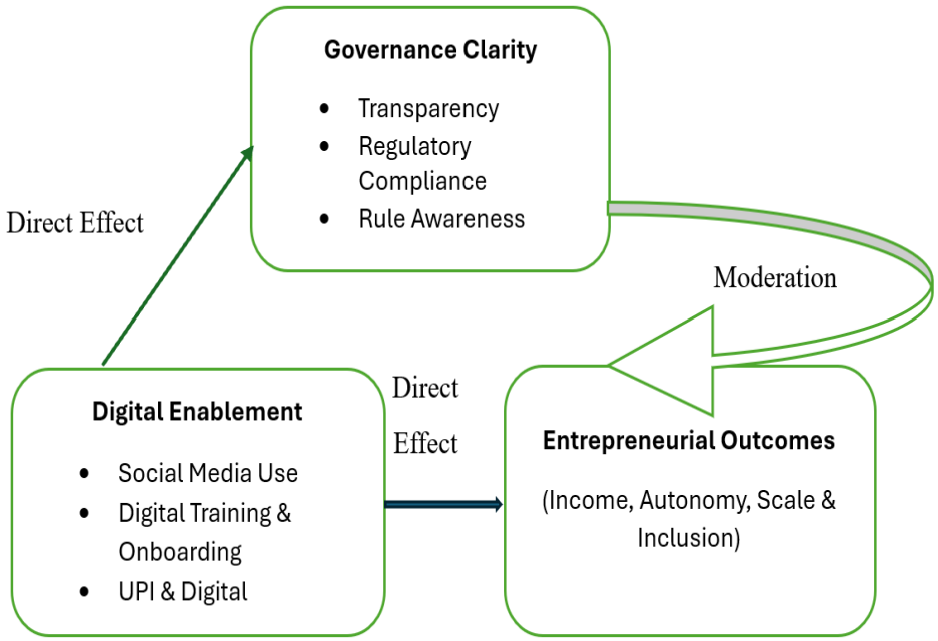

Figure 1. Conceptual Model of Digital Enablement, Governance Clarity, and Entrepreneurial Outcomes in the Indian MLM Sector.

6.2 Digital Enablement and Entrepreneurial Outcomes:

In India, the main activity of MLM has now shifted to using digital channels such as WhatsApp, Instagram, Facebook and YouTube, and the mobile applications a specific company develops to interact with customers, provide product demonstrations, and support network creation. Empirical evidence has proven that these digital practices are highly effective in enhancing entrepreneurial performance. It has been evidenced by 72% of direct sellers that social media marketing plays a positive role in their business, as reported in the survey report of the Indian Direct Selling Industry in 2023-24 (IDSA 2023-24) The necessity of digital training has also gained widespread popularity among direct sellers, with 59 per cent of them being trained about digital tools and 51 per cent on social media marketing (IDSA, 2024). Additionally, studies indicate that digital tools (such as social media platforms and CRM systems) can increase distributors' motivation and sales performance (Masrianto et al., 2022; Singh et al., 2024).

These results support the claim that distributors with more successful integration of digital tools will achieve better outcomes: higher revenue,

greater operational freedom, greater scalability, and greater social inclusion.

Hypothesis 1 (H1): Digital Enablement has a positive direct impact on Entrepreneurial outcomes.

6.3 Governance Clarity and Entrepreneurial Outcomes:

Entrepreneurial achievement also requires clarity in governance. The Consumer Protection (Direct Selling) Rules, 2021, provide a formal regulatory framework in which lawful and unlawful product-based MLMs have been clearly placed. Such regulations are required to provide for disclosures, grievance procedures, and general liability between direct selling entities and individual sellers.

Empirical evidence supports these effects. The Rules are termed game changers in the IDSA 2023-24 report because of increased consumer protection, transparency and quality. The media in the business world also associate the 7.15% five-year CAGR in the industry with a robust regulatory framework that stabilizes the environment for both distributors and consumers. This change is evident in consumer behavior, as more than half of consumers are not only aware of the application of the Consumer Protection Act to direct selling but are also experiencing increased trust and steady purchases.

Additionally, Legal transparency lowers uncertainty and legal risks, allows businesses to grow sustainably, and safeguards distributors (Joel et al., 2024; Asbeetah et al., 2025).

Overall, these results indicate that Governance Clarity is associated with decreased uncertainty and improved legitimacy, and ethical business conduct. The combination of these findings indicates that Governance Clarity has a direct positive impact on reducing uncertainty, enhancing legitimacy, and affecting ethical business practices.

Hypothesis 2 (H2): There is a positive direct relationship between governance clarity and entrepreneurial outcomes.

6.4 Moderating Role of Governance Clarity:

The model proposes that Governance Clarity strengthens the positive relationship between digital enablement and entrepreneurial outcomes. The personalization of marketing and performance monitoring, which are directly connected to better income and scalability, is possible based on data-driven insights (Miklosik et al., 2019; Asbeetah et al., 2025).

Reporting on the industry highlights that regulation and digitalization are the two mutually relevant drivers of sustainable growth. According to the IDSA 2023-24 survey, fraudulent schemes have created a tarnished reputation of the sector in the past. Nevertheless, the Direct Selling Rules, 2021, have assisted in restoring trust, which can make digital strategies provide more expected and ethical outcomes. This indicates that digital tools can operate optimally in settings with clear rules.

Legal studies support this trend. The Direct Selling Rules are relevant to online promotion activities and online selling, which should mean fair claims, should not allow earnings to depend on the recruitment process and should hold some accountability regarding digital misconduct. Governance, therefore, shapes how digital channels can be used, implying that regulation enhances the positive effects of digitalization. Literature on digital entrepreneurship in India shows that digital tools have the most promising effects when incorporated into institutional enabling platforms, which comprise formal regulations, training, and consumer protection. This general trend correlates with the concept that governance mediates the relationship between digital technology and entrepreneurship.

Hypothesis 3 (H3): Governance clarity positively moderates the relationship between digital enablement and entrepreneurial outcomes, such that this relationship is stronger when governance clarity is high.

The two sets of empirical data and theoretical arguments in this section are combined to endorse the proposed conceptual framework. Both digital enablement and Governance Clarity have direct positive effects on Entrepreneurial Outcomes, and Governance Clarity encourages the use of digital tools by fostering a transparent, trusted, and rule-based environment. The present integrated model can be used to understand the role of technological adoption and regulatory structures in creating an integrated effect that influences the MLM entrepreneurship in India.

7. IMPLICATIONS

Policymaker implications

Regulation must continue to develop, and the most relevant aspect is to enforce it at the state level.

Additional digital complaint forums, awareness campaigns, and managerial systems can predominantly draw the line between fair and unlawful direct selling.

Implications for companies

MLM companies ought to invest in open digital technologies. Trust, retention, and compliance are achieved through the use of apps, dashboards, product traceability, and training platforms.

Entrepreneur implications

Digital tools must be strategically used by distributors. Entrepreneurs have new skills, including personal branding, social selling, and integrating payments. Digital literacy has become a competitive advantage.

Research implication

The model exposes the empirical work. These relationships can be tested in future research using surveys or mixed-methods designs. Digital adoption scales, trust indices, income results, and governance perception can be used in measuring these variables.

8. CONCLUSION

The convergence between entrepreneurship, digital transformation, and governance is where multilevel marketing exists in India. Digital tools have reduced entry barriers and increased participation, enabling millions of individuals to create sources of income and an entrepreneurial identity. Meanwhile, reforms in governance have given way to legitimacy, formalization and consumer protection.

This study provides a theoretical framework that links digital practices, regulatory clarity, legitimacy, and outcomes. It argues that entrepreneurial potential is increased by digital transformation but is governed by governance, thereby increasing the legitimacy of the moderated risk. In India, the future of MLM is to ensure a balance between technological empowerment and transparent, enforceable governance, keeping both distributors and consumers safe. With all these in place, India could still grow into an all-inclusive, scaled, and digitally empowered MLM model.

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Forging the Governance - Finance Nexus: Leveraging the Mumbai Climate Budget Model to Scale Green Insurance for Climate-Resilient Indian Cities

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Abstract: This study examines how governance transparency, fiscal reform, and financial innovation work together for strengthening climate-resilient urban financing in India. The researchers have analyzed the interaction between Mumbai Climate Budget Model (MCBM) and the Green Insurance Model (GIM) under the Insurance-Linked Resilient Urban Financing (IRUF) framework. The three pillars of governance reform (Pillar I), regulatory and technical insurance readiness (Pillar II), and blended finance (Pillar III) collectively improve the creditworthiness of Urban Local Bodies (ULBs). The study links fiscal transparency to better credit access and insurance participation by using a qualitative case-based approach. The findings show that MCBM builds trust and provides reliable financial data. Furthermore, the researchers proposed blended finance to make GIM adoption affordable. The study concluded that there is a requirement of a coordinated system, connecting governance, finance, and insurance for scaling climate resilience across cities in India.

Keywords: Climate Budgeting, Green Insurance Model, IRUF framework, Urban Local Bodies, Fiscal Transparency.

1. INTRODUCTION

India's urban centers are increasingly vulnerable to climate-related shocks, from recurrent flooding to heat stress across major cities. There has been an increase in financial impact of climate change on cities in India. Estimated annual losses from storm or pluvial water related flooding is likely to increase from $4 billion in 2023 up to $14-30 billion by 2070 (World Bank, 2025).

Urban Local Bodies (ULBs) in India remain underfunded.

Since, the early 2000s, municipal revenues have stayed at approximately 1% of GDP. This is lower in comparison to other comparable economies where municipal revenues contribute 4-6% of the GDP on average.

The Mumbai Climate Budget Model (MCBM) was launched in year 2023. It integrates climate action into municipal budgeting. Concurrently, performance-linked insurance incentives tied to verified climate investments were introduced by the Green Insurance Model (GIM) under the Insurance-Linked Resilient Urban Financing (IRUF). This study examines how governance transparency created by MCBM will enhance creditworthiness and support adoption of GIM. The study through a multi-pillar framework combines institutional reform, technical insurance design, and blended finance.

2. SCOPE AND SIGNIFICANCE OF STUDY

The scope of this study is conceptual. It advocates that MCBM will help in the adoption of GIM within the broader IRUF framework. Through the synthesis of governance (MCBM) and financial dimensions (GIM under IRUF), the researchers propose a policy framework to strengthen urban climate resilience.

The study will highlight the importance of governance transparency in improving financial creditworthiness, in adopting parametric insurance, and in using blended finance as a market enabler. The policy insights provided will help to scale the MCBM and GIM under IRUF framework across cities in India.

3. RESEARCH OBJECTIVES

To explain how the Green Insurance Model (GIM) functions within the Insurance-Linked Resilient Urban Financing (IRUF) Framework.

To examine the financial and institutional barriers preventing Urban Local Bodies (ULBs) from accessing long-term climate finance.

To study the working of Mumbai Climate Budget Model (MCBM) and how it helps integrate climate action into regular governance.

To explain how the governance transparency created by the MCBM improves the creditworthiness and supports parametric insurance implementation needed to adopt the GIM under the IRUF framework (Pillar I and Pillar II).

To examine how blended finance and concessional funding mechanisms will improve the financial feasibility of ULBs in adopting the GIM under the IRUF framework (Pillar III)

4. LITERATURE REVIEW

Previously, climate risk finance was seen as a reactive and post disaster mechanism. Now, climate risk finance has evolved to a proactive risk reduction tool for building systemic resilience. Earlier studies by Swiss Re (2022) and United Nations Office for Disaster Risk Reduction (UNDRR, 2023) focused on providing rapid financial relief after catastrophic events. These post disaster financial relief mechanisms neither incentivized preventive instruments nor strengthened institutional capacity for long term resilience.

Recent research has shifted towards preventive financial mechanisms. Kraussmann (2022) introduced the concept of Insurance-Linked Resilience Finance (ILRF). The researcher argued that insurance products can be used as financial incentives to reward proactive climate action. This concept of risk reduction was further developed through the Green Insurance Model (GIM) under the Insurance-Linked Resilient Urban Financing (IRUF) framework.

Concurrent to financial innovation, the governance side of urban climate resilience was emphasized by a growing body of literature. The Organization for Economic Co-operation and Development (OECD, 2023) and C40 Cities (2023) emphasize the importance of climate budgeting frameworks. These organizations emphasize that fiscal transparency, departmental coordination, and climate mainstreaming within city governments can be improved through climate budgeting frameworks. To attract climate linked capital, climate budgeting framework should be institutionalized. This will help in providing the required data and accountability for credit rating.

In the Indian context, the Ministry of Housing and Urban Affairs (MoHUA, 2023) has mentioned

that major hindrance to climate finance are weak balance sheets of ULBs and limited fiscal autonomy. Studies by Jain (2023) and World Bank (2022) confirm that ULBs don't have standardized financial reporting and institutional credibility which are needed for insurance linked financing or accessing long term debt.

Prior research studies have treated governance as an administrative reform and insurance as a purely financial tool without examining their mutual interdependence in the urban Indian context. Specifically, there is a lack of analysis on how MCBM can improve ULBs' creditworthiness and adoption of GIM under the IRUF framework. This research addresses these gaps through a three-pillar framework that integrates governance, insurance, and finance. The three-pillar framework consist of governance reform (Pillar I), insurance taxonomy and GIM (Pillar II) and blended finance (Pillar III)

5. RESEARCH METHODOLOGY

The researchers adopted a qualitative, prescriptive, and case based research design for developing a conceptual framework linking transparency in governance to climate risk finance. The framework adopted in this study is based on three analytical pillars, namely, governance reform using MCBM (pillar I), insurance taxonomy and GIM (Pillar II), and blended finance (Pillar III). The study is based on secondary sources such as municipal budget reports, policy documents, and industry studies. The study mapped MCBM's governance outputs (fiscal transparency and accountability) to GIM's financial requirements (creditworthiness and risk pricing) using thematic synthesis. Thus, the study conceptualizes a governance–insurance-finance nexus within the three-pillar IRUF framework. The below chart 1 shows the conceptual framework of this study.

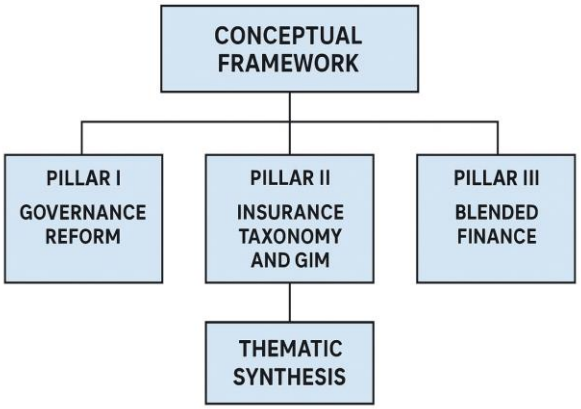


Chart 1 The Conceptual Framework of the Study
Source: Author's Work

Analysis and Discussion

The study's five research objectives are discussed in this section.

Research Objective 1

To explain how the Green Insurance Model (GIM) functions within the Insurance-Linked Resilient Urban Financing (IRUF) Framework

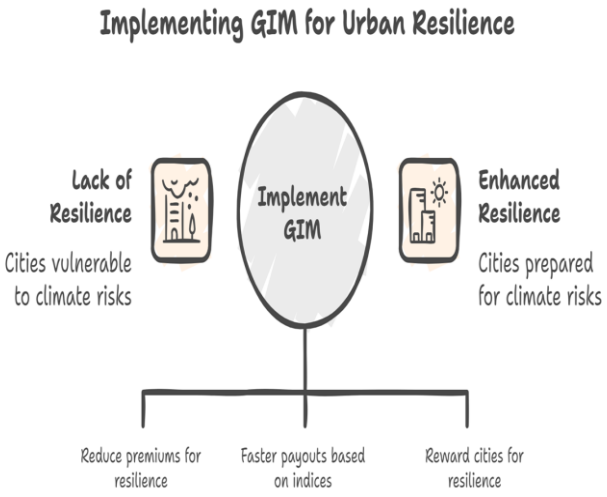
Traditional, climate risk insurance products provide compensation only after the disaster occurs (Swiss Re, 2022). The GIM within the IRUF framework goes a step further by linking insurance incentives to resilience improvements. GIM uses long term contracts (10-20 years) that reduce insurance premiums when verified resilience measures are implemented by cities (Kraussmann, 2022). To avoid bureaucratic delays and allow faster payouts, the model uses parametric triggers that is payments based on climate indices like rainfall or temperature (Allianz, 2023). The key feature of the model is rewarding cities with premium discounts for actions such as flood barriers, green roofs, and

upgraded drainage. Insurance risk falls leading to lower premium as cities invest in resilience. This creates a financial incentive for preventive measure. Transferring risk to stabilize fiscal shocks and enhancing credit by lowering perceived financial risk are the two main purposes of GIM. The successful implementation of the GIM within the IRUF requires transparent fiscal data, creditworthy institutions, and standardized resilience certification.

However, many Indian urban local bodies currently lack in transparent fiscal data and standardized resilience certification. Furthermore, these ULBs are not considered creditworthy institutions.

The below Chart 2 provides a visual summary of the GIM under IRUF framework.

Chart 2 GIM within the IRUF framework



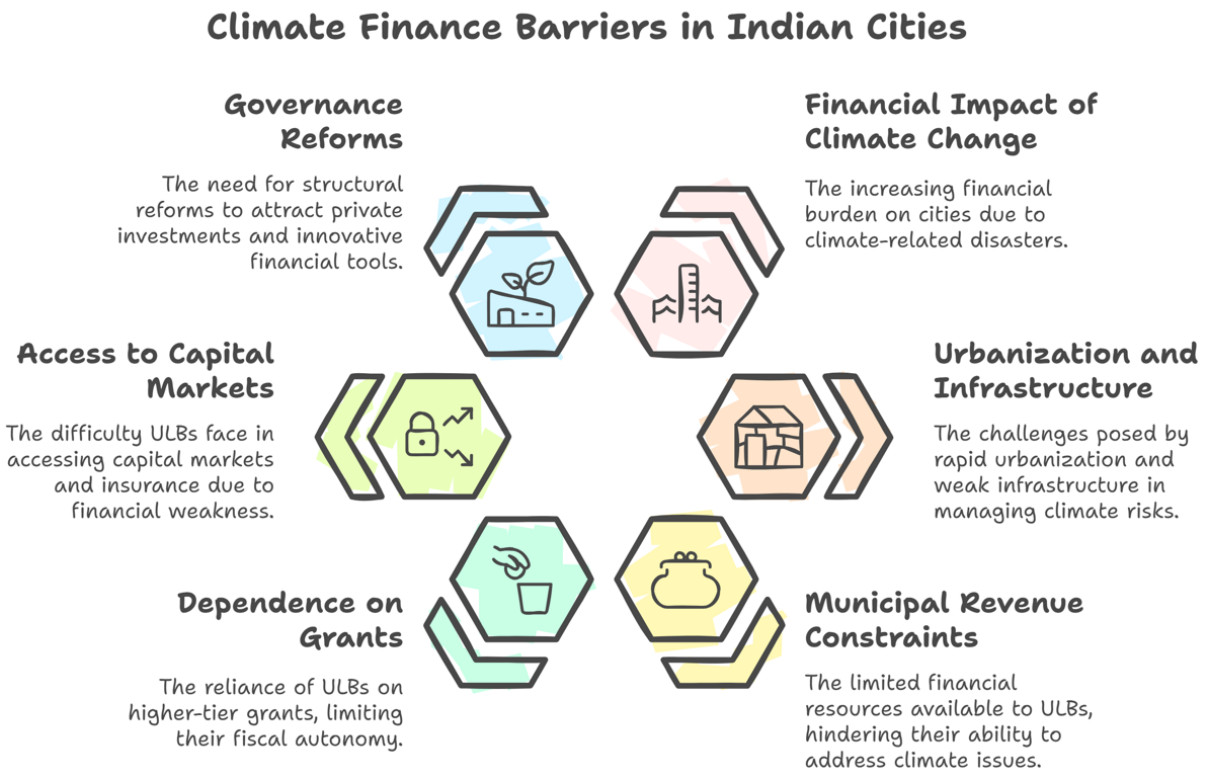
Source: Author's Work Based on Research Objective 1

Research Objective 2

To examine the financial and institutional barriers preventing Urban Local Bodies (ULBs) from accessing long-term climate finance.

There has been an increase in financial impact of climate change on cities in India. Global disaster losses now exceed US$300 billion annually (UNDRR, 2023). Due to rapid urbanization and weak infrastructure, cities in India bear a disproportionate financial share of climate change (World Bank, 2022). Growing fiscal and human costs of unmitigated urban risk is being highlighted through repeated floods in Mumbai, Chennai, and Hyderabad. Urban Local Bodies (ULBs) can play an important role but remain underfunded. Since, the early 2000s, municipal revenues have stayed at approximately 1% of GDP. This is lower in comparison to other comparable economies where municipal revenues contribute 4-6% of the GDP on average (MoHUA, 2023). These ULBs are dependent on higher-tier grants which in turn limit their fiscal autonomy and capacity for capital investment. Hence, only a few ULBs have the financial strength or creditworthiness for accessing capital markets or purchasing long-term insurance (Jain, 2023). Hence, there is a need for structural governance reforms so that ULBs are able to attract private investments or use tools like resilience bonds, public-private partnerships (PPPs) or parametric insurance (C40 Cities, 2023). The below Chart 3 provides a visual summary of hindrances to accessing long term climate finance.

Chart 3 Hindrance to Accessing Long Term Climate Finance



Source: Author's Work Based on Research Objective 2

Research Objective 3

To study the working of Mumbai Climate Budget Model (MCBM) and how it helps integrate climate action into regular governance.

The MCBM was launched in year 2023. It integrates climate action into municipal budgeting.

It classifies all expenditures based on climate relevance into mitigation and adaptation goals. For financial year 2024-25, Mumbai has allocated 32.18% (approximately ₹10,224.24 crore) of its total capital expenditure budget to climate relevant

activities (All India Radio News, 2024). MCBM builds strong governance based on five main mechanisms as follows:

a) **Climate Tagging:** Each department labels its spending as climate relevant, partly relevant, or neutral.

b) **Accountability:** Each department is given specific climate targets (For instance: enhancing urban drainage systems). At the end of year, departmental performance is evaluated not only on budget utilization but also on the achievement of these climate objectives. This makes climate action as an integral responsibility within municipal governance.

c) **Data integration:** All spending and emissions data are collected in one shared dashboard. This dashboard is jointly managed by the Environment and Finance departments.

d) **Transparency:** Key climate budget summaries is made public to build trust and involve citizens into climate action.

e) **Policy feedback:** Results are reviewed every year for shifting funds toward projects that have the biggest climate impact.

The below Chart 4 provides a visual summary of five mechanisms under the MCBM

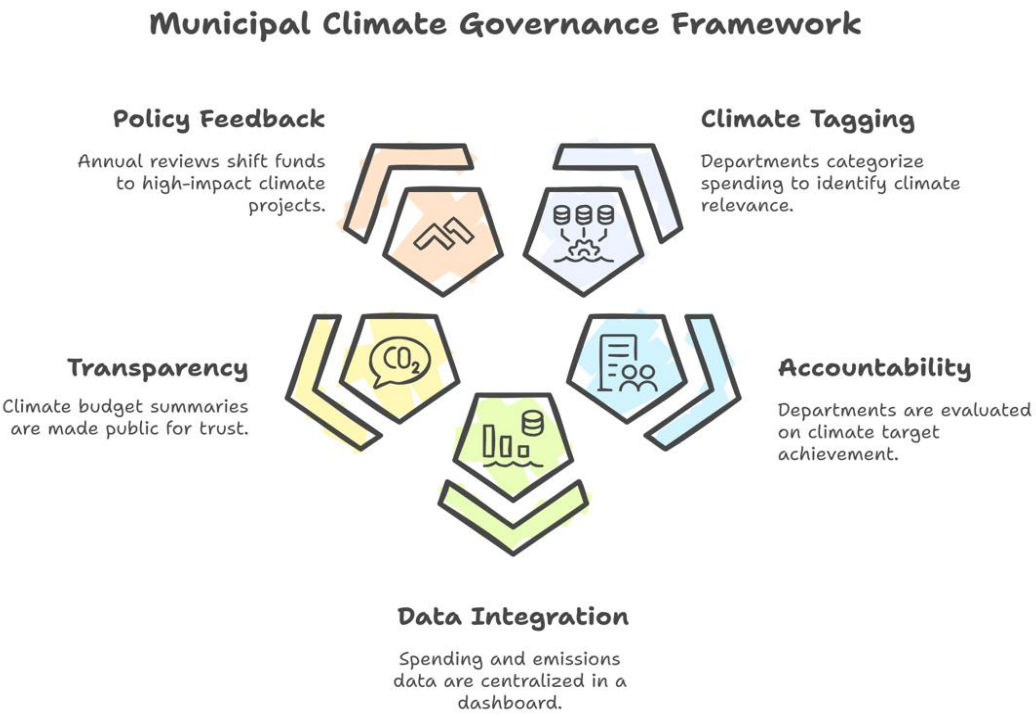


Chart 4 Mumbai Climate Budget Model (MCBM) - Governance Innovation

Source: Author's Work Based on Research Objective 3

Research Objective 4

To explain how the governance transparency created by the MCBM improves the creditworthiness and supports parametric insurance implementation needed to adopt the GIM under the IRUF framework (Pillar I and Pillar II).

Pillar I – Governance & Institutional Reform (MCBM)

The essential connection between MCBM and the IRUF framework is that MCBM gives ULBs the required trustworthiness for attracting external capital and qualifying for GIM contracts. The researcher's primary finding is that GIM model cannot be widely used unless the ULBs

adopt the governance improvements brought by MCBM (a model for reform). GIM works as a financial engine and MCBM works as an institutional fuel providing the necessary structure and reform for the engine to run.

The IRUF model requires long term, stable contracts, with verifiable commitments to city resilience (Swiss Re, 2023). MCBM's stability is essential for convincing insurers and investors that ULBs will stick to the IRUF's long term rules. This in turn will make GIM's credit enhancement feature effective. The MCBM standardizes the municipal budget. This standardization makes ULBs a predictable and auditable counterparty who can sign long term resilience contracts.

Table 1. Causal Chain Linking MCBM Governance to GIM Adoption

Step	Process/Description	Influence on GIM Adoption	Source
Initial Constraint	ULBs lack fiscal transparency and demonstrable long-term climate commitment.	Low credit rating, no access to capital markets, and inability to commit to long-term GIM premiums.	(World Bank, 2016)
I. Governance Reform	ULBs adopts and implements the Mumbai Climate Budget Model (MCBM) to standardize climate spending	Climate-related expenditures become formalized, trackable, and auditable across all departments	(Government of Maharashtra, 2024)
II. Transparency & Credibility	The MCBM generates transparent, auditable fiscal data demonstrating consistent resilience investment	Credit rating agencies and investors recognize improved financial management and reduced institutional risk	(Government of Maharashtra, 2024; World Bank, 2016)
III. Financial Access	Improved credit rating enables access to Capital Mobilization instruments (e.g., Resilience Bonds, blended finance).	ULB secures initial debt financing for GIM-mandated adaptation measures.	(World Bank, 2016)
IV. GIM Engagement	ULB attains sufficient creditworthiness and fiscal commitment to purchase a long-term GIM policy.	Successful entry into GIM loop, leveraging GIM as credit enhancement and earning premium discounts upon resilience completion.	(Swiss Re, 2023)

Source: Adapted from Government of Maharashtra (2024); World Bank (2016); Swiss Re (2023).

Pillar II – Multi-Scalar Regulatory and Technical Imperative (Insurance Taxonomy & GIM)

Pillar I (MCBM) resolves micro-level ULBs fiscal constraints. Pillar II includes both the regulatory framework and the technical/data mechanisms required for GIM adoption.

Regulatory Framework

In year 2023, the global parametric insurance market was valued at USD 18 billion and projected to reach at USD 34.4 billion by the year 2033 (Allied Market Research, 2023). India has started to experiment with parametric insurance. Pilot parametric insurance programs in Gujarat State have expedited claim payouts in comparison to traditional indemnity insurance payouts. (Mongabay India, 2024).

Insurance Regulatory and Development Authority of India: To enable insurers to issue GIM policies, IRDAI will facilitate domestic parametric insurance market and standardize climate risk disclosure (IRDAI, 2024).

International Financial Services Centres Authority: To transfer catastrophic tail risk transfer to global markets, IFSCA develops regulatory framework for Insurance Linked Securities (ILS). This includes the establishment of Special Purpose Insurer (SPI) entities in GIFT City.

Technical / Data Mechanism

To design localized parametric indices and reduce basis risk, a high-quality data will be generated with the help of MCBM's budget tagging, monitoring, and audit mechanisms. Table 2 summarizes the technical linkages that make parametric insurance capacity operational under the GIM.

Table 2 Technical Link Between MCBM and GIM's Parametric Insurance Mechanism

Aspect	Process/Function	Impact on GIM Mechanism	Source
Technical Foundation	MCBM institutionalizes climate-related planning and expenditure tracking across ULBs	Establishes the fiscal and data-governance base required for parametric insurance operation (audit trails, budget-tagging, verification workflows)	(UNDRR, 2022)
Basis Risk Challenge	Parametric insurance relies on pre-defined weather triggers but can misalign with local losses (basis risk)	Basis risk reduces trust in parametric pay-outs; undermines insurer/ULBs confidence and uptake	(Swiss Re Institute, 2022)
High-Granularity Data Need	Accurate parametric indices require dense sensor networks, localized modelling, and high-frequency administrative data	MCBM incentives (budgeting + procurement transparency) make ULBs more likely to invest in smart-city data infrastructure, reducing basis risk and improving pay out fidelity	(OECD, 2023)

Verification & Auditability	MCBM creates auditable expenditure records and monitoring protocols	Enables independent post-event verification that resilience investments were carried out. This is essential to trigger premium discounts and performance-based incentives under GIM	(Government of Maharashtra, 2024)
Trust & Market Development	Clear governance and verified data foster insurer and investor confidence	Facilitates parametric product design, pilot testing, and scaling of GIM within domestic markets	(Swiss Re, 2023; IRDAI, 2024)

Source: Adapted from UNDRR (2022); Swiss Re Institute (2022); OECD (2023); Government of Maharashtra (2024); IRDAI (2024).

Case Insight: Nagaland's Parametric Insurance Experience

An example of parametric insurance in India was seen in the case of Nagaland state. The state used parametric insurance to protect against extreme rainfall events (Mongabay India, 2024).

During the pilot stage (2021-2023), a key challenge of basis risk was observed when there was a mismatch in rainfall readings and actual ground damage. There were cases when flooding occurred but weather stations failed to record the rainfall beyond trigger level.

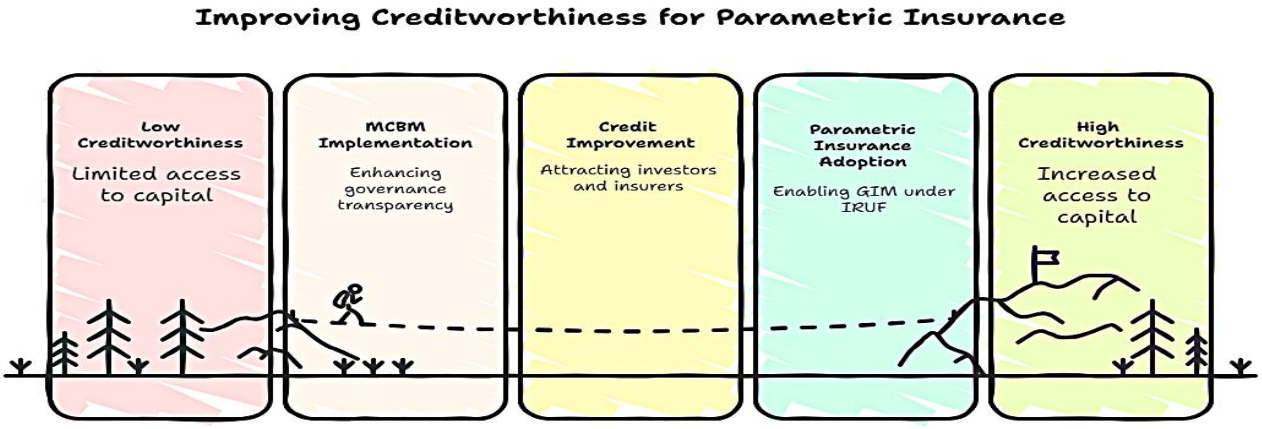
Hence, no payments were made even though real losses occurred. The state decided to improve the design in 2024 with more automatic weather stations by using gridded data from India Meteorological Department. This highlights the need for high quality local data for successful implementation of parametric insurance.

This research paper's argument are directly supported by lessons learnt from the case of Nagaland. MCBM through its climate tagging, budget tracking, and annual performance reports will create a trustworthy data system that will monitor cities' spending on resilience and assess the outcomes achieved.

Hence, parametric insurance solutions such as the GIM will be financially and technically feasible with strong governance and data systems.

The below Chart 5 shows MCBM as a tool for Parametric Insurance adoption and High Creditworthiness.

Chart 5 MCBM as a tool for Parametric Insurance Adoption and High Creditworthiness



Source: Author's Work Based on Research Objective 4

Research Objective 5

To examine how blended finance and concessional funding mechanisms will improve the financial feasibility of ULBs in adopting the GIM under the IRUF framework (Pillar III)

Pillar III – Blended Finance as a Market Enabler

Persistent fiscal constraints are faced by ULBs in India. Most of the ULBs rely on state transfers with limited own source revenue. Furthermore, most ULBs provide essential services such as water supply, solid waste management, and sanitation. This providing of essential services keeps little fiscal space for climate-resilient investments. Many ULBs cannot afford the initial premiums required for the Green Insurance Model (GIM). A strategic solution is provided by blended finance mechanisms that combines concessional public or philanthropic capital with private investment. These blended instruments will lower the upfront financial burden, enhance creditworthiness, and make climate-resilience investments more bankable.

Following are the blended instruments: -

1. **Concessional Loans:** It acts as the first loss layer for urban climate projects. It will absorb initial risk for the urban climate project. These concessional loans will allow ULBs to implement resilience measures mandated by GIM contracts, such as flood mitigation infrastructure and drainage upgrades.
2. **Grants and Subsidies:** The initial premium burden for ULIPs adopting GIM policies will be reduced through grants and subsidies. These grants and subsidies link funding with governance goals and help cities keep budget transparency to comply with MCBM reporting rules.

Credit Enhancement and Investor Confidence

Blended finance strengthens the creditworthiness of ULBs. Commercial investors will perceive reduced exposure as concessional capital will absorb the early risk. As, a result, commercial investors' confidence in municipal resilience projects will increase. Insurers will now be able to price the premium more precisely because the financial risk is lower and more predictable. Thus, blended finance will facilitate the functioning of GIM mechanism.

Self-Reinforcing Governance–Finance Loop

Blended finance links all the three IRUF pillars by creating a self-reinforcing cycle

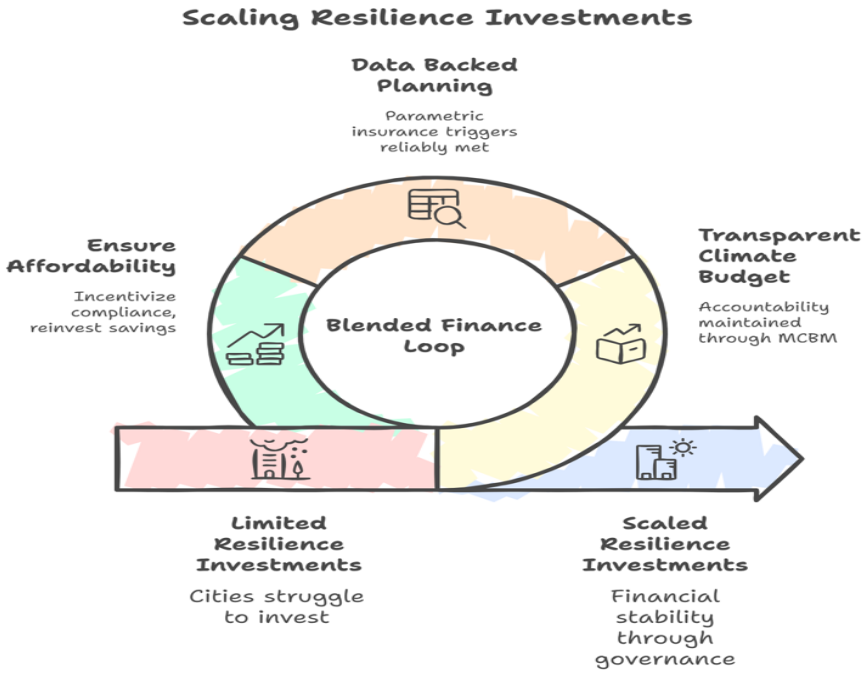
Governance (Pillar I): A transparent climate

budget and accountability is maintained through MCBM by ULBs.

Technical Insurance Readiness (Pillar II): Using data backed municipal planning, parametric insurance triggers are reliably met.

Financial Feasibility (Pillar III): Blended finance will ensure affordability and incentivize compliance. It will allow cities to reinvest savings into further resilience measurers.

Thus, ULBs, through the above loop will be able to gradually scale up resilience investments. Furthermore, financial stability will



be sustained through governance and insurance support.

The below chart 6 shows a visual descripting of blended Finance loop.

Chart 6 Blended Finance Loop

Source: Author's Work Based on Self-Reinforcing Governance–Finance Loop

Policy Implications through adoption of Blended Finance

The following are the policy implication of adopting blended finance in India

1. **Targeted Concessional Funding:** High risk cities with low fiscal capacity should be given priority for grants and concessional loans
2. **Integration with MCBM:** To ensure transparency and measurable outcomes, blended finance instruments should align with municipal climate budgeting frameworks.
3. **Private Sector Participation:** Reduction of initial risk through concessional loans and grants will encourage private investments and foster a sustainable urban resilience financing ecosystem.
4. **National Coordination:** A policy framework for blended finance deployment that complements GIM adoption should be provided by Central and State Governments.

Thus, a crucial enabler for the GIM under the IRUF framework is blended finance. Thus, blended finance completes the integrated **governance-insurance-finance** loop through the reduction of upfront financial burden, enhancement of

creditworthiness, and incentivization of compliance with climate governance reforms.

6. SUMMARY AND CONCLUSION

MCBM is a foundational governance reform that will enhance ULBs' fiscal transparency and accountability. This in turn will improve ULBs' creditworthiness which is a prerequisite for GIM adoption. The three interlinked pillars through which IRUF framework operates are:

Pillar I: There is an institutionalization of fiscal transparency and standardization of climate expenditure

Pillar II: To enable parametric insurance and risk transfer, there is a technical and regulatory readiness.

Pillar III: To ensure ULB participate in GIM contracts, blended finance bridges the affordability gap.

Together these three pillars, create a self-reinforcing governance finance loop. Here, improved transparency lowers insurance risk, reduces insurance premium, and increases fiscal stability.

7. RECOMMENDATION AND SUGGESTION

- **Institutionalization of Climate Budgeting:** Indian ULBs should adopt MCBM type frameworks through standardization of climate tagging.
- **Regulatory Alignment:** Joint guidelines should be issued by IRDAI and IFSCA for integrating parametric insurance with municipal budgeting data
- **Fiscal Incentives:** Conditional grants should be provided to ULBs that adopt resilience-linked insurance models.
- **Data Infrastructure Investment:** Cities should implement smart sensor systems and open data platforms for improving accuracy of parametric insurance index.
- **Capacity Building:** Strengthen municipal finance and actuarial literacy for implementation of GIM.

8. POLICY IMPLICATIONS

India's urban resilience finance will be transformed through the integration of MCBM and GIM under the IRUF framework.

1) It will mainstream climate budgeting into public financial management.
2) It will enable domestic insurers to expand into parametric products.

Ultimately, this model supports India's commitments under the National Mission on Sustainable Habitat and SDG 13 (Climate Action).

9. LIMITATIONS AND SCOPE FOR FURTHER RESEARCH

This study is limited by its reliance on a single case of MCBM. Quantitative validation through financial modelling is beyond the scope of this research paper but remains essential for empirical grounding. Further research can be carried out to check feasibility of MCBM's replicability in comparative cross-city studies.

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Perceived Organizational Support and Self-Efficacy among IT employees: Examining the Mediating Role of Job Crafting and the Moderating Effect of Job Complexity

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Abstract: Purpose: This study aims to understand the relationship between perceived organizational support and self-efficacy, and also to understand whether job crafting serves as a mediator and the effect of job complexity as a moderator. The research highlights how support from the organization helps employees change the meaning, tasks, and their relationship with the job, which makes them feel confident in a complex work environment. A recent report by Bain and NASSCOM emphasized that by 2047, the service sector in India, which is largely fueled by the information technology (IT) and information technology-enabled services (ITES) industry, is estimated to contribute close to 60% of India's GDP (BS Reporter, 2025). The IT field is chosen as the context for the study because it is claimed that people constitute a core determinant of output in knowledge-intensive work contexts. IT employees operate within a fast-changing, dynamic, and rapidly innovating environment.

Design/methodology/approach: Academic databases, including Google Scholar, EBSCO, and ProQuest, were utilized to conduct the initial research. The literature review focuses on perceived organizational support, self-efficacy, and their mediation through job crafting, as well as the moderated effect on job complexity. A quantitative study was conducted among a heterogeneous sample of employees working in the Information Technology Sector, with a total sample size n = 374. The data were analyzed using SPSS software.

Practical implications: The organization should provide support to employees and help them craft their job roles, which will increase their confidence and ability. Additionally, job complexity should be managed well to enhance performance. i.e., excessive complexity may negatively impact performance.

Outcomes: The study found that perceived organizational support (POS) has a positive impact on self-efficacy (SE). Job crafting (JC) strongly mediated the relationship between perceived organizational support and self-efficacy. Job complexity moderates the relationship between job crafting and self-efficacy. Thus, the research highlights that overall supportive environment, proactive job crafting, and manageable job complexity enhance the confidence and belief of employees

Originality/value: This paper contributes to the literature by highlighting how perceived organizational support has a positive effect on employee self-efficacy through job crafting as a mediating factor, and how job complexity moderates these relationships

Keywords: perceived organizational support, job crafting, job complexity, self–efficacy

1. INTRODUCTION

In today's dynamic work environment, employees are expected to adapt to changing work demands, underscoring the significance of self-efficacy as a crucial psychological resource for both well-being and performance (Bandura, 1997). The authors Eisenberger et al. (1986) linked performance to employees' perceptions of their organization. If an organization values its employees' contributions and cares about them, then the employees' performance improves. Existing literature reviews highlight the positive relationship between perceived organizational support and positive work outcomes, but the pathway through which employees achieve self-efficacy remains underexplored.

One such process or potential pathway is job crafting, which can increase employees' self-efficacy. Employees feel supported, which enables them to tailor their work to their interests and strengths, thereby enhancing their confidence and competencies (Tims et al., 2012). However, these benefits may differ depending on the level of complexity. It may either offer an opportunity or limit the employee's growth (Bai et al., 2021). Thus, the present study investigates the relationship between perceived organizational support and self-efficacy, with job crafting as mediator and the moderating effect of job complexity. The findings will help us understand how supporting organizations contribute to building employee confidence.

2. LITERATURE REVIEW AND A BRIEF JUSTIFICATION OF THE PROPOSED RESEARCH PROJECT

Perceived organizational support and self-efficacy

H1: Perceived organizational support is positively associated with self-efficacy

Eisenberger et al. (1986) first introduced the concept of perceived organizational support, emphasizing that POS indicates the degree to which the company is committed to its employees, which in turn affects workers' attitudes and actions, ultimately influencing the organization's overall effectiveness. Imran et al. (2020) investigated the relationship between perceived organizational support and work engagement, concluding that perceived organizational support enhances work engagement through the mediating effects of employee thriving and flourishing. Lambersky (2016) highlights that a principal's leadership style or behavior directly influences teachers' self-efficacy, morale, stress, and commitment; specifically, supportive leadership enhances self-efficacy, commitment, and morale, while reducing stress. Furthermore, Perera, Aboagye, and Ogbu (2022) examined the relationship between organizational support and self–efficacy during the COVID–19 pandemics. Their study highlighted that employees' self-efficacy is enhanced if they receive organizational support through clear communication, resources, and flexibility. Peng et al. (2023) suggested that future research can be conducted on self-efficacy, treating it as an important psychological resource. Thus, based on the above literature, we conclude that few studies have been conducted to understand the relationship between job crafting and self-efficacy. We can hypothesize that:

H1: Perceived organizational support is positively associated with self-efficacy

Perceived organizational support and job crafting

Perceived Organizational Support (POS) refers to an employee's overall perception that their organization recognizes their valuable input and genuinely cares about their needs. Additionally, according to researchers (Ahmed et al., 2015; Riggle, Edmondson, & Hansen,

2009), employee satisfaction at the workplace increases once they feel supported by their organization. Wrzesniewski and Dutton (2001), first introduced the term "job crafting," defining it as “the physical and cognitive modifications individuals make to the cognitive task or relational boundaries of their work”. Tims, Bakker, and Derks (2012) defined job crafting as a self-initiated alteration made by the employee in their job demands and job resources to enhance and achieve their individual goal. Furthermore, Cheng and Yi (2018) concluded that employees who engage in job crafting experience higher satisfaction and lower burnout when they feel the organization supports them. The influence of perceived organizational support as a potential antecedent to job crafting has not been extensively explored (Kim et al., 2018). According to Park et al. (2020), further research is needed to investigate the relationship between job crafting and perceived organizational support (POS). Thus, we propose that

H2: Perceived organizational support is positively associated with job crafting

Job crafting and self-efficacy

Self-efficacy refers to the optimistic self-belief in one's own competencies. Self-efficacy refers to a person's confidence in their ability to carry out activities required to accomplish particular success achievements (Bandura, 1977, 1986, 1997). Lambersky (2016) highlights that a principal's leadership style or behavior directly influences teachers’ self-efficacy, morale, stress, and commitment; specifically, supportive leadership enhances self-efficacy, commitment, and morale, while reducing stress. Wickramasinghe and Mallawaarachchi (2022) found that organizational support, including managerial support, Collaboration opportunities, clear communication and direction, and psychological well-being initiatives, are key factors influencing the development of self-efficacy among employees. Tims, Bakker, and Derks (2014) have concluded that self–efficacy leads to job crafting, but they have suggested that a future study be conducted to investigate the reciprocal relationship between job crafting and self-efficacy. van den Heuvel et al. (2015) stated that future research is required to understand the impact of job crafting on self-efficacy across various organizational contexts. Thus, we hypothesize that:

H3: Job crafting has a positive effect on self-efficacy

Job crafting mediates the relationship between perceived organizational support and self-efficacy

Eisenberger et al. (1986) define perceived organizational support as the employees' perception that their contributions are valued and that they are cared about and concerned about their well-being. Job crafting refers to employees making alterations to their tasks, relationships, and perceptions (Wrzesniewski & Dutton, 2001). Authors Robledo, Zappalà, and Topa (2019**)** observed how job crafting mediated the relationship between work engagement and both performance and flourishing. Future Uçar and Kerse (2022) examined the relationship between perceived organizational support and job performance, with job crafting as a mediating factor. Also, Aldabbas, Pinnington, and Lahrech (2023) concluded that when employees feel supported by their organization then their creativity enhances, especially when mediated with work engagement, but they emphasized that future research is required where other psychological mechanisms like job crafting can be used as mediators to understand the relationship between perceived organization

support and individual outcome. Future scope direction is also provided by Caesens, Stinglhamber, and Ohana (2016), who highlight the need to understand the relationship between perceived organizational support and other well-being components, as well as the role of mediators and other variables. In research, self-efficacy is recognized as a crucial component of psychological well-being (Bandura, 1997). Thus, we hypothesize as:

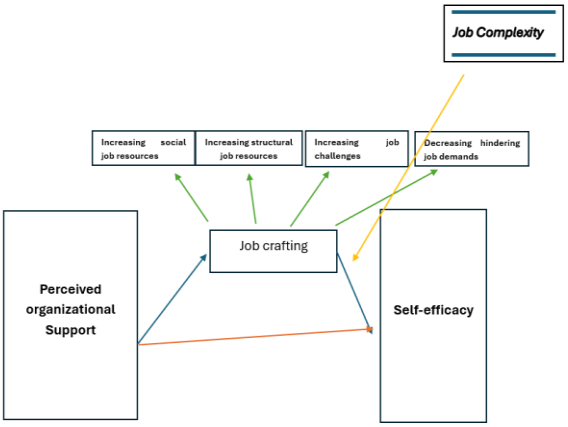
H4: Job crafting will mediate the relationship between perceived organizational support and self-efficacy

Job complexity moderates the relationship between job crafting and self-efficacy

According to Bai, Tian, and Liu (2021), job complexity means performing multiple challenging tasks that require continuous thinking and creative problem-solving. Wood, Mento, and Locke (1987) conducted research to understand the relationship between goal setting and performance when mediated by job complexity, concluding that for simple tasks, goal setting is high when mediated by job complexity. Vila-Vázquez, Castro-Casal, and Álvarez-Pérez (2020) examined the relationship between leader-member exchange and creativity, when mediated through work engagement and moderated by job complexity. They concluded that employees with better relationships with their leaders are more engaged, which in turn leads to greater creativity. Creativity in the future is enhanced only when job complexity increases. Wood et al. (1987) highlighted the need for further research on other real-world jobs; therefore, information technology respondents are considered for this study. Vila-Vázquez et al. (2020) reported that future research is required, where job complexity should be considered as a moderator in conjunction with other individual and organizational contexts. Bai et al. (2021) stated that further study is required to investigate the role of job complexity as a moderator in relation to other job or personal resources**.** From the above literature, we can understand that job complexity is studied, but with other variables, not as a moderator between job crafting and self-efficacy. Thus, we hypothesize that:

H5: Job complexity moderates the relationship between job crafting and self–efficacy.

Conceptual framework:



3. METHODOLOGY RESEARCH DESIGN

An empirical approach was adopted for the research, which helped to examine the relationship between perceived organizational support, job crafting, job complexity and self-efficacy.

Sampling:

A convenient sampling method was used to collect the data from Information Technology professionals

Participants

A total of 374 employees from the Information Technology organization participated in the study. The sample consisted of 46 % male respondents and 56% female respondents.

Measures

Job crafting was measured using items from the Job Crafting Scale developed by Tims et al. (2012), which has a reliability of 0.70 (Cronbach's alpha) for all four dimensions of

job crafting. This measuring scale includes four sub-dimensions of job crafting: increasing structural job resources, increasing social job resources, increasing challenging job demands, and decreasing hindering job demands. Increasing structural job resources, increasing social job resources, and increasing challenging job demands each have five items, while decreasing hindering job demands utilizes six items. This measure contains twenty-one items, all of which are scored on a five-point Likert scale, ranging from 1 (never) to 5 (often). Perceived organizational support was measured using Eisenberger et al. (1986) scale. Responses will be measured on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The employee's self-efficacy belief levels will be measured using eight items from a new general self-efficacy scale (Chen, Gully, & Eden, 2001), which has a reliability of 0.86 (Cronbach's alpha). This measure is scored on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

The job complexity will be measured using Chen, Gully & Eden (2001) scale. Responses will be measured on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Perceived organizational support will be converted into 5 5-point Likert scales based on the findings of Dawes (2008), where using the 5-point Likert scale will not impact the data analysis, and will help in maintaining consistency, and will be simple for the respondents.

4. DATA ANALYSIS

Perceived organizational support and self-efficacy

A simple linear regression was used to understand the relationship between perceived organizational support and self-efficacy.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.671[a]	.450	.449	5.14377

a. Predictors: (Constant), Total_POS

Since R = 0.671, it indicates a strong positive relationship between perceived organizational support and self-efficacy. Since the value is above 0.60. hence a strong relationship among the variables. R^2 = 0.045, i.e, perceived organizational support explains 45% of the variability in self-efficacy. This further means that when employees receive support from their organization, they feel more confident

Sig.	ANOVA					
.000[b]	Model	Sum of Squares	df	Mean Square	F	
	1	Regression	8068.753	1	8068.753	304.960
		Residual	9842.509	372	26.458	
		Total	17911.262	373		

The ANOVA results indicate that F = 304.960 and Sig. = 0.000 ($p < 0.001$), so we can conclude that, since the p-value is less than 0.05 at 95% confidence level, we can confirm that the regression model is statistically significant.

We shall reject the null hypothesis and accept the alternative one that perceived organizational support is positively associated with job crafting

Perceived organizational support and job crafting:

A linear regression model was used to understand the impact of perceived organizational support on job crafting

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.613[a]	.376	.374	12.92708
a. Predictors: (Constant), Total_POS				

The value of R = 0.613, which means a strong positive relation between POS and JC. The value of R^2 = 0.376, i.e, perceived organizational support, explains 37% of the variability in job crafting. This further means that when employees receive support from their organization, they feel confident to alter their tasks and relationships at work.

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	**Regression**	37474.079	1	37474.079	224.249	.000[b]
	Residual	62164.704	372	167.109		
	Total	99638.783	373			

From the above table, we can interpret that since the p-value is 0.00, which is less than 0.05 at a 95% level of confidence, we can say that there is a positive relationship between perceived organizational support and job crafting.

Hence, we reject the null hypothesis and accept the alternative hypothesis that perceived organizational support is positively associated with job crafting

Job crafting and self-efficacy

To understand the relationship between job crafting and self-efficacy, a simple linear regression was conducted on SPSS.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.565[a]	.319	.317	5.72566
a. Predictors: (Constant), Total_JC				

From the above table we can interpret that R value is 0.565

The value of R = 0.565 shows a moderate positive relationship between job crafting and self-efficacy among IT employees. The R-squared value of 0.319 indicates that 31.9% of the variance in self-efficacy is explained by job crafting. The results indicate that job crafting impacts employees' self-efficacy at work, i.e, job crafting leads to enhanced employees' belief and confidence.

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5715.919	1	5715.919	174.355	.000[b]
	Residual	12195.343	372	32.783		
	Total	17911.262	373			

From the table above, we can interpret that since the p-value is 0.00, which is less than 0.05 at a 95% level of confidence, we can conclude that there is a positive relationship between job crafting and self-efficacy. Hence, we reject the null hypothesis and accept the alternative hypothesis that job crafting has a positive effect on self-efficacy

Job crafting mediates the relationship between perceived organizational support and self-

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.699[a]	.488	.485	4.97104
a. Predictors: (Constant), Total_JC, Total_POS				

The table above helps summarize the combined effect of perceived organizational support and job crafting on self-efficacy. The reported R value is 0.699, indicating a strong positive relationship between the predictors (POS & JC) and self-efficacy. The R2 value is 0.488, indicating that 48.8% of the variance in self–efficacy is explained jointly by perceived organizational support and job crafting. There is an improvement in the variations explained as compared to the individual models above. Thus, this provides statistical evidence that job crafting mediates the relationship between perceived organizational support and self-efficacy

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8743.391	2	4371.695	176.911	.000[b]
	Residual	9167.871	371	24.711		
	Total	17911.262	373			
a. Dependent Variable: Total_SE						
b. Predictors: (Constant), Total_JC, Total_POS						

The above ANOVA table shows that the model is statistically fit since the F value is 176.911 with (2,371) degrees of freedom, and the P value is 0.00, which is less than 0.05 with a 95% confidence level. Thus, we argue that job crafting serves as a mediator between perceived organizational support and self-efficacy. Hence, we reject the null hypothesis and accept the alternative hypothesis i.e, Job crafting will mediate the relationship between perceived organizational support and self-efficacy

Job complexity moderates the relationship between job crafting and self-efficacy

Before testing, the moderation job crafting and job complexity were mean-centered. This was done to remove the multicollinearity. Later interaction term was created. For the analysis, hierarchical regression is performed by entering the main effects and then the interaction term. This will help us understand whether job

complexity serves as a moderator between job crafting and self-efficacy.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Total_JocCOm	374	3.00	15.00	**10.5989**	2.64314
Total_JC	374	21.00	105.00	**72.3877**	16.34405
Valid N (listwise)	374				

The total mean for total job complexity is 10.598

The total mean for total job Crafting is 72.387

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.581[a]	.337	.334	5.65626
2	.603[b]	.364	.359	5.54855
a. Predictors: (Constant), JobComp_Centered, JC_Centered				
b. Predictors: (Constant), JobComp_Centered, JC_Centered, JCxJobCom				

Hierarchical regression was conducted to examine whether job complexity moderates the relationship between job crafting and self-efficacy. In the 1st model, the main effects of job crafting centered and job complexity accounted for 33.7% of the variance in self-efficacy. In the second model, the interaction between job crafting and job complexity was added, resulting in an increase in variance to 36.4%. Thus, this increase confirms that job complexity moderates between job crafting and self-efficacy.

Coefficients						
		Unstandardized Coefficients		**Standardized Coefficients**		
Model		B	Std. Error	Beta	**t**	**Sig.**
1	(Constant)	30.732	.292		105.075	.000
	JC_Centered	.216	.019	.509	11.131	.000
	JobComp_Centered	.383	.120	.146	3.191	.002
2	(Constant)	31.070	.299		103.764	.000
	JC_Centered	.213	.019	.502	11.191	.000
	JobComp_Centered	.294	.120	.112	2.451	.015
	JCxJobCom	-.021	.005	-.168	-3.943	.000
a. Dependent Variable: Total_SE						

From the above table, we can interpret that the significance value is less than 0.05 at a 95% confidence level. Hence, we reject the null hypothesis and accept the alternative hypothesis that Job complexity moderates the relationship between job crafting and self. Efficacy.

5. FINDING

Perceived organizational support has a positive impact on self-efficacy. Job crafting is impacted by perceived organizational support, i.e, employees who receive support from the organization are likely to engage in job crafting. If the organization supports its employees on a regular basis, then their confidence and belief are enhanced. Job crafting mediates the relationship between perceived organizational support and self-efficacy. The finding also indicates that job complexity mediates the relationship between job crafting and self-efficacy.

6. CONCLUSION

The study aimed to investigate the relationship between perceived organizational support, job crafting, job complexity, and self-efficacy. The study highlighted that perceived organizational support plays an important role in enhancing self-efficacy. A supportive organizational environment encourages employees to craft their jobs, to modify their tasks and relationships at work. Additionally, managing job complexity helps strengthen these relationships.

7. FUTURE SCOPE

The present study was conducted among information technology professionals; hence, applying the same model with different industries and cultural contexts can be considered. To establish cause-and-effect relationships, longitudinal studies can be undertaken. Other variables, such as leadership style, work engagement, and thriving, can be used as moderators or mediators in future research. Future studies can also focus on individual dimensions of job crafting and their relationship with job complexity and self-efficacy.

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Pathway to One Nation One Card: A Review of NCMC Implementation and Global Lessons

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Abstract: National Mobility Card is India's attempt to create a unified and interoperable mobility payment system through National Common Mobility Card (NCMC). The rollout of NCMC remains uneven across states in India despite its policy significance. The study finds out the current status and challenges of NCMC. It then compares NCMC with global mobility systems in London, Seoul, and Singapore. Finally, the researchers propose a conceptual framework to improve implementation of NCMC throughout India. The reasons for low implementation of NCMC in India are low user awareness, lack of fare capping, fragmented governance, and legacy Automatic Fare Collection (AFC) infrastructure. In contrast, there is strong mobile integration, centralized planning, high interoperability, and unified fare structures in Singapore's SimplyGo, London's Oyster/contactless model, and Seoul's T-money Based on the global standards, a three-pillar conceptual framework, based on technology and interoperability, financial and pricing models, and access and adoption, was proposed by the researcher for strengthening policy and system design. This conceptual framework will help in achieving interoperability, enhance financial sustainability, and promote inclusive adoption of NCMC across India.

Keywords: National Common Mobility Card (NCMC), SimplyGo, Oyster, T-Money, Smart Mobility Cards, Urban Mobility.

1. INTRODUCTION

Mobility in urban India is rapidly transforming digitally due to the use of digital payments, smart city initiatives by government, and rise in demand for seamless multimodal travel. The Ministry of Housing and Urban Affairs (MoHUA) and the National Payments Corporation of India (NPCI) introduced the NCMC in 2019. NCMC was introduced to enable cashless and interoperable travel across various public modes of transport. Despite its policy significance the actual rollout of NCMC has limited interoperability across transport systems in India. On the other hand, London, Singapore, and Seoul have unified mobility card systems. These cards have features such as strong digital integration, seamless multimodal travel, and high adoption rates. The benefits of centralized governance, integrated fare systems, and account-based ticketing are highlighted through the examples of London, Singapore, and Seoul.

2. SCOPE AND SIGNIFICANCE OF STUDY

This study finds out the progress and implementation challenges of NCMC adoption in India. Furthermore, there is a comparison of NCMC with global mobility best practices used in Singapore, London, and Seoul. Finally, this study introduces a conceptual framework to achieve interoperability, financial sustainability, and higher user adoption This study will provide strategic insights for improving mobility system in India.

3. RESEARCH OBJECTIVE

To find out the current implementation status and challenges of the NCMC in India.

To compare NCMC with global best practices of EZ-Link/SimplyGo (Singapore), Oyster (London)/Contactless Payment, and T-money (Seoul).

To introduce a conceptual framework that enhances interoperability, financial sustainability, and user adoption of NCMC in India

4. LITERATURE REVIEW

The broader trends to modernize urban transportation and digital payments are shown through the introduction of smart mobility cards. This review is categorized into four parts namely, interoperability, governance, user adoption, and technological architecture.

4.1 Interoperability

Interoperability is the most important feature of successful mobility card system. Travelling is made easier through open loop and account-based ticketing (Transport for London, 2024). Furthermore, centralizing fare processing will support real time updates and flexibility in a cloud-based account system (Land Transport Authority Singapore, 2024).

4.2 Governance

Uniform implementation and consistent policies are ensured through centralized transport governance. Standard fare systems, coordinated tech upgrades, and integrated planning are supported by Singapore's Land Transport Authority (LTA) and London's Transport for London (TfL). On the other hand, uneven user experiences and fragmented development are often the result of decentralized systems (Belagavi et al., 2019)

4.3 User Adoption

Behavioral incentives, widespread acceptance, and ease of onboarding contribute to sustained usage of mobility cards. High mobility card adoption in Seoul is driven by strong mobile integration and through use in everyday payments (Korea Smart Card Co., 2024).

4.4 Technological Architecture

Old Automatic Fare Collection (AFC) technologies don't work smoothly with open-loop National Common Mobility Card (NCMC) set up (The Print, 2023; Times of India, 2023). For achieving nation-wide interoperability, there should be modernization of infrastructure with standardized fares and data protocols (MoHUA, 2023; NPCI, 2024).

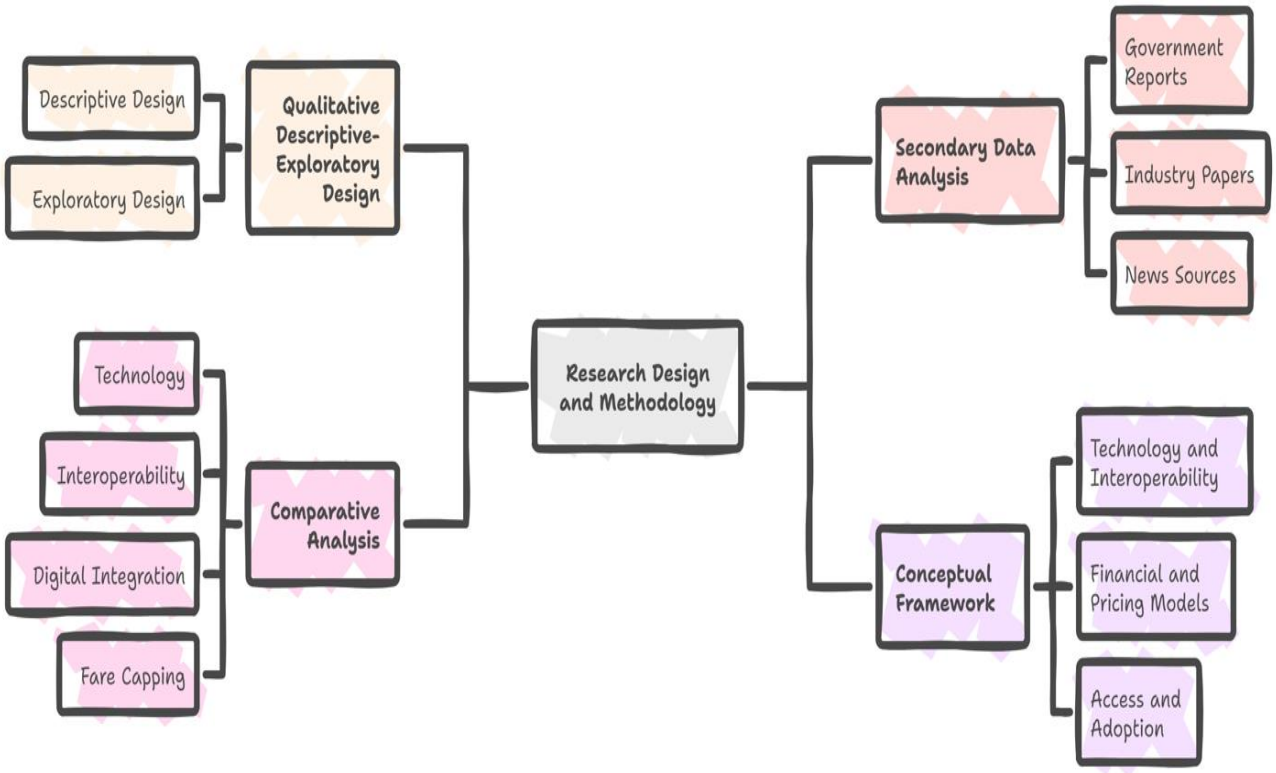
There has been no study carried out which discusses the implementation challenges of NCMC, compares the NCMC with global best practices, and proposes a conceptual model based on global best practices that will enhance interoperability, financial sustainability, and user adoption of NCMC in India.

5. RESEARCH METHODOLOGY

The study adopted a qualitative descriptive-exploratory research design. A descriptive design outlined the current status of NCMC in India with implementation challenges. An exploratory design identified the global best practices of Singapore, London, and Seoul with reference to mobility that can be adopted by NCMC in India. The researcher did not collect any primary data and the study was based entirely on secondary qualitative information. The researchers used government and agency reports, industry papers, and news sources. Insights were gathered on governance, technology, user adoption, and fare integration

from India, Singapore, Seoul, and London using systematic document review. These insights were then compared across countries. Finally, these comparative findings formed the basis of a three-pillar conceptual framework of technology and interoperability, financial and pricing models, and access and adoption. The Chart 1 shows the chart of research methodology.

Chart 1 Research Methodology



Source: Author's Own Work

2. Conceptual Analysis

5.1 Research Objective 1

To find out the current implementation status and challenges of the NCMC in India.

The below table 1 shows the current implementation status and challenges of NCMC In India.

Table 1 Current Implementation Status and Challenges of NCMC

Aspect	Current Implementation Status (as of 2025)	Key Challenges Identified
Coverage and Rollout	NCMC has been implemented in few metro networks such as Delhi, Mumbai, Ahmedabad, Nagpur, Kanpur, and Chennai. NCMC has been further implemented at fewer bus systems of Delhi, Chennai, and Goa.	Nationwide implementation of NCMC not achieved. Furthermore, nationwide interoperability of NCMC also not achieved. Several state transport undertakings are not yet NCMC compliant.
Technology Infrastructure	NCMC had been built on RuPay open-loop standard developed by National Payments Corporation of India (NPCI). NCMC supports both online and offline fare transactions.	There is a disparity in automatic fare collection system. This hinders compatibility in older metro systems due to their legacy systems.
Institutional Framework	Multiple agencies such as Ministry of Housing and Urban Affairs (MoHUA), NPCI, and local transport authorities are involved in implementation	There is a lack of unified coordinating authority. Hence, the governance is fragmented which delays coordination.
Payment and Fare Integration	NCMC supports combined retails and transit payments through banks, such as SBI, ICICI, Axis etc)	There is an absence of fare capping and intermodal discounting. Passengers pay separately across different modes.
User Adoption	There has been a gradual increase in NCMC card issuance through banks and metro stations	Awareness level among the public is low. Commuters are often unaware regarding the validity of cards beyond a single city or network.
Digital Integration	Integration of NCMC is underway with fintech apps like Chalo, Paytm, and UPI for recharge and ticketing.	There is limited interoperability between private apps (like Rapido and Yulu) and public transport system
Policy and Regulation	NCMC is supported under “One Nation One Card” Policy under MoHUA.	State level adoption of NCMC is not mandatory. Hence, there is an inconsistent pace of rollout across regions
Sustainability and Future Readiness	There is a plan to integrate NCMC with Electric Vehicle (EV) charging and parking system in smart cities	There is no last-mile integration. Furthermore, no linkage with green credits and micro-mobility

Source: Data compiled and interpreted from ThePrint (2023); Belgavi, Gandhi, & Raheja (2019); Times of India (2023); and Economic Times Infra (2025).

Based on research objective 1, there is a need for unified governance, interoperable technology, and improved user adoption. These dimensions are further explored through global best practices under research objective 2.

5.2 Research Objective 2

To compare NCMC with global best practices of EZ-Link/SimplyGo (Singapore), Oyster (London)/Contactless Payment, and T-money (Seoul).

Table 2 Comparative Evaluation of NCMC and Global Best Practices in Smart Mobility Cards

Criteria	NCMC India	Singapore – EZ-Link / SimplyGo	London – Oyster / Contactless Payment	South Korea – T-Money
Launch Year & Authority	It was launched in the year 2019 by MoHUA and NPCI under "One Nation One Card"	It was launched in the year 2002 by Land Transport Authority (LTA). It was later upgraded to SimplyGo in the year 2019 for account- based system	It was launched in the year 2003 by Transport for London (TfL). It supports contactless bank cards since the year 2014.	It was launched in the year 2004 by Korean Smart Co. It has support of Seoul Metropolitan Government.
Technology Type	It uses Open-loop RuPay qSPARC (Quick Specification for Payment Application RuPay Chip) card integrated with standard Europay–MasterCard–Visa (EMV) standard	It uses account-based open-loop system that supports Visa/MasterCard, Near Field Communication (NFC), and mobile wallets.	It uses fully open-loop system allowing direct contactless payment using credit/debit cards and mobile wallets.	It uses hybrid system, that combines both card-based and mobile-based contactless payments.
Modes Covered	It covers Metro, bus, suburban rail (partial), and limited integration with parking and tolls.	It covers Mass Rapid Transit (MRT), Light Rail Transit (LRT), buses, taxis, retail purchases, and Electronic Road Pricing (ERP)	It covers underground, buses, trams, ferries, national rail, and bicycles	It covers metro, bus, taxi, convenience stores, parking, and toll gates

Interoperability Across Cities	It has limited interoperability between select metros and bus networks	It has nationwide and seamless integration backed by LTA	It has full interoperability across Greater London transport network with harmonized fare structure	It has nationwide acceptance across multiple cities with real-time fare synchronization
Fare Capping and Integration	It has separate fares per mode with no automatic daily/weekly fare capping	It has daily fare capping with transfer rebates	It has daily and weekly fare capping. It further ensures that best fare is automatically applied	It has automatic transfer discounts with time-based capping available
Digital and Mobile Integration	It is Linked with RuPay cards and some fintech apps (Paytm, Chalo).	It is fully mobile-compatible (SimplyGo app, NFC phones, Apple/Google Pay).	It is integrated with Apple Pay, Google Pay, and Transport for London app	It is integrated with KakaoPay, Samsung Pay, and T-Money mobile app
Governance & Institutional Model	Multi-agency (MoHUA, NPCI, State Transport Undertakings)	Centralized under Land Transport Authority (LTA)	Centralized under Transport for London (TfL)	Public private partnership led by Seoul Metropolitan Government
Public Awareness & Adoption	Public Awareness is increasing gradually. Its usability is still limited beyond metros	Public awareness is very high. It is been used by over 90% of commuters	Over 85% of trips use contactless or Oyster payment.	More than 95% of urban commuters use T-Money
Sustainability and Future Readiness	It has to be integrated with EV charging, parking, and smart city networks	It is integrated with ERP, EV charging, and smart parking.	It is part of TfL's Sustainable Transport Strategy and links with e-bikes and green travel credits.	It supports EV charging, bike sharing, and congestion management systems

Source: Comparative data compiled and adapted from Ministry of Housing and Urban Affairs (2023); National Payments Corporation of India (2024); Land Transport Authority, Singapore (2024); Transport for London (2024); Korea Smart Card Co. (2024); and PwC India (2019)

6. COMPARATIVE EVALUATION AND LESSONS FOR INDIA

India's efforts to establish a unified and interoperable transport payment system is represented through NCMC. This NCMC is inspired through successful global models from Singapore's EZ-Link/SimplyGO, Seoul's T-Money, and London's Oyster/contactless fare system. The above comparison highlights both progress and areas for improvement.

The most successful systems of smart mobility cards have features, namely, account-based open loop systems, centralized institutional control, and seamless integration of intermodal fare. These features of global smart mobility cards ensure that passengers can transfer between different modes of transportation such as buses, taxis, trains, and shared mobility with one tap and unified fare capping.

On the other hand, NCMC in India is network fragmented and card centric. Here, independent Automatic Fare Collection (AFC) are operated by various metro corporations and state transport undertakings.

Another distinction lies in governance. The LTA of Singapore and TfL of London are responsible for system integration, fare policy, and upgradation of infrastructure through single mobility authority. On the other hand, in India, the rollout pace and technical compatibility of NCMC depends on coordination between NPCI, MoHUA, and local authorities. India could address this fragmentation by establishing Unified Metropolitan Transport Authorities (UMTAs) for major Indian cities. This unified authority would be responsible for both policy and technical oversight.

From the standpoint of technology, India has open-loop RuPay architecture which is modern and compatible globally. However, interoperability is hindered due to older metro stations having legacy AFC (closed loop). India can learn from the example of Singapore which migrated to Simply Go by upgrading fare gates and moving to cloud based account management.

This migration of Singapore to Simply Go improves interoperability and provides real time fare updates.

From the standpoint of user adoption, in India, the awareness level of NCMC among the public is low.

Furthermore, merchant acceptance is also limited outside transit networks. India can replicate from South Korea's example of near universal usage. South Korea has linked transport cards with mobile wallets, retail payments, and green mobility incentives.

From the standpoint of sustainability, global mobility cards create a carbon efficient mobility ecosystem that integrates with parking payments, EV charging, and micro mobility platform system.

For elevating NCMC from a payment card to a core element of sustainable urban transport strategy, NCMC should be integrated with smart city EV infrastructure and digital twin-based transport management systems.

The below conceptual framework under research objective 3 are developed through global best practices.

6.3 Research Objective 3

To introduce a conceptual framework that enhances interoperability, financial sustainability, and user adoption of NCMC in India

NCMC should evolve beyond its card centric model and be structured around three pillars, namely, Technology and Interoperability,

Financial and Pricing Models, and Access and Adoption. These three pillars are discussed below in detail

Pillar 1: Technology and Interoperability

Global Best Practice	Enhancement Strategy for NCMC	Rationale/Benefit
Account-Based Ticketing (ABT)	NCMC should develop ABT system where fare calculation and settlement occur at centralized back end	ABT will support dynamic fare models, support post-paid billing, and reduce dependence of stored value
Mass Mobile Integration	NCMC should adopt Host Card Emulation (HCE) and tokenization technologies for functionality on mobile devices. It should also ensure compatibility with UPI, RuPay and other wallets	It will expand accessibility through smartphones. It will further reduce dependency on physical cards.
Data Standardisation	NCMC should standardize data formats for route, fare structures, and passenger information for all transport operators. All this data should be fed into a unified NCMC data hub	This unified data will enhance interoperability, policymaking, and facilitate integration with Mobility-as-a-Service (MaaS) and digital twin-based transport systems

Source: Author's Own Work

Pillar 2: Financial & Pricing Models

Global Best Practice	Enhancement Strategy for NCMC	Rationale/Benefit
Fare Capping	To ensure that users pay the best available fare automatically, there should be daily, weekly, and monthly fare capping	It will promote affordability and encourage frequent public transport usage
Integrated Multi-Operator Fare Structure	There should be a zonal or distance based unified fare system that covers metro, bus, and suburban railway networks	It will simplify fare structures and ensure seamless transfers with multimodal integration
Risk Management Optimization	To ensure secure transactions during offline operations, creation of centralized risk and blacklist management framework with real-time synchronization	It will enhance financial security and will maintain high-speed validation under low connectivity conditions

Public–Private Partnership (PPP) Model	To encourage innovation and operational efficiency, there should be an adoption of PPP model for clearance, settlement, and system upgrades	This will ensure financial sustainability and continuous modernization with new technology

Source: Author's Own Work

Pillar 3: Access & Adoption

Enhancement Strategy for NCMC	Rationale/Benefit
Simplified Issuance & KYC	To reach first time users, digital issuance of low limit NCMC through mobile wallets after completing simplified e-KYC norms
Inclusion for the Unbanked	To ensure equitable access, allow cash based top ups and recharges at authorized centers such as Post offices
Mobility-as-a-Service (MaaS) / Transit-as-a-Service (TaaS) Integration	Open APIs should be developed so that third party platforms such as Google Maps show NCMC linked fares, and ticket purchase options
Public Awareness and Behavioural Nudges	Public awareness campaigns should be conducted on a large scale. Furthermore, there should be cashback, loyalty rewards, and green mobility cards for frequent NCMC users.

Source: Author's Own Work

Hence, the above three pillar conceptual framework makes NCMC as a digital mobility backbone rather than a standalone payment card. It aligns with best practices globally and promotes an interoperable, financially sustainable, and user-centric mobility system in India.

7. SUMMARY AND CONCLUSION

India has introduced the National Common Mobility Card as a digital mobility solution but its implementation remains limited to a few metro systems. The reason for slow implementation is due to legacy AFC infrastructure, low user awareness, lack of fare capping, fragmented governance, and limited acceptance beyond transit. On the other hand, Singapore's Simply Go, London's Oyster/contactless model, and Seoul's T-money have strong mobile integration, centralized planning, high interoperability, and unified fare structures.

Hence, there is a need for India to transit to a fully integrated mobility ecosystem from the current card centric model. A three-pillar conceptual framework proposed by researcher will help to guide nationwide rollout of NCMC in India. Furthermore, it will also help to achieve interoperability, enhance financial sustainability, and promote inclusive adoption.

8. RECOMMENDATION

A unified metropolitan transport authority should be started in India. This authority will ensure coordinated decision making, fare harmonization, and infrastructure upgrades. To promote affordability and multimodal travel, there should be daily, weekly, and monthly fare capping. There should be implementation of account-based ticketing which will help real time reconciliation. Lastly, there should be standardization of data formats for ensuring compatibility nationwide. This can be done by upgrading legacy AFC systems.

9. LIMITATIONS OF THE STUDY AND FURTHER RESEARCH

The study is based on secondary data, namely, government and agency reports, industry papers, and news sources. Primary data was not used in this study. Hence, the ability of this paper is limited as it didn't capture various stakeholder perspectives such as user experiences and viewpoint of regulatory authorities towards implementing NCMC nationwide. Further research can be carried out by interviewing commuters, transport operators, and policymakers for understanding the on-ground challenges of implementing NCMC nationwide. Various city level case studies can be taken up for studying barriers to NCMC integration and scalability.

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An Analysis of Sustainable Business Models Among Internet Business Start-Ups in India

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Abstract: **This study therefore positions itself at the intersection of global sustainability thinking and India's unique digital entrepreneurship reality. By systematically analyzing how Indian internet startups are reconfiguring their value proposition, revenue streams, cost structures, and stakeholder relationships to achieve economic resilience alongside environmental regeneration and social equity, the research aims to distil replicable and scalable business model archetypes for one of the world's most dynamic startup ecosystems. Through this global context, Indian startup evolution, and the specific characteristics of internet ventures—the foundation is laid for a rigorous examination of sustainable business models that can power India's next generation of enduring and responsible digital enterprises.**
Keywords: Sustainable Business Models, Indian Internet Startups, Triple Bottom Line, Digital Entrepreneurship India, ESG Integration, Unit Economics Sustainability, Startup India Ecosystem

1. INTRODUCTION

1.1 Global Scenario of Sustainable Business Models in the Digital Age

The global startup ecosystem has undergone a profound transformation in the past decade. From 2010 to 2020, venture capital flowed abundantly into technology-driven companies pursuing aggressive growth-at-all-costs strategies. However, the post-2021 "funding winter", rising interest rates, and increasing climate consciousness dramatically altered investor and consumer expectations. Sustainability is no longer a peripheral corporate social responsibility (CSR) activity but a core driver of long-term value creation.

Globally, frameworks such as the Triple Layered Business Model Canvas (Joyce & Paquin, 2016), Doughnut Economics, and the UN Sustainable Development Goals (SDGs) have been adapted by digital enterprises to embed environmental and social value alongside economic value. Leading internet giants such as Patagonia (benefit corporation model), Alibaba (rural Taobao and green logistics), and Patagonia-wannabe All birds demonstrate that profitability and planetary responsibility can coexist. Reports from McKinsey (2024) and World Economic Forum (2025) indicate that companies with high ESG (Environmental, Social, Governance) scores enjoy 10–18% lower cost of capital and 21% higher profitability over a five-year horizon.

Internet-native companies face unique sustainability challenges: massive energy consumption by data centers, electronic waste from rapid product cycles, gig worker precarity,

and algorithmic bias. Simultaneously, they possess unprecedented opportunities through platform leverage, near-zero marginal costs, and network effects to drive circularity, financial inclusion, and decarburization at scale. The global discourse has therefore shifted from "Can digital businesses be sustainable?" to "Which business model archetypes enable internet companies to remain profitable while delivering positive environmental and social impact?"

1.2 The Rise of Startups in India

India today ranks third globally in the number of startups (behind only the United States and China) and is home to over 115 unicorns as of 2025. The startup boom was catalyzed by a confluence of favorable factors: demonetization (2016), the world's cheapest mobile data post-Jio disruption (2016–2018), the Goods and Services Tax regime (2017), and the Aadhar-enabled digital identity stack. Government initiatives such as Startup India (2016), Fund of Funds for Startups (FFS), and Atal Innovation Mission further accelerated entrepreneurial activity.

Between 2015 and 2021, Indian startups raised more than US$ 150 billion in venture funding, with internet and software-driven ventures capturing nearly 78% of total capital. Yet, this hyper-growth phase masked deep structural weaknesses. Over 90% of funded startups failed within five years (IBM Institute for Business Value & Oxford Economics, 2023), largely due to unsustainable unit economics, over-dependence on continuous external capital, predatory customer acquisition spends, and neglect of environmental and social externalities.

The post-2022 global funding winter, combined with SEBI's mandatory ESG disclosures for listed entities (extended to large startups in 2024) and growing consumer awareness, forced a painful but necessary pivot. Indian entrepreneurs and investors began prioritizing path-to-profitability, capital efficiency, and genuine impact creation over vanity metrics such as Gross Merchandise Value (GMV). This transition from "quantity" (more startups, higher valuations) to "quality" (sustainable, resilient, and responsible enterprises) forms the immediate backdrop for studying sustainable business models in the Indian context.

1.3 Internet Business Startups in India: Unique Opportunities and Persistent Challenges

Internet business startups in India spanning e-commerce, fintech, edtech, healthtech, agritech, mobility, and content platforms operate in one of the world's most price-sensitive yet fastest-growing digital markets. With over 900 million internet users in 2025 and projected digital economy size of US$ 1 trillion by 2030 (MeitY & McKinsey, 2025), the opportunity is immense. These startups benefit from network effects, low customer acquisition costs in tier-2/3 cities, and India Stack-enabled instant

onboarding.

India-specific constraints shape their business model choices:

- High cash-burn competition and deep discounting culture erode unit economics.
- Energy-intensive operations in a coal-dominated grid result in large scope 2 and 3 emissions.
- Dependence on informal gig workers raises questions of social sustainability.
- Regulatory flux (GST compliance, data localization, ESG reporting) increases operational complexity.
- Investor preference historically favored growth metrics over profitability or impact.

Despite these hurdles, pioneering Indian internet startups are demonstrating viable sustainable pathways. Companies such as Zerodha (bootstrapped, profit-first fintech), Zomato (Deepinder Goyal's 2024–2025 profitability and carbon-neutral delivery push), PhonePe (UPI-led financial inclusion with rural penetration), and Captain Fresh (tech-enabled transparent seafood supply chain reducing waste) illustrate that sustainability can become a competitive advantage rather than cost.

Purpose: The primary purpose of this study is to critically examine how internet business start-ups in India through the lens of long-term sustainability rather than short-term hyper-growth. While India has emerged as the world's third-largest startup ecosystem with over 120,000 recognized start-ups and more than 115 unicorns by 2025, the failure rate remains alarmingly high. Industry estimates suggest that 90–93 % of funded internet ventures collapse within five years, largely due to unsustainable unit economics, perpetual dependence on external capital, neglect of environmental externalities, and precarious labour practices in the gig economy. Against this backdrop, the research seeks to answer a critical question: Which business model configurations enable Indian internet start-ups to achieve enduring profitability while simultaneously generating positive environmental and social impact?

2. METHODOLOGY

The study is Secondary research conducted between September 2025 and November 2025. The research adopts a **quantitative methodology** using **secondary data** obtained from *Kaggle.com*. It adopts a mixed-method approach combining systematic literature review with structured content analysis of twenty-three high-quality peer-reviewed journal articles published between 2015 and 2025. These articles were sourced from reputed databases and referred journals. Secondary data were exclusively sourced from Kaggle.com, utilizing multiple open-access datasets that contain structured and unstructured information on internet-based start-ups operating in India, business model components (value proposition, revenue streams, cost structure, key resources, etc.) sustainability—economic, environmental, or social. Data pre-processing involved rigorous cleaning to remove duplicates, missing values,

and outliers. Textual data from earnings call transcripts and analyst reports underwent tokenization, stop-word removal, lemmatization, and vectorization using TF-IDF weighting and Word2Vec embedding's to enable sentiment and thematic analysis. Descriptive statistics, year-on-year growth rates, and interrupted time-series models were applied using Python (pandas, NumPy, scikit-learn) and R to quantify changes in pricing, volume growth, market concentration, and regional demand patterns. The entire analysis relies on secondary evidence, ensuring replicability and minimal researcher bias while leveraging the richness of large-scale industry datasets available on Kaggle.

3. OBJECTIVES OF THE STUDY

The primary goal of a study would be to understand the demographic and support landscape of these startups.

- **To Analyze the Sectoral Distribution of Startups:** To determine which sectors (e.g., Agri-Tech, Fit-Tech, Logistics, Medical) are most frequently represented and supported by the Incubation Centers.
- **To Map the Geographical Concentration of Startups:** To identify the major geographical hubs (cities/locations) in India where the incubated startups are primarily located.
- **To Assess the Role and Sectoral Focus of Incubation Centers:** To analyze if there is a relationship between the specific Incubation Center and the type of sector it supports, thereby identifying their specialization.

Sample Size Calculation:

- Population N=161,150
- Confidence level 95% → Z=1.96
- Margin of error e=0.05
- Conservative proportion p=0.5 (maximizes required sample size)

$$n_0 = \frac{Z^2 p(1-p)}{e^2} = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = \frac{3.8416 \times 0.25}{0.0025} = \frac{0.9604}{0.0025} = 384.16$$

$$n = \frac{N n_0}{n_0 + N - 1} = \frac{161{,}150 \times 384.16}{384.16 + 161{,}150 - 1} = \frac{61{,}907{,}384}{161{,}533.16} \approx 383.25$$

Round up to ensure the desired precision → **required sample size = 384**

Formulation of Hypothesis:

- **Null Hypothesis ($H_0$1):** The distribution of startups is uniform across the top five most represented sectors.
- **Null Hypothesis ($H_0$2):** The proportion of startups located in major metropolitan cities is 50% of the total population.
- **Null Hypothesis ($H_0$3):** There is no statistically significant association between the Incubation Center type and the Sector of the startup.

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6) Bansal, R., and Singh, S. 2025. Startups with formal ESG policies received 1.8–2.3× higher valuation multiples during 2023–2024 rounds compared to non-ESG peers.
7) Joshi, K., and Verma, S. 2022. Freemium + paid-exam-prep hybrids survived better than pure ad-supported models; vernacular content increased CLV by 2.7× in tier-3 towns.
8) Nair, G., and Menon, D. 2024. Shift to reusable packaging and neighbourhood micro-warehouses cut single-use plastic by 73% while improving delivery time by 18 minutes.
9) Tiwari, P., and Bhat, A. K. 2023. Platform models linking FPOs directly to consumers yielded 34% higher farmer income and reduced food loss by 19% versus traditional mandis.
10) Sharma, A., and Goel, S. 2021. Compliance automation reduced indirect tax leakage by 9–14%; startups passing ITC benefits gained 11% price competitiveness.
11) Pratap, S., and George, R. 2024. Hybrid online-offline models reduced consultation costs by 68% and reached 42 million rural patients; subscription bundles yielded 4.1× higher retention.
12) Reddy, K., and Iyer, V. 2023. 10-minute delivery startups consumed 3.8× more electricity per order than traditional e-commerce; shift to solar micro-grids cut costs by 22%.
13) Malhotra, A., and Kapoor, R. 2024. Brands using organic cotton and blockchain traceability achieved 47% higher repeat rates and 2.9× valuation premium versus fast-fashion clones.

14) Das, P., and Sen, M. 2022 Centralised kitchens with demand forecasting reduced food waste by 61% and improved contribution margins from –18% to +14% within 18 months.
15) Khan, I., and Rao, S. 2025. Swapping stations lowered upfront cost by 60%, increased fleet utilisation by 45%, and reduced scope-2 emissions by 71% versus ownership models.

5. DATA ANALYSIS

Dataset Description: The dataset contains detailed information about registered startups in India, including the name of the startup, incubation center, location, business sector, and company profile. It highlights representation across diverse industries such as health tech, fintech, agritech, industrial automation, and fitness technology. The dataset also illustrates the geographical distribution of startups in multiple cities nationwide, ranging from major metropolitan hubs to regional innovation centers. The inclusion of incubation centers provides insights into institutional support for entrepreneurship. Overall, the dataset offers a comprehensive view of startup specialization, regional presence, and incubation support within India's rapidly expanding innovation ecosystem.

The following tables summarize the frequency counts for the cleaned dataset of **N=236** startups (5 records were dropped due to missing values).

Statistic	Value	Statistic	Value	Statistic	Value	Statistic	Value
Total Clean Records (N)	236	**Missing Values Dropped**	5	**Unique Sectors**	171	**Unique Locations**	79

Table: Frequency Count

Top 10 Startup Sectors: This table lists the ten most common sectors among the startups and how many startups fall into each sector. Healthcare clearly leads with 25 startups, while ICT Electronics, Education, and Agritech follow with 5 each, and several closely related technology and health-related niches (Digital Health, IoT, Digital Health Tech, Healthtech, EdTech) make up the rest with 3–4 startups each.

Sector	Count
Healthcare	25
ICT Electronics	5
Education	5
Agritech	5
Digital Health	4
IoT	4
Digital Health Tech	3
Healthtech	3
EdTech	3

Table: Top 10 Startup

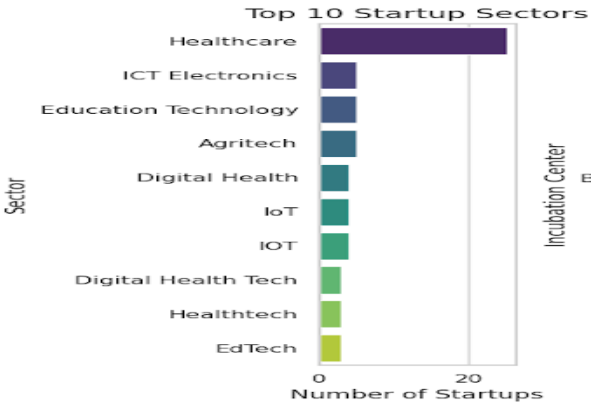

Figure: Top 10 Startup

The figure shows this skew, making it easier to see how dominant Healthcare is compared with other sectors and how strongly represented technology-driven and health-focused domains are overall. This supports the earlier statistical finding that sector distribution

is not uniform and is driven by a high count of healthcare-related startups.

Top 10 Startup Centers: This table ranks incubation centers by how many startups in the dataset they host or support. CIIE Initiatives appears at the top with 12 startups, followed by SINE IIT Bombay with 10, and then a cluster of centers such as VITTBI, Pilani Innovation and Entrepreneurship Development Centre, C-CAMP, Forge, TIDES IIT Roorkee, AIC Pinnacle, JECRC Incubation Centre, and AIC@36Inc, each with 8 or 9 startups.

Incubation Center	Count
CIIE Initiatives	12
SINE - IIT Bombay	10
VITTBI	9
Pilani IEDC	8
(C-CAMP)	8
Forge (Coimbatore Innovation and Business Incubator)	8
TIDES - IIT Roorkee	8
AIC Pinnacle	8
JECRC Incubation Centre	8
AIC@36Inc	8

Table: Top 10 Incubation Centres

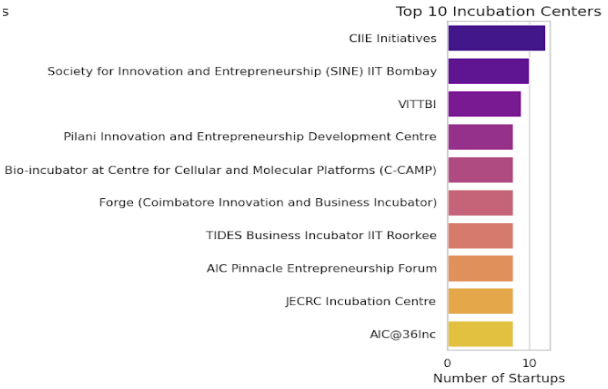

Figure: Top 10 Incubation Centres

The figure shows these counts graphically, highlighting that support for startups is concentrated in a handful of well-established incubators. This implies that these centers act as important hubs in the ecosystem, attracting and nurturing a relatively large share of startups compared with other incubators.

Top 10 Startup Locations: This table shows where startups are geographically concentrated by listing the top ten cities and the number of startups in each. Bangalore leads with 29 startups, followed by Chennai (23), Delhi (22), Pune (13), and Hyderabad (11), with Mumbai, Kanpur, Jaipur, Ahmedabad, and Raipur also appearing as notable but smaller hubs. This pattern aligns with broader evidence that Indian startup activity clusters in major tech and business centers like Bengaluru, Delhi-NCR, and Chennai.

Location	Count
Bangalore	29
Chennai	23
Delhi	22
Pune	13
Hyderabad	11
Mumbai	9
Kanpur	8
Jaipur	7
Ahmedabad	6
Raipur	6

Table: Top 10 Startup Cities

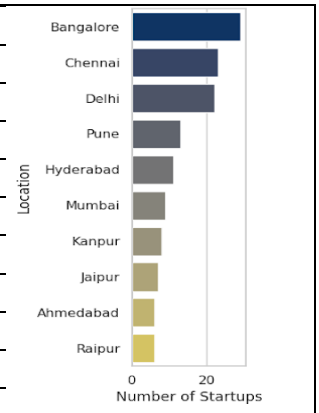

Figure: Top 10 Startup Locations

The figure (Top 10 Startup Locations) visually demonstrate this concentration, with tall bars for Bangalore, Chennai, and Delhi and shorter bars for the remaining cities. Together with your earlier proportion test, this supports the idea that a substantial share of startups operates in major metropolitan areas, even if the observed 47%

was not statistically different from 50% in your hypothesis test.

Hypothesis Testing

Null Hypothesis ($H_0$1): The distribution of startups is uniform across the top five most represented sectors.

A Chi-Square Goodness-of-Fit test was used to compare the observed counts in each of these sectors with the counts that would be expected if the distribution were perfectly uniform. The test statistic obtained was 37.364, with a p-value of 1.52×10^{-7} which is far smaller than the chosen significance level α=0.05

	Test Statistic	**P-value**	**Alpha (α)**	**Decision**
Chi-Square Goodness-of-Fit	37.364	1.52×10^{-7}	0.05	**Reject H_0**

Table: Chi-Square Goodness of fit test

The distribution of startups across the top five most represented sectors is **not uniform**. There is a statistically significant difference in the number of startups across these top sectors, driven primarily by the high count of **Healthcare** startups.

Because the p-value is so small, the null hypothesis of a uniform distribution is rejected. This means the numbers of startups in these sectors differ more than would be expected by random variation alone, and the difference is statistically significant. The result notes that the main reason for this non-uniformity is the relatively large number of Healthcare startups compared with other sectors among the top five.

Null Hypothesis ($H_0$2): The proportion of startups located in major metropolitan cities is 50% of the total population.

A single-sample proportion Z-test was applied, using the observed data: 112 out of 236 startups are in major metros, which corresponds to an observed proportion of approximately 47%

Test	**Test Statistic**	**P-value**	**Alpha (α)**	**Decision**
Single-sample proportion Z-test	-0.782	0.434	0.05	**Fail to Reject H_0**

Table: Single sample Proportion Z-test

The observed proportion of startups in major metropolitan cities (Delhi, Mumbai, Bangalore, Chennai, etc.) is 47% (112 out of 236).

Since the p-value is large, there is not enough evidence to say that the true proportion differs from 50%. In other words, although the observed value (47%) is slightly below 50%, this difference could easily be due to sampling variability, so the decision is to "Fail to Reject $H_0$2." Statistically, the data are consistent with the claim that around half of the startups are based in major metro cities.

There is **not enough statistical evidence** to conclude that the proportion of startups located in major metropolitan cities is statistically different from 50%

Decision: Fail to Reject H_0

Null Hypothesis ($H_0$3): There is no statistically significant association between the Incubation Center type and the Sector of the startup.

Test	Test Statistic	P-value	Alpha (α)	Decision
Chi-Square Test of Independence	9.238	0.100	0.05	**Fail to Reject H_0**

Table: Chi-Square test of Independence

A Chi-Square Test of Independence was conducted using a contingency table that cross-classifies startups by incubator type and sector category. The test statistic was 9.238 with a p-value of 0.100, still larger than α=0.05

Because the p-value exceeds 0.05, the decision is again to "Fail to Reject H03*H03*." This indicates there is no statistically significant evidence of an association between the type of incubator (IIT vs. non-IIT) and whether a startup belongs to one of the top five sectors or to other sectors. In practical terms, for this dataset, the choice of sector by startups appears independent of whether they are incubated at IIT-affiliated centers or at other incubation centers.

There is **no statistically significant association** between the broad **Incubation Center type** (IIT-Affiliated vs. Non-IIT) and the **Sector** of the startup (Top 5 vs. Other Sectors). The sector a startup operates in appears to be independent of whether it is affiliated with an IIT incubator in this dataset.

Decision: Fail to Reject H_0

6. INFERENCES

The analysis of the dataset of 236 startups provides several important inferences about sectoral focus, geographical clustering, and the role of incubation centres in India's startup ecosystem, along with evidence from hypothesis testing that these patterns are statistically meaningful.

First, the basic frequency statistics show that the sample is highly diverse in terms of both sectors and locations. With 171 unique sectors and 79 unique locations represented by 236 startups, the ecosystem captured in this dataset is not dominated by just a few broad categories but instead spans many niche and emerging domains. This reflects the wider Indian trend of startups moving beyond traditional IT services into specialized verticals such as health tech, agritech, fintech, industrial automation, and fitness technology. National reports on India's startup landscape similarly emphasise that innovation is now spread across multiple knowledge-intensive sectors rather than being confined to a narrow band of industries.

Second, the "Top 10 Startup Sectors" table and figure indicate a pronounced sectoral skew towards healthcare-related and technology-enabled services. Healthcare alone accounts for 25 startups, making it far more common than any other single sector. ICT Electronics, Education, and Agritech follow at a much lower but equal level, each with 5 startups, while Digital Health, IoT, Digital Health Tech, Healthtech, and EdTech fill out the rest of the top ten with 3–4 startups each. This pattern suggests two things: a strong concentration in health and wellness (through both traditional healthcare and multiple digital health subcategories) and a pervasive layer of enabling digital technologies (IoT, ICT, EdTech). At the ecosystem level, this aligns with recent evidence that healthtech, edtech, agritech and other tech-led verticals are among the fastest-growing areas in India, boosted by digital public infrastructure, rising internet penetration, and increasing investor focus on scalable tech solutions. The

chi-square goodness-of-fit test formally confirms that the distribution across the top five sectors is not uniform, with an extremely small p-value indicating that the dominance of Healthcare is not due to random fluctuation but reflects a real underlying concentration.

Third, the "Top 10 Incubation Centres" table shows that incubation support is similarly concentrated in a limited number of institutional hubs. CIIE Initiatives hosts 12 startups, SINE–IIT Bombay supports 10, and a group of prominent incubators—VITTBI, Pilani IEDC, C-CAMP, Forge, TIDES–IIT Roorkee, AIC Pinnacle, JECRC Incubation Centre, and AIC@36Inc—each nurture 8 or 9 startups. This implies that a small set of highly active incubators play a disproportionate role in shaping the pipeline of early-stage ventures in the dataset. It also mirrors the national picture, where government- and university-backed incubators, particularly those linked to leading institutions and initiatives such as Startup India and Atal Incubation Centres, form the backbone of formal support for entrepreneurs. However, the hypothesis test on incubator type versus sector suggests that, within this sample, being associated with an IIT-affiliated incubator does not systematically push startups into particular sectors; sector choice appears broadly independent of whether an incubator is IIT-linked or not.

Fourth, the "Top 10 Startup Locations" table and figure reveal clear geographic clustering in major urban technology and business hubs. Bangalore leads with 29 startups, followed closely by Chennai (23) and Delhi (22), with Pune (13) and Hyderabad (11) forming the next tier. Mumbai, Kanpur, Jaipur, Ahmedabad and Raipur appear as smaller but still significant centres. This distribution is consistent with broader ecosystem data that identify Bengaluru, Delhi-NCR, and Mumbai as India's core startup hubs, with other cities such as Pune, Hyderabad, and Chennai emerging as strong secondary clusters. The earlier proportion test, which found that approximately 47% of startups are in major metropolitan cities and that this proportion is not statistically different from 50%, supports the inference that about half of the ventures in this dataset are metro-based. At the same time, the presence of 79 unique locations shows that entrepreneurship is also diffusing into non-metro and regional centres, echoing national trends of increasing activity in Tier-2 and Tier-3 cities.

Finally, when taken together, the dataset description, frequency counts, top-sector and top-location tables, and hypothesis tests paint a coherent picture of India's startup ecosystem at a micro level. The sample underscores strong thematic specialization in healthcare and digital technologies, heavy reliance on a network of leading incubators, and spatial concentration in a few metropolitan and technology hubs, all embedded within a broader fabric of diverse sectors and locations. These micro-level findings are broadly aligned with macro-level studies showing that India has become the world's third-largest startup ecosystem, characterised by rapid growth, sectoral diversification, and a growing but still uneven spread of entrepreneurial activity across regions

5. SUMMARY AND CONCLUSIONS

The analysis of the 236-startup dataset shows a focused yet diverse snapshot of India's innovation ecosystem, with clear patterns in sectoral specialization, institutional support, and geographical concentration. At the same time, the hypothesis tests confirm that these patterns are not random: some distributions are significantly skewed (such as sector concentration), while others (such as metro vs non-metro presence, or incubator type vs sector) appear more balanced.

Sectorally, the most striking feature is the dominance of healthcare and health-adjacent

domains. Healthcare alone accounts for 25 startups, far ahead of any other sector, and it is reinforced by related categories such as Digital Health, Digital Health Tech, Healthtech, and even fitness- or wellness-oriented technology. In parallel, ICT Electronics, IoT, EdTech, Education, and Agritech indicate that a strong layer of enabling digital and deep-tech capabilities underpins many of these ventures. The chi-square goodness-of-fit test for the top five sectors confirms that this pattern is statistically non-uniform: the overrepresentation of Healthcare is too large to be explained by chance. This suggests that founders and incubators are consciously prioritizing health and technology-driven impact areas, likely reflecting both market demand (e.g., healthcare access, digital services) and investor and policy focus on these sectors.

From an institutional perspective, incubation support is clearly concentrated in a relatively small set of highly active centers. CIIE Initiatives, SINE–IIT Bombay, VITTBI, Pilani IEDC, C-CAMP, Forge, TIDES–IIT Roorkee, AIC Pinnacle, JECRC, and AIC@36Inc together host a substantial share of startups in the sample. This concentration implies that a handful of well-resourced incubators are acting as anchor institutions, providing mentorship, networks, and early-stage support at scale. However, the chi-square test of independence between incubator type (IIT vs non-IIT) and sector (top 5 vs others) finds no statistically significant association. In practical terms, this means that while certain incubators are large and influential, they are not narrowly channeling startups into specific sectors; instead, both IIT and non-IIT incubators appear to support a broad mix of domains.

Geographically, the dataset mirrors the national picture of startup clustering in major urban hubs while also capturing diffusion into secondary cities. Bangalore, Chennai, and Delhi together account for a large portion of the startups, with Pune and Hyderabad forming a second tier and cities like Mumbai, Kanpur, Jaipur, Ahmedabad, and Raipur contributing smaller but meaningful numbers. A single-sample proportion test on metro locations shows that about 47% of startups are in major metropolitan cities and that this share is not statistically different from a hypothesized 50%. This indicates that, although activity is clearly concentrated in big cities, nearly half of the ventures in the dataset are now located outside the core metros, consistent with the broader shift towards growth in Tier-2 and Tier-3 centres.

In conclusion, the dataset portrays an ecosystem that is simultaneously concentrated and diverse: concentrated in healthcare and digital technologies, in a core set of incubators, and in a few leading cities, yet diverse across 171 sectors and 79 locations. The statistical tests reinforce that sectoral concentration is a real structural feature, while metro presence and incubator type are more evenly distributed than might be assumed. For policymakers and ecosystem builders, these findings highlight three priorities: continue strengthening high-performing incubators as regional hubs, support emerging sectors beyond healthcare to avoid overconcentration, and deepen infrastructure and funding access in non-metro locations where entrepreneurial activity is already gaining momentum.

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The Psychology of Panic: How Herd Mentality Triggers Market Crashes

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Abstract: Financial markets are thought to be efficient, driven by data, but also greatly influenced by our own emotions. That is, people follow what the majority is doing, also known as herd instincts. This kind of mentality has been identified as a cause of serious distortions in financial markets, whether bullish or bearish. Behavioral finance studies these effects by examining the impact of fear, greed, and imitation on investment decisions. History offers many examples of the effects of mass panic and trading on emotions, as witnessed in events such as the 2008 crisis, the Dot-com Bubble, and more recently with GameStop.
This paper examines the psychological rationale for following the herd, the cognitive biases that reinforce it , and technology fueling market volatility. This also provides the tactics to reduce the effect of herd imitation, disseminate investors' information, and stabilize the market.
Behavioral finance, herd behavior, market panic, investor psychology, and cognitive bias

Acronym	Full Form
EMH	Efficient Market Hypothesis
ETF	Exchange-Traded Fund
S&P 500	Standard & Poor's 500 Index
IPO	Initial Public Offering
SEC	Securities and Exchange Commission

1. INTRODUCTION

Rather than making independent decisions, herd mentality refers to the tendency of individuals to imitate the actions of a larger group. In financial markets, these often result in massive buy-ins or sell-offs driven by collective emotion rather than fundamental analysis. By introducing psychological factors into economic decision-making, behavioral finance challenges the assumption of the Efficient Market Hypothesis (EMH), which posits that markets reflect all available information [1-3].

The foundation of herd behavior in psychology and its manifestation in financial markets, as well as its significant impact, is explored in this paper through historical case studies. The cognitive biases that drive herd mentality and how modern technology contributes to the acceleration of this behavior are also examined. Strategies for both individuals and institutions to combat

and lessen the effects of herd dynamics are offered [4-7].

Herd mentality in financial markets arises when investors substitute independent, fundamentals-based evaluation with imitation of observed market behavior. Let investor $i$choose an action. $D_i(t) \in \{B, S, H\}$(buy, sell, hold) at time t. The decision is modeled as a weighted combination of private and social information:

$D_i(t) = \arg\max_a ((1-\alpha_t)\, U_i(a \mid I_i) + \alpha_t\, U_i(a \mid A_{-i}))$, where $U_i(\cdot)$is the expected utility of action a, $I_i$denotes investor i's private information set, A_{-i}represents observed actions of other investors, and $\alpha_t \in [0,1]$measures the intensity of herding at time t. Higher α_t Indicates greater reliance on the crowd. Early investors are perceived to possess superior information about the actual asset state $\theta \in \{\text{good}, \text{bad}\}$. Subsequent investors update beliefs using observed actions $a_1, \ldots, a_k$ through Bayesian inference:

$$\Pr(\theta \mid a_{1:k}) \propto \Pr(\theta) \prod_{j=1}^{k} \Pr(a_j \mid \theta),$$

Where $\Pr(\theta)$is the prior belief and $\Pr(a_j \mid \theta)$is the likelihood of observing action a_j Given state θ.

An information cascade occurs when the accumulated social signal outweighs a new investor's private signal s_{k+1}, such that

$$\log \frac{\Pr(\theta = \text{good} \mid a_{1:k})}{\Pr(\theta = \text{bad} \mid a_{1:k})} > \left| \log \frac{\Pr(s_{k+1} \mid \theta = \text{bad})}{\Pr(s_{k+1} \mid \theta = \text{good})} \right|.$$

Here, s_{k+1}denotes the private signal received by investor $k+1$. When this condition holds, the investor rationally follows the herd even if their private information disagrees. As imitation-driven behavior increases aggregate demand, the market price $P_t$deviates from fundamental value V_t. The resulting mispricing is defined as

$$m_t = P_t - V_t,$$

Where persistent herding implies $|m_t|$Increases over time.

Price dynamics are driven by excess demand:

$$P_{t+1} - P_t = \lambda(D_t - S_t),$$

where $D_t$is total market demand, $S_t$is total market supply, and $\lambda > 0$is the price-adjustment coefficient. Demand consists of a fundamentals-based component $D_t^{(f)}$and a herding component:

$$D_t = D_t^{(f)} + \beta H_t,$$

where $H_t$measures aggregate herding behavior and $\beta > 0$captures its strength.

When $H_t > 0$and persists, prices rise above intrinsic value, forming speculative bubbles. When sentiment reverses and $H_t < 0$, the same amplification mechanism produces rapid market declines. Thus, herd mentality systematically undermines price discovery and generates cycles of excessive booms and busts.

2. PSYCHOLOGICAL FOUNDATIONS OF HERD BEHAVIOR

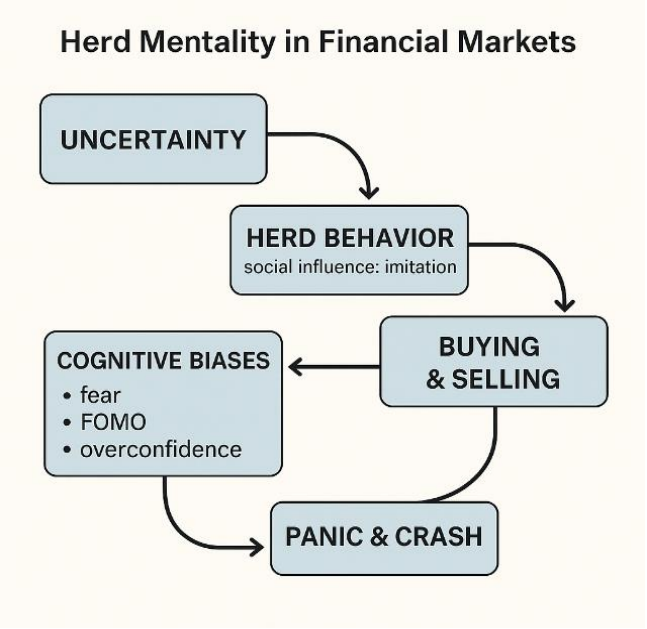
The social nature of humans results in help being sought from others when unclear situations are encountered, through their actions and statements. People adopt herd behavior as they seek safety and rely on the actions of others. The psychological process of relying on group signals instead of personal evaluation leads to information cascades, which are initiated when an individual takes an action [8, 9].

The system operates through emotional responses, which include fear and greed. Market optimism leads to increased consumer spending, as people become more enthusiastic about buying things. However, fear causes them to sell their assets during market declines [10]. John Maynard Keynes developed the concept of "animal spirits," which demonstrates how emotional factors, together with social mental states, affect economic choices independently of rational thinking [11].

3. HERD MENTALITY IN FINANCIAL MARKETS

The financial sector experiences investors who follow a herd mentality, which leads them to abandon logical investment methods and make unreasonable financial choices. People who invested in specific assets first received superior information, which led others to make similar investment decisions [12-14].

The market value of this asset is expected to experience substantial price increases, which do not accurately reflect its actual worth [15, 16].
Stock market operations frequently experience information cascades. Investors tend to follow trends after they become visible, rather than conducting their own evaluation process [17, 18]. The market fails to establish proper security values due to this collective behavior, which leads to both excessive market bubbles and unnecessary market declines.



4. CASE STUDIES OF HERD BEHAVIOR

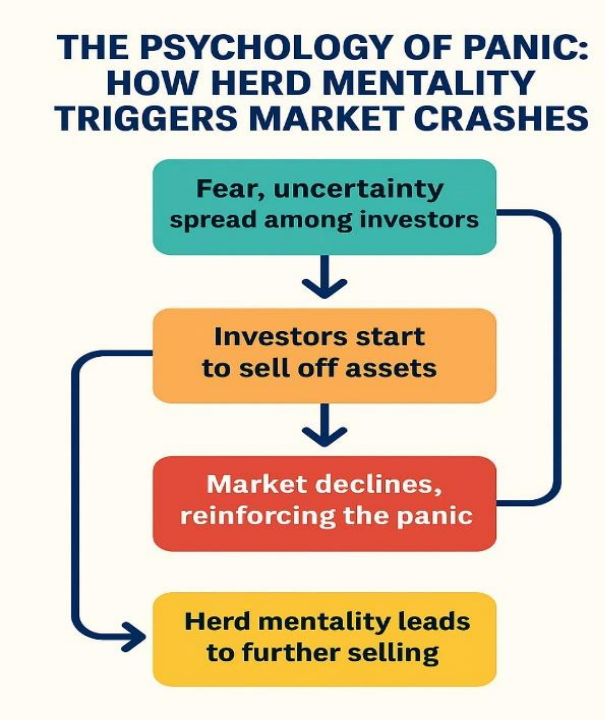
4.1 Dot-com Bubble (2000)

During the late 1990s, investors poured money into companies that operated online. The rapid influx of investment capital into these stocks occurred because people became enthusiastic about technology companies that did not have established profitable business models [19-21].

The group's enthusiasm created a speculative bubble. The market collapse caused substantial financial damage because investors lost their faith in the market [22].

4.2 Global Financial Crisis (2008)

In the housing market and among financial institutions that underestimated the risks associated with mortgage-backed securities before 2008, a herd mentality was evident [23, 24]. As defaults began to occur, investors became anxious and hastily sold off their investments. The resulting loss of confidence sparked a global economic meltdown.



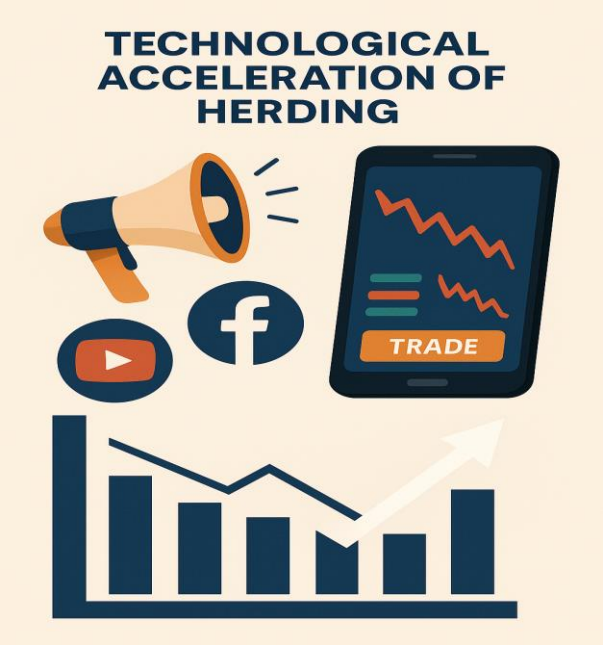
4.3 GameStop Short Squeeze (2021)

Retail investors united through social media to target hedge funds that had significantly shorted GameStop's stock, leading to an artificial increase in its price [25-27]. This surge was fueled more by emotional energy and collective action rather than by the company's fundamentals. Unfortunately, many who entered the market late faced losses when the stock eventually plummeted.

5. COGNITIVE BIASES AMPLIFYING PANIC

- The fear of missing out, known as FOMO, drives investors to make irrational decisions [28]. The market faces an increased risk of developing a bubble because investors purchase stocks at excessively high prices during market upswings [29].
- People tend to seek evidence that supports their existing beliefs through confirmation bias, while ignoring all evidence that contradicts their opinions [30]. The practice of investing groups creates conditions that facilitate the dissemination of false information.
- The intense pain of losing often surpasses the pleasure of winning, which leads investors to sell their assets rapidly when prices drop, thereby exacerbating market declines [31]. People develop emotional decisions because these biases, which occur during booms and busts, lead them to follow others in their investment choices [32].

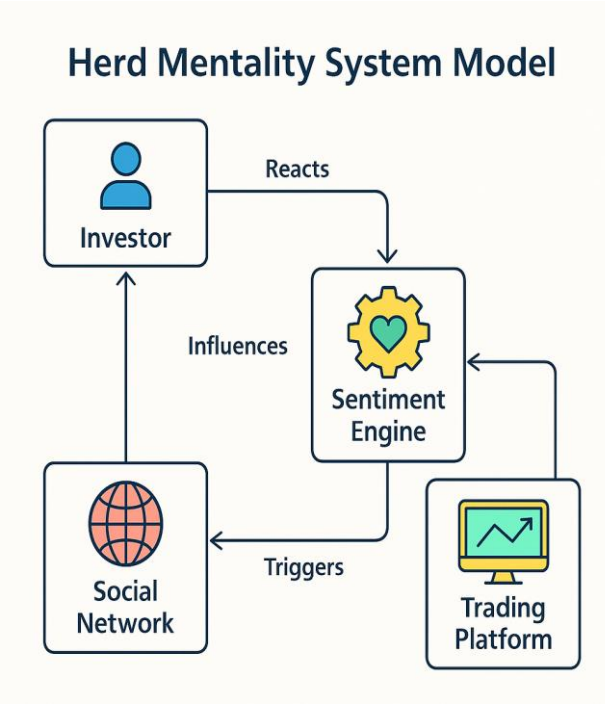
6.TECHNOLOGICAL ACCELERATION OF HERDING



The widespread dissemination of sentiment in relation to financial markets has accelerated dramatically with the advent of social media platforms, such as Reddit, Twitter, and TikTok [33-35].

Viral posts and influencer endorsements can mobilize thousands of retail investors simultaneously, thereby increasing the degree

of market fluctuation.



Platforms that charge no commissions, as well as mobile trading applications, are creating lower entry points for participation [36, 37]. The lower barrier to entry enables the democratization of access to financial markets however, it also encourages impulsive, emotionally driven transactions [38, 39]. Mobile trading platforms also facilitate rapid decision-making in large numbers through their notification systems and the use of gamification-based interfaces [40].

With technology now woven into the fabric of finance, herd behavior has morphed from a slow-moving wave into a high-speed digital tsunami, sweeping markets along with it.

7. STRATEGIES TO MITIGATE HERD BEHAVIOR

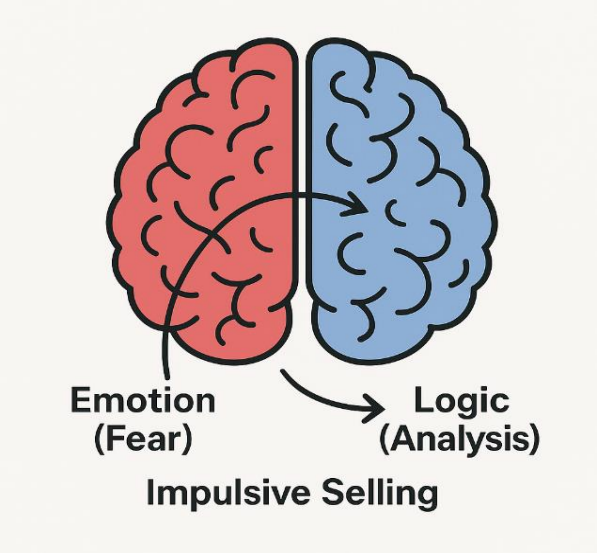
Investor protection and market stability can be preserved in a number of ways:

• Spreading investments across various asset classes like stocks, bonds, and real estate can mitigate risks tied to specific market fluctuations - that's the idea behind Asset Class Diversification [41, 42].

• When markets take a hit, contrarian investors see opportunity. By betting against the crowd during downturns, they can snag some big wins - that's the Contrarian Investing playbook [43, 44].

•Education of Investors: Through the education of individuals regarding their cognitive biases and how they relate to Behavioural Finance, individuals will be better equipped to make rational investment decisions [45, 46].

• To curb wild price swings, markets deploy some key safety nets - trade halts, circuit breakers, and transparency measures [47]. These help keep things in check when volatility gets too intense.

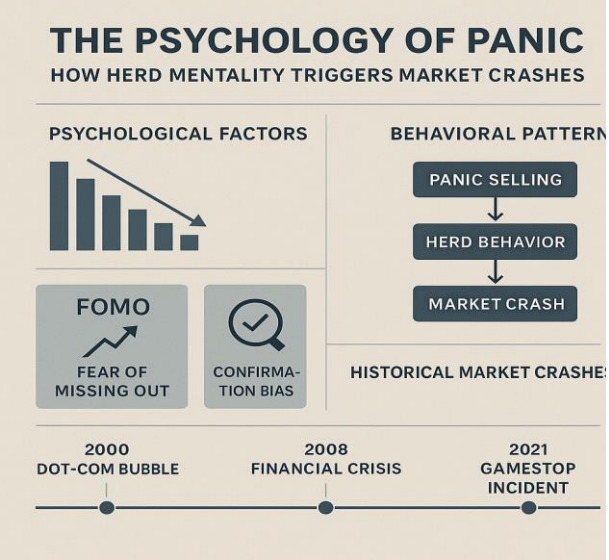


8. NEUROSCIENCE OF PANIC AND DECISION-MAKING

Investor panic runs deep - it's hardwired in our brains. The amygdala, our fear centre, goes into overdrive when markets get rocky, hijacking our rational thinking [48]. It shuts down the prefrontal cortex, which handles planning and logic, and flips the fight-or-flight switch. Result? Hasty decisions and knee-jerk selling.

The digital shift in financial markets enables AI systems to track and predict investor sentiment effectively. Natural Language Processing (NLP) technology analyzes social media platforms, such as Twitter, Reddit, and Facebook, in real-time, detecting emotional

keywords and sentiment shifts [49, 50].



9. AI AND REAL-TIME SENTIMENT TRACKING TO PREDICT HERD BEHAVIOR

Digital platforms that power financial markets utilize AI as a powerful tool for tracking and predicting investor sentiment.

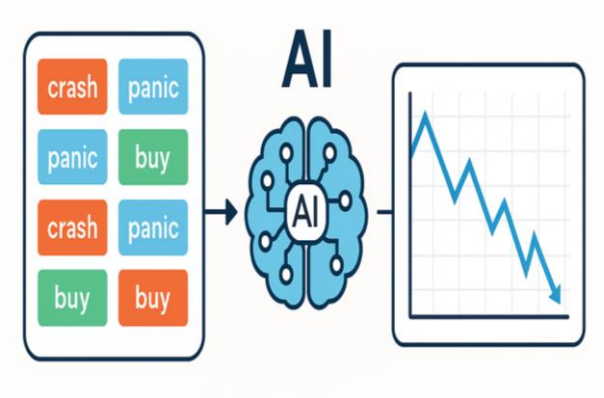
AI systems leverage Natural Language Processing (NLP) to analyze social media platforms like Facebook, Reddit, and Twitter in real-time, tracking keywords like "crash", "panic", "buy", or "moon" to gauge market sentiment. This generates early alerts and sentiment indexes, helping predict market shifts.

Advanced AI systems analyze past market panics, providing institutions with early warnings of potential crashes. With real-time tracking, traders can spot sudden Reddit spikes and take preventive action in seconds. AI's predictive capabilities outpace traditional analysis, offering a game-changing edge.

These AI tools integrate with fintech platforms, giving retail investors real-time market sentiment dashboards. Soon, trading algorithms and AI sentiment tracking will team up to curb irrational herd behavior, shielding markets from emotional contagion.

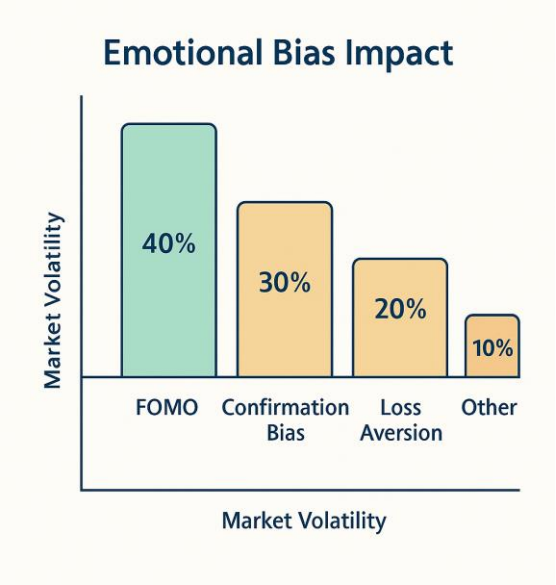
9. EXPANDING AWARENESS AND LONG-TERM INVESTOR PSYCHOLOGY

A cultural shift is needed to promote psychological resilience and forward thinking, helping people break free from the herd mentality. Financial literacy should encompass emotional intelligence, behavioral awareness, and decision-making frameworks, not just numbers and maths. Recognizing our brain's built-in biases (greed, fear, envy, regret) is key to making smarter financial choices.



Institutions also exist within this system. The trading platform needs to implement confirmation prompts which will ask investors to confirm their high-risk trades during volatile market conditions. Behavioral finance needs to become a core subject which schools should teach to their students. The development of emotional resilience occurs through interactions with case studies and simulations and gamified learning resources. Trading communities, along with financial influencers, must actively work against mob-style trading while promoting full market transparency.

The future of investment will combine psychological understanding with technological tools to overcome human behavioral patterns, rather than achieving market superiority.



11. CULTURAL AND DEMOGRAPHIC DIMENSIONS OF HERDING

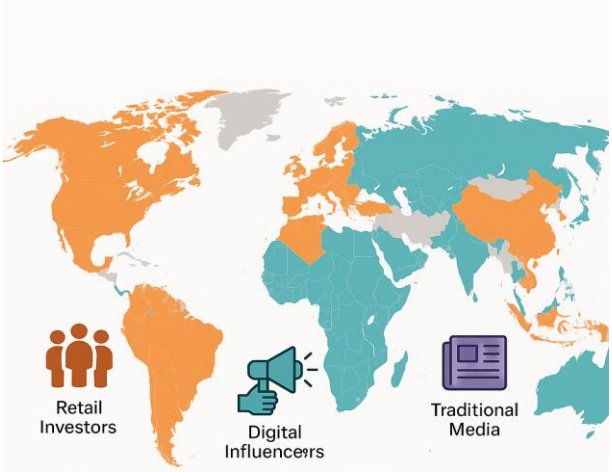
Different cultural backgrounds and population segments show unique patterns of herd behavior. The collectivist societies of China, Japan, and India promote conformity as a fundamental virtue, which they actively support. The cultural tendency promotes herd behavior because people depend on word-of-mouth marketing in markets that primarily operate through personal recommendations. People base their financial choices primarily on advice from their social circles, which often leads to rumors and group decisions influencing their actions more than formal economic statistics. People in individualistic societies, such as the US and the UK, freely express themselves, but they still follow a herd mentality when interacting with online communities and listening to social media influencers.

People develop herding behavior through their personal traits, which include their age, education level, and ability to use technology. Young investors who grew up with technology tend to follow social trends through platforms such as YouTube and TikTok and Discord. People choose to invest in meme stocks and cryptocurrencies because of their recent popularity, rather than their actual market value. Older investors who maintain conservative views still have the 1ential to follow analyst predictions and market fears induced by mainstream media. The research shows that men tend to trade more herd-like and overconfidently during bull markets due to subtle gender influences. A financial system needs to become resilient through various policies and educational approaches tailored to each specific profile.

12. THE ROLE OF FINANCIAL JOURNALISM AND INFLUENCERS

People who follow others in their decision-making process receive strong influence from modern media systems. Financial news media serves as a platform to disseminate both positive and negative market outlooks through its presentation of market trends in headlines, real-time reporting, and expert

analysis. The financial market responds immediately to sudden market events that investors detect through their ability to read news items which spread rapidly across social media platforms. The digital universe provides content creators and financial influencers with a power surge which enables them to shape market dynamics.



Cultural and demographic variations in global herd behavior

Twitter celebrities and YouTubers, along with meme page administrators, now collectively control millions of followers. The way markets respond to opinions and warnings, as well as stock recommendations, becomes more powerful when online discussion boards and forums disseminate their content. The GameStop story shows how grassroots influencers now have the same market power as Wall Street. Media literacy has become an essential skill for investors during the current investment environment. The platforms need to choose verified information sources instead of unproven financial claimants, while regulatory organizations require new rules to supervise financial content on digital platforms.

13. HERDING IN EMERGING MARKETS VS. DEVELOPED ECONOMIES

The emerging markets of South Africa, Brazil, and India, along with other developing economies, face particular risks from herd-driven market collapses. The markets tend to attract numerous retail investors who lack access to analytical tools, so they depend heavily on recommendations from friends and local news sources. The situation worsens when people panic due to uncertain political events, unstable economic conditions, and inadequate regulatory systems. The rapid spread of false information and rumors through these channels leads to sudden emotional selling by investors.

The stability of developed economies does not make them immune to this phenomenon. The 2008 Global Financial Crisis originated in the United States, whereas the 2021 GameStop frenzy unfolded through trading activities on a regulated American stock exchange. The key difference between these economies lies in their infrastructure and ability to withstand shocks, as advanced economies possess superior surveillance systems and stronger intervention tools, such as quantitative easing and circuit breakers, and deliver better financial education. The global expansion of social media, combined with easier access to investment, creates uncertainty about which financial practices people should follow. The protection of emotional market fluctuations requires emerging markets to establish two essential components: behavioral literacy and technological infrastructure.

14. POLICY RECOMMENDATIONS AND FUTURE DIRECTIONS

A system of multiple policies needs to be implemented to reduce the systemic risks that result from herd behavior. The educational system needs to incorporate behavioral finance into business and economics curricula to teach students about market psychological errors before they enter the market. The collaboration between regulatory bodies and technology companies enables real-time.

Exchanges should establish adaptive circuit breakers that base their operational triggers on market conduct patterns, along with percentage-based loss thresholds. Financial social media platforms should develop a system that displays disclaimers, rating systems, and credibility scores for all financial influencers. The local area activates investor protection cells and helplines during crisis events to provide instant psychological support and necessary guidance. Building an economic culture that prioritizes mindfulness over mob mentality is more important for policy in the future than focusing solely on numbers.

15. CONCLUSION

Financial markets operate according to basic rules that cause people to act in concert when trading financial instruments. People develop herd behavior due to their biological need to avoid risks and their natural tendency to follow emotions and social norms instead of relying on knowledge. The study examines herding behavior in markets, exploring its psychological elements, historical development, and technological enabling factors.

Financial markets experience larger and faster price swings because modern systems connect multiple markets, which operate based on rapid changes in sentiment. The development of stable markets requires the integration of behavioral prompts with protective systems, personal responsibility with institutional backing, and emotional knowledge with financial understanding.

The first step is to identify our psychological blind spots. We can move towards a more thoughtful investment culture by educating ourselves and others about behavioral pitfalls, developing financial systems that respect human limits, and creating policies that prevent collective overreaction.

Financial systems need to grasp the "why" behind money movements - these human factors are just as crucial as stats and algorithms for keeping the system stable.

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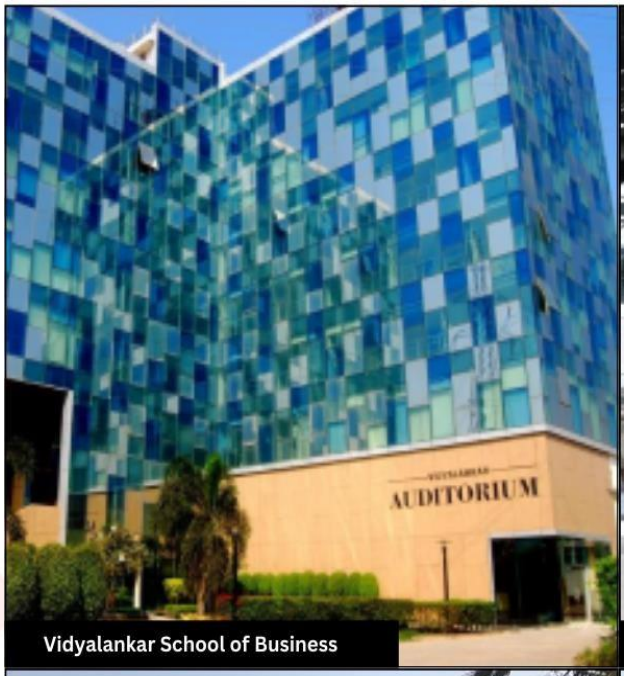

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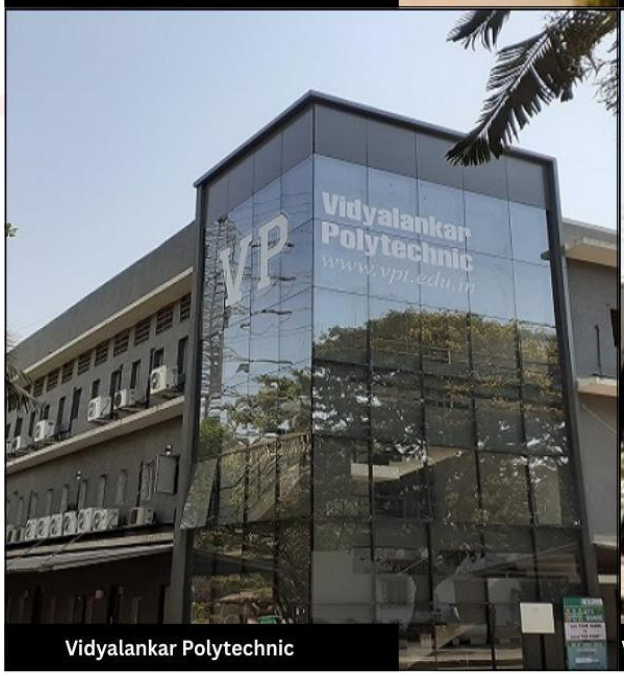

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