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Toward Inclusive Finance: A Systems Theory-Based Empirical Model for Indian Financial Institutions

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Abstract

Indian Financial Institutions encompass an extensive range of organizations involved in the country's financial industry and are vital to the nation's ability to conduct financial transactions, support economic growth, and facilitate the flow of funds. This study explores the noteworthy factors of the financial inclusion system and how they affect the performance and growth of Indian financial institutions, which aligns with Goal 8 of Sustainable Development. The statistical tool used is Exploratory Factor Analysis using the software package IBM-SPSS Statistics and Confirmatory Factor Analysis using Smart PLS 4. This article comprehensively analyses the significant internal and external factors of the financial inclusion system across the seven subsystems. Also, a model is proposed using the systems theory of financial inclusion. It outlines the primary methodology used and the scholar's views on studying this subject and suggests some crucial areas for further study.

Keywords: Sustainable Development Goal 8, Financial Inclusion System, Exploratory factor analysis, Financial Intermediaries, SPSS, model.

JEL Classification: C3, C890, C880, G200, O430

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1. Introduction

At the right place, right time, and right product or services available to the right people, which influences them to be part of India's financial system, is said to be financial inclusion or inclusive finance. The robust nature of the system of financial inclusion empowers underprivileged people, motivating or encouraging them to show activity in terms of asset building, safety net, risk management, and financial well-being. To handle the impediments to accessibility of financial services like lack of infrastructure, financial illiteracy, expensive transaction costs, regulatory limitations, and biased practices, financial inclusion is there. Sustainable Development Goal 8 aims to foster employment, decent work, and inclusive, sustainable economic growth that enhances the ability of domestic financial institutions to promote and increase access to basic financial services for all, in a way that promotes financial inclusion.

Financially included means to be in a huge advantage like financial resilience, planning, developing healthcare, and education in a way that develops the index of sustainable development goals. Furthermore, financial inclusion leads to economic development, reduction of income inequality, generates investments, and stability in the market. Right from the governments and financial institutions to the development agencies, all are important players in promoting inclusive finance. Upgradation of technology, especially in the case of digital finance, has shown gigantic changes in the scenario of the Indian financial system, as they made available affordable and scalable products to the underprivileged. Digital payment systems, credit scoring algorithms, and mobile banking are a few of the game-changing instruments advancing financial inclusion.

Demand-side factors such as assets, education, literacy, accessibility, culture, and income have been explored (Ghatak, 2013). In the case of inclusive finance education, income and use of communication equipment as individual features play an important role (Wang, 2017; Yangdol, 2019). In the research paper (Cámara, 2015), the section on vulnerable groups, including young people, women, and the rural area population, faces many difficulties in

entering the formal financial system. The type of financial product, such as loans and mortgages, can also impact financial inclusion.

Even with remarkable advancements, blockages (unequal legal frameworks, infrastructure shortages, data privacy, and obstacles to digital literacy) remain in the way of accomplishing universal financial inclusion. A multimodal strategy that incorporates inclusive innovation, targeted interventions, capacity building, and policy reforms is needed to address these issues.

1.1 Indian Perspective of Financial Inclusion

India's central bank (**R**eserve **B**ank of **I**ndia) inaugurated the notion of inclusive finance or financial inclusion by delivering India its Annual Policy Statement in the year 2005. This was introduced with the motto of giving prior importance to the isolated or secluded regions of India. The report of the Khan Committee, which was published in 2005, put stress on microfinance and rural loans and further revealed the number of citizens who are not using the official banking system meant for the common people. Many banks were officially invited to collaborate by joining the government initiatives in association with the RBI to attain 100% financial inclusion. Initially, the Indian government launched *PMJDY (Pradhan Mantri Jan Dhan Yojana),* inspiring the underprivileged people to enroll themselves in formal bank accounts. Later, the flagship schemes of financial inclusion like *PMSBY (Pradhan Mantri Suraksha Bima Yojana), PMMY (Pradhan Mantri Mudra Yojana), PMJJBY (Pradhan Mantri Jeevan Jyoti Bima Yojana), APY (Atal Pension Yojana), and SUI (Stand Up India)* were added to the successful mission of India's inclusive finance.

The study done by Singh et al. (2020) reveals that the noteworthy factors that affect the financial inclusion of the members of the Self-Help Groups are financial awareness, ease of banking and economic status of the members, the relevance of financial products, physical infrastructure, monthly income, landholding, education, age, and their status concerning the BPL (Below Poverty Line) category. Some of the recent factors impacting inclusive finance in India include the gender gap, low earnings, ignorance toward marginalized groups, low financial literacy, remote locations, and cultural barriers (Goel, 2023). Despite the government's initiatives, the overall financial inclusion position remains low (Malik, 2019). The Reserve Bank of India (RBI) and the Government of India (GOI) emphasized financial inclusion with measures of the *PMJDY* and the *National Strategy for Financial Inclusion* 2019-24. Baria

(2024) highlights the importance of rural asset ownership, wealth inequality, education, population density, and unemployment. Anon and Anon (2019) emphasize the role of financial literacy, institutional, psychological, and technological factors, and government schemes.

Raichoudhury (2020) underscores the significance of income, infrastructure, and employment opportunities. Dar and Ahmed (2020) further emphasize the impact of gender, age, education, and income on financial inclusion. It has been described by Singh and Mallick (2024) that those who belong to urban, richer, educated, and salaried individuals have a higher probability of being financially included. These determinants collectively underscore the complex and multifaceted nature of financial inclusion in India.

1.2 Theoretical Underpinning

One of the sub-theories under the financial inclusion beneficiary's theory is the systems theory of financial inclusion, which affirms that the ultimate goals of inclusive finance can be achieved through the existing sub-systems (economic, social, or financial systems). The higher the extent of inclusive finance higher the improvement in the existing sub-systems. Any transition in one existing sub-system can influence the expected output of the financial inclusion. Suppose there is an imposition of regulations on the economic agents or suppliers of financial services (who are a part of the economic and financial system) that can better serve the customers of basic financial services in a way that enforces the economic agents and suppliers to offer affordable and standard financial services to the users within the defined rules. This protects the users of financial services from being exploited by price discrimination (Ozili, 2020).

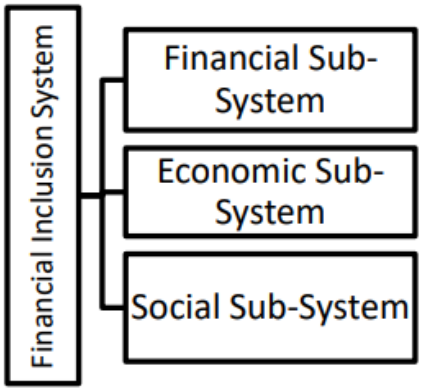


Figure 1. Bifurcation of the financial inclusion system

Source: Author's creation

Whereas, if there is an imposition of any change in the existing *National Financial Inclusion Plan*, the existing sub-systems don't need to undergo a change or transition, as any change in the sub-system level has to be made within the sub-system. Ultimately, according to the system theory perspective, the beneficiaries of financial inclusion are the existing sub-systems (economic, financial, and social) in the country. There is a dearth in the literature, which is shown in Table 1.

Table 1. Gaps in the systems theory of financial inclusion

Sl. No.	Theoretical gaps
1	It is possible that the existing sub-system may not perform as well as expected, resulting in the non-achievement of the goals of financial inclusion.
2	There is a dearth in the theory that does not include external factors while only considering the factors affecting the system or existing sub-system internally to accomplish the financial inclusion outcomes.
3	The theory also assumes that there is a direct relationship between the existing subsystem and the financial inclusion outputs.

Source: Author's creation

1.4 Research Objective

The objective is to identify the significant factors (internal as well as external) of the system of financial inclusion that are impacting the working (in the perspective of performance and growth) of the Indian Financial Institutions.

2. Data and Methodology

2.1 Data

Organized literature has been consulted to accumulate the list of factors of financial inclusion impacting the growth and performance of Indian Financial Institutions. The conduct of an empirical study has been conducted concerning the customers' viewpoint associated with Indian Financial Institutions. In this study, variables used for the survey have been selected from the financial inclusion covering Access, Usage, and Quality aspects and then categorized under the financial sub-system, Social sub-system, Economical sub-system, technological sub-system, environmental sub-system, Demographical sub-system, and Ethical sub-system. These variables are selected based on prior studies and works of literature (G20 Financial Inclusion

Indicators), experts, and their ability to be the items of inclusive finance or financial inclusion impacting the growth and performance of the Indian Financial Institutions.

2.2 Scale development and measurement instrument

The scale for the items or the indicators of financial inclusion was developed from extensive literature, as shown in Table 2. It was then subcategorized under various subsystems of the Financial Inclusion System.

Table 2. Adoption of determinants to develop the measurement scale

Sl. No.	Systems	Determinants	Inspiration from literature
1	Financial subsystem	Access Availability Automated kiosk Need for formal borrowing Agent banking	(Sarma & Pais,2010); (Gupte *et al.,* 2012); (Vaid *et al.,* 2020); (Natarajan & Sulaiman, 2021); (Lenka & Barik, 2018); (Allen *et al.*, 2016); (Venkatesh et al., 2012)
2	Social subsystem	Social empowerment Perceived benefits of usage Financial literacy (knowledge, behavior, and attitude) Inclusion-exclusion paradox Financial belief Barriers	(Barik, 2009); (Vaid *et al.,* 2020); OECD/INFE 2023; (Ozili, 2021a); (Ozili, 2021b)
3	Demographical subsystem	Area development Proximity to a bank	(Ozili, 2021)
4	Technological subsystem	Technology Data security and privacy	(Vaid *et al.,* 2020); (Natarajan & Sulaiman, 2021); (Ozili, 2020b)

5	Economical subsystem	Economic empowerment National Strategy for Financial Inclusion Government policies and initiatives State of the economy Remittances	(Barik, 2009); (Ozili, 2021c); (APramuka *et al*., 2020); (Wellalage & Locke, 2019)
6	Environmental subsystem	Industrialization of the local area Financial wellbeing Financial resilience Cross-sectoral collaboration	(Collins & Urban, 2019)
7	Ethical subsystem	Disclosure requirement Dispute resolution Trust Transparency Financial inclusion washing The imposition of tax by the government	(Vaid *et al.,* 2020); (Ozili, 2022)

Source: Author's collection

The application of the agreement scale was done under the 5-Point Likert Scale by preparing a well-organized questionnaire. Five different choices (two extremes, two intermediate, and one neutral option) are given to the respondents in a 5-point Likert Scale. The following scales were used to prepare the questionnaire, as shown in Table 3.

Table 3. The scale adopted in the 5-Point Likert Scale

Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1	2	3	4	5

To verify the effectiveness of the structured questionnaire, it was piloted among the people associated with the Indian Financial Institutions. The survey was done through printed forms to get the pilot study responses. The raw data was collected, making it closed-ended and making it compulsory to respond to all the questions in the survey. By the use of Cronbach's

alpha, the reliability (internal consistency) of the entire questionnaire was checked for the pilot study, and then it was circulated for larger sample collection.

2.3 Methodology

Here, the factor analysis method is applied. For this, the software package of IBM-SPSS Statistics and the statistical tool Exploratory Factor Analysis (EFA) are used for a sample size of 201 respondents. The respondents include the stakeholders of financial institutions in India. For Common Method Bias (CMB), Harman's Single Factor Test in SPSS is done where all study variables are loaded onto one single factor, which must explain less than 50% of the total variance (Podsakoff et al.,1986). In this study, the single factor explained 9.449% (< 50%) of the variance. For EFA, the syntax used is shown in Table 4. To curtail the number of variables to significant ones, Principal Component Analysis (PCA) was employed.

Table 4. Syntax to carry out the exploratory factor analysis, along with correlation and reliability checks in SPSS

1.	**Data cleaning**	***Data cleaning is done.***
2.	**Exploratory Factor Analysis**	*Analyze > Dimension reduction > Factor analysis*
		Selecting the variables according to the factors.
		Descriptives > Statistics (Initial solution) > Correlation matrix (KMO and Bartlett's test of sphericity)
		Extraction > Method (Principal Components)> Analyze (Correlation matrix) > Display (Scree plot) > Extract (based on Eigenvalue greater than 1)
		Rotation > Method (Varimax)
		Scores > Default
		Options > Missing values (default) > Coefficient display format (Suppress small coefficient absolute value below 0.55)> Ok
3.	**Reliability Analysis**	*Analyze > Scale > Reliability Analysis*
		Selecting the variables according to the factors.
		Statistics > Descriptives for (Item, Scale, Scale if item deleted) > Model (Alpha) > Scale label (default) > Ok

4.	**Correlation**	*Analyze > Correlate > Bivariate Correlations > Select the variables >* *Correlation coefficients (Pearson) > Test of significance (Two-tailed) >* *Flag significant correlations > Ok*

Source: Author's creation

To make the factor analysis relevant to this subject, and check the adequacy of the sample and the appropriateness of the validity of the factor analysis, the Kaiser Meyer Olkin (KMO) and Bartlett's Test of Sphericity are examined as shown in the following Table 5. It is realized from this table that the Kaiser-Meyer-Olkin Measure of sample adequacy is more than 0.5 (which is acceptable), and the level of significance is < 0.05. Thus, it can be said that the data is appropriate for factor analysis. For the reliability (internal consistency) of the study and the questionnaire, Table 6 shows the descriptive statistics of the individual sub-systems. The questionnaire's content validity is verified by the correlation coefficient between questions and variables (Baer et al., 2008). As far as the Content validity is concerned, the questionnaire was developed under the supervision of expert opinions and an extensive literature review. To validate the construct validity, Pearson Product-Moment Correlations were calculated using the statistical tool, that is, SPSS.

Table 5. KMO and Bartlett's Test in SPSS

Tests		**Financial Sub -System Factors**	**Social Sub-System Factors**	**Demographic Sub-System Factors**	**Technological Sub -System Factors**	**Economical Sub-System Factors**	**Environmental Sub - System Factors**	**Ethical Subsystem Factors**
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.729	0.720	0.651	0.666	0.807	0.814	0.686
Bartlett's Test of Sphericity	**Approx. Chi-Square**	659.025	692.748	420.145	149.523	1513.407	604.443	686.123
	Degree of freedom	55	105	21	6	78	28	45
	Significance	.000	.000	.000	.000	.000	.000	.000

Source: Author's calculation through SPSS

Table 6. Descriptive statistics

Sub-Systems	Mean	Variance	Standard Deviation	No. of items
Financial Sub-System	39.78	23.045	4.800	11
Social Sub-System	55.89	23.252	4.822	15
Demographical Sub-System	25.07	13.585	3.686	7
Technological Sub-System	14.85	4.278	2.068	4
Economical Sub-System	48.68	33.940	5.826	13
Environmental Sub-System	28.74	17.375	4.168	8
Ethical sub-system	36.90	17.770	4.215	10

Source: Author's calculation through SPSS

3. Encapsulation of the findings

3.1 Interpretation of the significant factors identified through exploratory factor analysis

Table 7 represents the extraction of factors under the seven sub-systems along with their value of Cronbach's alpha. It is verified in the literature provided by Raharjanti et al. (2022) that Cronbach's alpha is acceptable within the range of 0.6 and 0.8.

Table 7. Factor extraction from the factor analysis

Financial Sub-System	Factor 1	F1, F2, F3, F4	0.718
	Factor 2	F8, F9, F10, F11	
	Factor 3	F13, F14, F15	
Social Sub-System	Factor 4	S1, S2, S3, S4	.671
	Factor 5	S5, S6, S7, S8	
	Factor 6	S9, S10, S11	
	Factor 7	S12, S13, S14, S15	
Demographical Sub-System	Factor 8	D1, D2, D3	.642
	Factor 9	D4, D5, D6, D7	
Economical sub-system	Factor 10	E1, E2, E3, E4, E5	.797
	Factor 11	E6, E7, E8, E9	
	Factor 12	E10, E11, E12, E13	
Environmental Sub-System	Factor 13	EN2, EN3, EN5, EN6, EN7	.754
	Factor 14	EN8, EN9, EN10	
Ethical sub -system	Factor 15	ET1, ET2, ET3, ET4	.677
	Factor 16	ET5, ET6, ET7	
	Factor 17	ET9, ET10, ET11	
Technological Sub - System	Factor 18	T1, T2, T3, T4	.673

Source: Author's calculation through SPSS

a) Financial Sub-System

The Financial subsystem takes over the control of overall financial operations inside an enterprise or economy. It includes tasks like budgeting, capital management, risk management, cash flow management, financial planning, and investment decisionmaking (Mishkin, 2015). To maintain liquidity, mitigate financial risks, and allocate resources effectively, these

subsystems are essential. According to Brealy, Myers, and Allen (2017), financial subsystems facilitate informed decisions about investments, operating expenses, and financial reporting by offering data and frameworks for decision-making. At the macroeconomic level, the financial subsystem contributes to the supervision of financial markets, central banking, and regulatory structures, guaranteeing stability and the best possible economic performance (Kohn, 2018). Data adequacy is good for this sub-system as KMO measures .729, and Bartlett's test of sphericity satisfies the criteria with significance 0. The Cronbach's alpha for the financial sub-system is .718, having three factors and eleven items. In Table 8, all the items correlate strongly with a subset, but weakly with others, which means the scale is multidimensional. Also, there is no high correlation, i.e., >0.80, between items, which shows there is no redundancy.

Table 8. Inter-Item Correlation Matrix for the financial sub-system

	F1	F2	F3	F4	F8	F9	F10	F11	F13	F14	F15
F1	1.000										
F2	.524	1.000									
F3	.329	.577	1.000								
F4	.565	.528	.453	1.000							
F8	.169	.240	.372	.225	1.000						
F9	.124	.250	.353	.310	.579	1.000					
F10	.215	.180	.107	.278	.280	.406	1.000				
F11	.106	.376	.317	.289	.403	.447	.502	1.000			
F13	.063	.150	.050	.100	-.063	-.067	-.009	-.070	1.000		
F14	.116	.043	-.054	.001	-.058	-.164	-.094	-.204	.490	1.000	
F15	-.068	.007	.000	-.030	-.065	-.010	.047	-.014	.352	.377	1.000

Source: SPSS

Factor 1: Convenience of Financial Access

The interpretation of the factor, namely "Convenience of Financial Access," is that it reflects the ease of using financial services, indicates the preference for informal credit, shows decentralisation or doorstep access, and demonstrates institutional effort to reduce entry barriers.

Factor 2: Ease of Financial Transactions

This factor meaning the ease of financial transactions capture the perception of the respondents of how simple, accessible and efficient the financial processes and services are both in physical form and in digital form. It blends procedural convenience and digital usability, two critical pillars of financial inclusion in India's evolving financial ecosystem.

Factor 3: Customer centric Financial Services

This factor shows the extent to which financial institutions are perceived as responsive to customers' needs, both in product offerings and in user support mechanisms. It depicts the personalisation of services, technology enabled service facilitation and user centric policies specially in a diverse population with varying financial capabilities and literacy levels.

b) Social sub-system factors

The area of a larger social system that concentrates on the social, cultural, and behavioral facets of a community or an organization is known as a Social subsystem. It includes all of the values, beliefs, customs, conventions, and behaviors that influence how people behave and interact with one another in a community. This subsystem has a major impact on social cohesiveness and stability and influences several domains, including communication, education, family structure, and social roles (Hofstede, 2001). Organizations and societies can better handle social challenges, adjust to shifting cultural dynamics, and create inclusive settings that honor a variety of beliefs and traditions by comprehending the Social subsystem (Triandis, 1995). People are more likely to use financial products if they trust the services provided by the financial institutions (Atkinson & Messy, 2012). A report by the Reserve Bank of India (2020) mentioned that it is the Financial Literacy Week, an initiative taken by the RBI to spread financial awareness, has shown remarkable improvements in the engagement of customers and responsible behavior.

These subsystems aid in directing the socialization process and guaranteeing that norms and behaviors are upheld as societal and cultural circumstances change. Data adequacy is satisfactory for this sub-system with KMO of 0.720, and Bartlett's test of sphericity satisfies the criteria with significance 0. The Cronbach's alpha for the Social sub-system is 0.671, having four factors and fifteen items. The inter-item correlation matrix for the Social sub-system is depicted in Table 9, which shows items correlate strongly with a subset, but weakly with others,

showing the scale is multidimensional. Also, there is no high correlation, i.e., >0.80, between the items, which depicts there is no redundancy.

Table 9. Inter-Item Correlation Matrix

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15
S1	1.000														
S2	.475	1.000													
S3	.231	.392	1.000												
S4	.256	.358	.401	1.000											
S5	-.119	-.026	-.101	.249	1.000										
S6	-.186	-.017	-.039	.301	.521	1.000									
S7	-.078	.070	.052	.255	.368	.494	1.000								
S8	-.072	.023	-.152	.242	.415	.553	.470	1.000							
S9	-.075	-.009	-.064	.062	.197	.237	.214	.330	1.000						
S10	-.135	-.090	-.087	-.058	.053	.123	.070	.247	.441	1.000					
S11	-.039	-.035	-.010	.136	.081	.159	.103	.110	.357	.406	1.000				
S12	.029	.159	.134	.062	-.021	.028	.025	.064	.065	.106	.086	1.000			
S13	.028	.151	.071	-.002	.076	.154	.066	.181	.161	.084	-.020	.409	1.000		
S14	.082	.216	.026	-.023	-.056	-.013	.039	.062	.046	.147	-.005	.350	.387	1.000	
S15	.044	.194	.105	.029	.016	.021	-.011	-.059	-.005	.003	.019	.220	.271	.360	1.000

Source: SPSS

Factor 4: Confidence in Financial Institutions

This factor captures the customer's positive orientation towards the formal financial systems, which includes the belief in saving and long-term planning, satisfaction with financial products, impact of financial literacy initiatives, and the trust in the institutions' friendliness and fairness. This is necessary where customers not only have access to financial services but also engage with them meaningfully and consistently.

Factor 5: Community Trust and Institutional Credibility

This factor represents the intertwined roles of financial awareness and social trust in bolstering the credibility and performance of financial institutions. It reflects how knowledge dissemination, community-based structures, and inclusion efforts foster confidence among

customers, thereby facilitating greater use of formal financial services and contributing to sustainable financial inclusion.

Factor 6: Financial Awareness and Risk Vigilance

This factor encompasses the combination of financial literacy, consumer protection awareness, and goal-oriented financial behavior. It signifies that customers are not only knowledgeable about financial products and terms but are also alert to potential risks (such as fraud) and capable of setting meaningful financial goals, which are critical components of effective financial inclusion.

Factor 7: Financial Literacy and Institutional Convenience

This factor captures the synergy between financial literacy, customer confidence, and institutional accessibility. It underscores that effective financial inclusion depends not only on knowledge and decision-making capacity but also on the convenience and availability of services provided by financial institutions.

c) Demographical Sub-system factors

Population size, age distribution, gender, ethnicity, education levels, and migration patterns within a population are examples of demographic characteristics that are the subject of a demographical subsystem, which is a subsystem of a larger financial inclusion system. Because they impact consumer behavior, public policy, and labor markets, these elements have an impact on social, economic, and political dynamics (Giddens, Duneier, Appelbaum, and Carr, 2017). Elderly populations, for example, might put a burden on healthcare systems, and younger populations may increase demand for work and education (Simmons, 2016). Thus, to plan and shape sustainable societal development, the demographic subsystem is essential. The correlation matrix is shown in Table 10. To measure whether the data adequacy is satisfactory or not for this sub-system, the KMO and Bartlett's test of sphericity are performed here. The value was measured as .651 for KMO and satisfies the criteria with significance 0 of Bartlett's test of sphericity. The Cronbach's alpha for the Demographical sub-system is .642 having two factors and seven items. Additionally, there is no high correlation,

i.e., greater than 0.80, between items, indicating that there is no redundancy.

Table 10. Inter-Item Correlation Matrix for the demographic sub-system

	D1	D2	D3	D4	D5	D6	D7
D1	1.000						
D2	.564	1.000					
D3	.411	.536	1.000				
D4	.052	.073	.097	1.000			
D5	-.100	-.018	-.082	.630	1.000		
D6	-.040	.045	-.018	.273	.504	1.000	
D7	-.020	.043	-.009	.296	.449	.613	1.000

Source: SPSS

Factor 8: Geographical and Linguistic Accessibility

This factor captures the critical role of physical proximity and language accessibility in promoting effective financial inclusion. It reflects how geographical convenience and regional language support empower customers to engage confidently and frequently with financial institutions. Physical infrastructure like nearby ATMs and language-appropriate communication reduce transactional friction and build trust, which is particularly important in diverse and multilingual contexts.

Factor 9: Targeted Inclusion and Regional Expansion

This factor captures the combined effects of demographic-focused inclusion programs and geographic expansion on the growth and outreach of financial institutions. It illustrates how women's empowerment initiatives, digital inclusion of rural youth, access through postal networks, and penetration into smaller cities collectively contribute to institutional development and broader financial inclusion.

d) Economical Sub-system factors

Economic and political subsystems concentrate on the distribution of wealth, resource allocation, and governance frameworks. These systems and procedures have an impact on variables including trade, inflation, and employment (Mankiw, 2020). It influences the economy's general health and rate of expansion. The political subsystem, on the other hand, defines how power is allocated and used in society and includes the institutions and procedures associated with governance, legislation, and policy implementation (Lasswell, 1958). These

subsystems are intricately linked because political decisions can shape economic progress, and economic policies can affect political stability. Beck et al. (2005) explained that, "Financial inclusion facilitates MSME growth, enabling access to formal credit and financial services." To measure whether the data adequacy is satisfactory or not for this sub-system, the KMO and Bartlett's test of sphericity are done here. The value was measured as .807 for KMO and satisfies the criteria with significance 0 of Bartlett's test of sphericity. The Cronbach's alpha for the Economical sub-system is .797, having three factors along with thirteen items. The correlation matrix is shown in Table 12, where there is no high correlation, i.e., >0.80, between items, which shows there is no redundancy.

Table 12. Inter-Item Correlation Matrix for the Economical sub-system

	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13
E1	1.000												
E2	.724	1.000											
E3	.649	.778	1.000										
E4	.539	.714	.761	1.000									
E5	.396	.564	.611	.599	1.000								
E6	.055	.053	.035	.077	.107	1.000							
E7	.195	.123	.209	.199	.270	.679	1.000						
E8	.112	.063	.010	.094	.197	.573	.714	1.000					
E9	.148	.129	.096	.125	.229	.487	.720	.687	1.000				
E10	-.178	-.180	-.177	-.199	-.079	.162	.230	.273	.238	1.000			
E11	.014	-.050	-.082	-.119	-.110	.178	.191	.270	.166	.628	1.000		
E12	.003	.007	-.065	-.050	-.048	.304	.237	.282	.208	.565	.686	1.000	
E13	-.074	-.013	-.105	-.075	-.065	.230	.136	.205	.157	.483	.440	.573	1.000

Source: SPSS

Factor 10: Inclusion-Driven Institutional and Economic Growth

This factor captures the synergistic effects of financial inclusion policies, government schemes, and social programs in expanding the reach and economic impact of financial institutions. It underscores how targeted credit programs (e.g., MUDRA), tapping into MSMEs, promoting rural economic activity, leveraging remittances, and enhancing social welfare collectively fuel both institutional growth and economic empowerment.

Factor 11: Customer Empowerment and Financial Resilience

This factor illustrates the dual aspects of empowerment in financial decision-making at the household level and the tangible benefits of formal financial inclusion, such as reduced reliance on informal credit and increased financial resilience. While customers exhibit autonomy in everyday spending decisions, challenges remain in critical domains like educational decisions, suggesting room for greater empowerment. Overall, the transition to formal finance contributes to enhanced stability and resilience.

Factor 12: National Strategy and Market Influences

This factor encapsulates the impact of government policies, national strategies, and macroeconomic environment on financial inclusion and customer financial behavior. It highlights that inclusion is not only driven by institutional or individual factors but is significantly shaped by the broader policy framework and economic context, including market volatility, which affects how customers engage with financial products.

e) Technological Sub-system factors

A technological subsystem is a segment that focuses on building, using, and managing technology to accomplish particular objectives. It comprises the equipment, methods, systems, and tools used to boost output, simplify procedures, and encourage creativity in a company or community (Laudon and Laudon, 2018). Fostering technical improvements and addressing new issues like automation, digital transformation, and data analytics depend heavily on this subsystem (Brynjolfsson and McAfee, 2014). Employing cutting-edge technologies can help businesses become more efficient, save money, and gain a competitive edge. In a world that is becoming more digital, technological subsystems are also essential to the development of industries, propelling expansion and changing social dynamics. In Table 11, the correlation matrix is shown. Data adequacy is satisfactory for this sub-system with KMO of .666 and Bartlett's test of sphericity satisfies the criteria with significance 0. The Cronbach's alpha for the Technological sub-system is .673, having one single factor with four items. Additionally, there is no high correlation, i.e., greater than 0.80, between items, indicating that there is no redundancy.

Table 11. Inter-Item Correlation Matrix for the technological sub-system

	T1	T2	T3	T4
T1	1.000			
T2	.557	1.000		
T3	.408	.394	1.000	
T4	.208	.156	.370	1.000

Source: SPSS

Factor 13: Digital Technology and Infrastructure

This factor underscores the critical role of digital infrastructure, smartphone accessibility, data analytics, and FinTech innovations in driving financial inclusion. It highlights how technology reduces acquisition costs, improves targeting, and simplifies transaction processes, thereby making financial services more accessible and convenient for a wider population.

f) Environmental Sub-System factors

The environmental subsystem is influenced by the natural environment, including the physical, biological, and ecological components. This subsystem encompasses the management of natural resources, environmental protection, and sustainability efforts aimed at preserving ecological balance (Daly and Farley, 2011). It plays a crucial role in addressing environmental challenges such as climate change, pollution, and resource depletion, while also ensuring that human activities align with the planet's carrying capacity (Meadows, 2008). The environmental subsystem is central to the concept of sustainable development, as it strives to balance economic growth and societal needs with the imperative of conserving the environment for future generations (Barbier, 2011). Table 13 has the data on the inter-item correlation matrix. To measure whether the data adequacy is satisfactory or not for this sub-system, the KMO and Bartlett's test of sphericity is done here. The value was measured as .814 for KMO and satisfies the criteria with significance 0 of Bartlett's test of sphericity. The Cronbach's alpha for the Environmental sub-system is .754 having two factors along with eight items. Also, there is no high correlation, i.e., >0.80, between items, which shows there is no redundancy.

Table 13. Inter-Item Correlation Matrix for the environmental sub-system

	EN2	EN3	EN5	EN6	EN7	EN8	EN9	EN10
EN2	1.000							
EN3	.508	1.000						
EN5	.431	.593	1.000					
EN6	.475	.697	.601	1.000				
EN7	.440	.716	.605	.785	1.000			
EN8	-.047	.046	.012	.068	.091	1.000		
EN9	.065	.000	.031	.150	.053	.293	1.000	
EN10	.093	.010	.053	.099	.118	.231	.381	1.000

Source: SPSS

Factor 14: Sustainable inclusion

This factor captures the broad socio-economic and environmental impacts of financial inclusion. It includes positive outcomes such as asset acquisition, improved housing, and access to utilities, alongside sustainable institutional practices. The presence of a negative perception regarding standard of living degradation suggests a nuanced understanding of inclusion's effects, possibly related to over-indebtedness or other challenges.

Factor 15: Eco Inclusion

This factor captures the interconnection between environmental sustainability, industrial growth, and financial inclusion. It reflects how regional industrialization increases financial service demand, while green finance and ESG frameworks support inclusive and responsible growth. Additionally, climate insurance and risk-relief tools enhance the resilience of communities, especially in disaster-prone zones, showing a systemic alignment between inclusion, sustainability, and economic security.

g) Ethical sub-system factors

The Ethical sub-system deals with the values, norms, and standards that guide individual and collective behavior, aiming to ensure fairness, integrity, and social responsibility (Frankena, 1973). On the other hand, the legal subsystem encompasses the system of laws, regulations, and legal institutions that govern behavior, enforce rights, and resolve disputes within a society or organization (Hart, 1961). Both subsystems are interconnected, as ethical standards often inform the creation of laws, and legal frameworks shape the way ethical

principles are implemented and upheld. The correlation matrix is shown in Table 14. Data adequacy is satisfactory for this sub-system with KMO of .686 and Bartlett's test of sphericity satisfies the criteria with significance 0. The Cronbach's alpha for the Ethical sub-system is .677, having three factors and ten items. Also, there is no high correlation, i.e., >0.80, between items, which shows there is no redundancy.

Table 14. Inter-Item Correlation Matrix for the Ethical Subsystem

	ET1	ET2	ET3	ET4	ET5	ET6	ET7	ET9	ET10	ET11
ET1	1.000									
ET2	.711	1.000								
ET3	.452	.508	1.000							
ET4	.351	.481	.530	1.000						
ET5	.055	-.020	.096	-.087	1.000					
ET6	.015	-.029	.046	-.003	.581	1.000				
ET7	.025	-.013	.023	-.090	.478	.396	1.000			
ET9	.068	.098	.098	.011	.131	.141	.065	1.000		
ET10	.047	.106	.157	.043	.191	.163	.114	.750	1.000	
ET11	.002	.034	.008	-.088	.067	.040	-.014	.493	.534	1.000

Source: SPSS

Factor 16: Trust and Transparency

This factor captures the importance of institutional ethics, regulatory compliance, and transparency in fostering customer trust and enhancing inclusive finance. Customers are more likely to participate in formal financial systems when they perceive institutions as ethical, transparent, and communicative. This trust-building environment is essential for sustainable and long-term inclusion, particularly among vulnerable or previously excluded populations.

Factor 17: Ethical Accountability

This factor represents a critical dimension of financial inclusion: it emphasizes how accountability, authenticity in inclusion strategies, and government fiscal policies shape the outcomes of financial inclusion efforts. When institutions genuinely engage underserved customers through fair practices, inclusion is strengthened. However, when inclusion is merely

symbolic (i.e., inclusion washing) or when excessive taxation reduces disposable income, both institutional performance and inclusion objectives may suffer.

Factor 18: Customer protection

This factor captures the role of ethical conduct and effective grievance mechanisms in building trust within financial inclusion frameworks. While quick resolution and fair compensation reflect customer-centric service and accountability, inclusion washing acts as a counterpoint, highlighting the risks of failing to live up to inclusive promises. Together, these elements reflect how authenticity, transparency, and justice shape the perceived credibility and performance of financial institutions.

3.2 Report on Confirmatory Factor Analysis

According to Hair et al. (2018), the measurement model in SmartPLS 4 calculates the reliability and construct validity (convergent and divergent validity) through factor loadings and average variance extracted (AVE), which is equivalent to a confirmatory factor analysis (CFA), as both methods have the same goal to validate the constructs. The CFA was done on a sample size of 310 responses. Table 15 shows the summary for the measurement model. Reliability is achieved through Cronbach's alpha and composite reliability. By calculating the mean of the squared loadings of each indicator linked with the construct, we can have the value of Average Variance Extracted (AVE), which must be greater than 50% (0.50), proving the divergent validity (Sarstedt et al, 2021). This determines the convergent validity. For the reliability, Cronbach's alpha, composite reliability (ρ_A), and composite reliability (ρ_c) must be > 0.6 (Hair et al., 2010). Some items are deleted in confirmatory factor analysis, which are S7, S8, S12, S13, E6, EN2, and T1, due to their lower factor loadings and thus impacting AVE to decrease. Therefore, the reliability and validity of the constructs are achieved and hence proven.

Table 15. Result summary for the measurement model, indicating confirmatory factor analysis

Latent Variables	Items	Collinearity Statistics	Internal Consistency Reliability					Divergent Validity	
		VIF	Factor Loadings	AVE	Cronbach's Alpha	Composite Reliability (ρ_A)	Composite Reliability (ρ_C)	HTMT	Fornell and Larcker
		<3.3	> 0.6	> 0.5	0.6-0.9	0.6-0.9	0.6-0.9	Significantly < 0.85(0.90)	√AVE> Latent Variable Construct
FACTOR 1	F1	1.456	0.728	0.541	0.707	0.753	0.821	Yes	Yes
	F2	1.726	0.788						
	F3	2.211	0.86						
	F4	1.144	0.524						
FACTOR 2	F8	1.951	0.825	0.545	0.716	0.743	0.825	Yes	Yes
	F9	1.708	0.82						
	F10	1.283	0.682						
	F11	1.171	0.6						
FACTOR 3	F13	1.338	0.673	0.519	0.581	0.629	0.762	Yes	Yes
	F14	1.318	0.65						
	F15	1.091	0.826						
FACTOR 4	S1	2.485	0.872	0.729	0.876	0.876	0.915	Yes	Yes
	S2	2.218	0.852						
	S3	2.301	0.847						
	S4	2.044	0.845						
FACTOR 5	S5	2.051	0.887	0.764	0.692	0.697	0.866	Yes	Yes
	S6	1.39	0.862						
FACTOR 6	S9	1.544	0.669	0.71	0.818	1.007	0.878	Yes	Yes
	S10	2.155	0.89						
	S11	2.214	0.943						
FACTOR 7	S14	1.912	0.894	0.818	0.778	0.785	0.9	Yes	Yes
	S15	1.684	0.915						
FACTOR 8	D1	1.73	0.766	0.582	0.639	0.632	0.806	Yes	Yes
	D2	1.806	0.829						
	D3	1.083	0.686						
FACTOR 9	D4	1.718	0.83	0.552	0.716	0.767	0.826	Yes	Yes
	D5	1.867	0.848						

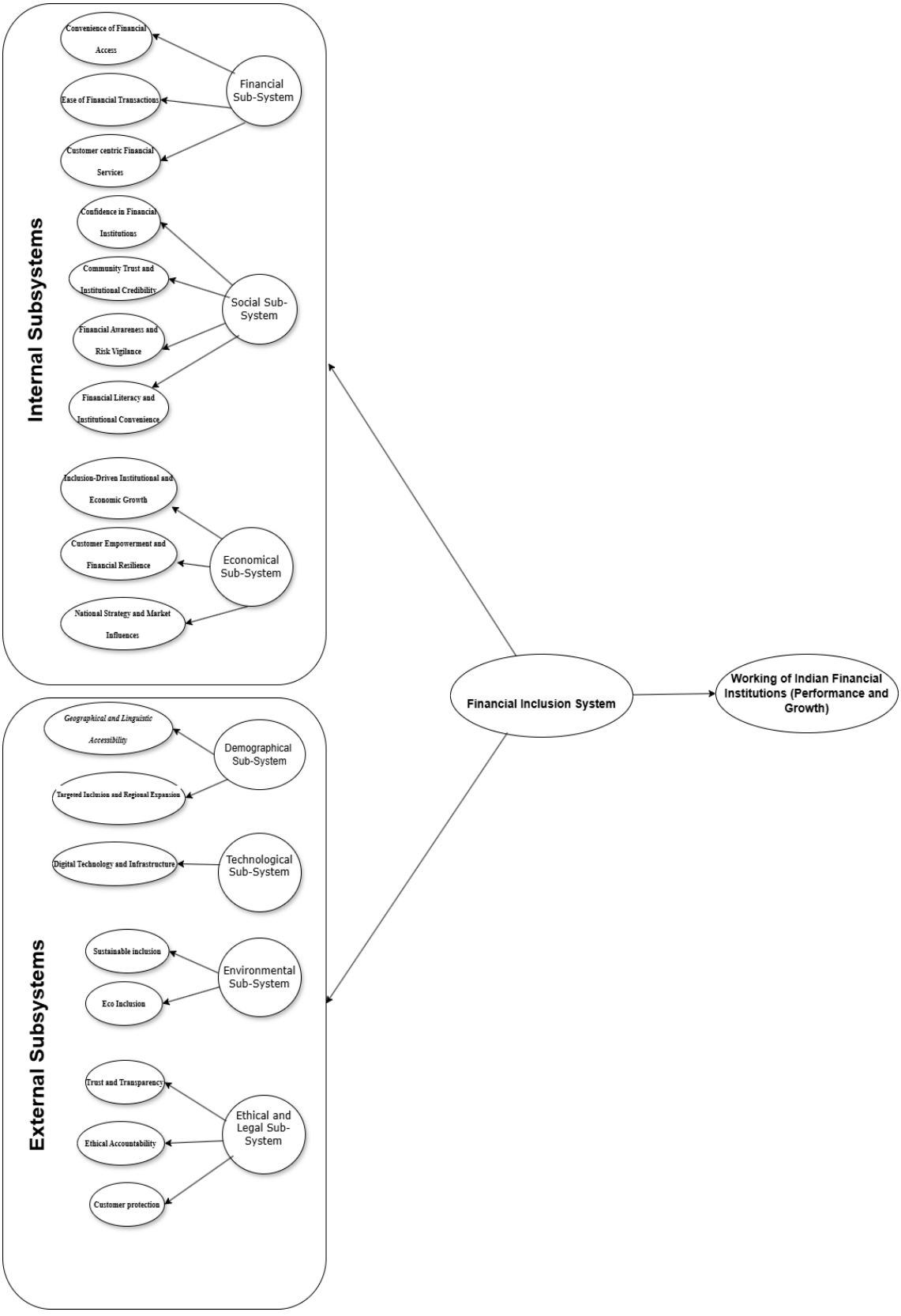
	D6	1.467	0.755						
	D7	1.121	0.48						
FACTOR 10	E1	1.421	-0.778	0.492	0.764	0.776	0.824	Yes	Yes
	E2	1.437	-0.645						
	E3	1.91	-0.792						
	E4	1.715	-0.78						
	E5	1.47	-0.45						
FACTOR 11	E7	1.306	0.731	0.649	0.73	0.755	0.847	Yes	Yes
	E8	1.565	0.817						
	E9	1.571	0.863						
FACTOR 12	E10	1.507	0.787	0.564	0.739	0.751	0.837	Yes	Yes
	E11	1.698	0.792						
	E12	1.623	0.79						
	E13	1.247	0.62						
FACTOR 13	EN3	1.734	0.753	0.548	0.724	0.726	0.828	Yes	Yes
	EN5	1.692	0.736						
	EN6	1.562	0.793						
	EN7	1.458	0.674						
FACTOR 14	EN8	1.086	0.724	0.481	0.462	0.463	0.735	Yes	Yes
	EN9	1.138	0.707						
	EN10	1.075	0.648						
FACTOR 15	ET1	1.77	0.788	0.683	0.844	0.849	0.896	Yes	Yes
	ET2	1.567	0.775						
	ET3	2.391	0.867						
	ET4	2.334	0.872						
FACTOR 16	ET5	1.425	0.779	0.518	0.543	0.542	0.762	Yes	Yes
	ET6	1.355	0.66						
	ET7	2.375	0.714						
FACTOR 17	ET9	1.435	0.842	0.666	0.753	0.774	0.857	Yes	Yes
	ET10	1.51	0.776						
	ET11	1.692	0.83						
FACTOR 18	T2	1.05	0.453	0.605	0.641	0.753	0.81	Yes	Yes
	T3	2.057	0.896						
	T4	2.067	0.898						

Source: Author's compilation from SmartPLS 4

3.3 The Model

This research article proposes the model as Figure 2 based on the systems theory of financial inclusion where not only the internal sub-systems including financial subsystems, Social sub-systems, and Economical sub-systems are included in the financial inclusion system, but also the external sub-systems such as Demographical, Technological, Environmental and Ethical sub-systems also influences financial inclusion system as a whole. Financial inclusion significantly impacts financial institutions by enhancing their operational efficiency, stability, and outreach. The integration of technological advancements, such as mobile banking and digital payment platforms, has transformed traditional banking, making financial services more accessible and cost-effective for underserved populations (Rahman, 2024; Ocharive and Iworiso, 2024). This shift not only broadens the customer base but also fosters economic participation, leading to improved banking performance and customer satisfaction (Kumar and Kumari, 2023). Then, the financial inclusion system impacts the working of the Indian Financial Institutions in terms of performance and growth. Although emerging economies are more reliant on banks, they also experience ongoing financial instabilities (Demirgüç-Kunt & Levine, 2009; Laeven & Valencia, 2013). Therefore, compared to nations with less reliance on banks, those with stable banking systems or financial institutions have a greater impact on their economies (Kroszner et al., 2007). Consequently, the existence, diversity, and mechanisms of the relationship between bank stability and financial inclusion in these nations are discussed as the best possible financial policy design and are important for their long-term financial stability and economic development.

Figure 2. The proposed model



Source: Author's representation

4. Implications and recommendations

The proposed model will connect the financial inclusion system with the working of the financial institutions, which provides a fertile ground for further exploration of the systems theory. The outcome can be viewed on a large scale, thereby improving the financial institutions. Investigating these dimensions cannot only guide institutional strategy and policy development but also contribute to a deeper understanding of the broader social, economic, and technological shifts in the financial ecosystem, thereby leading to the accomplishment of sustainable goals.

5. Conclusion

In conclusion, it can be inferred that the factors beyond the financial, economic, and social sub-systems, various other sub-system factors also influence the functioning of the financial inclusion system. Though there has been a remarkable improvement in the combination of factors, whether it be technological upgradations, regulatory initiatives and measures, or reforms in the economy, there is a perforation of unwanted issues that are hindrances to universal financial inclusion. Concerning banks, institutions, insurance companies, mutual funds, and fintech startups, have elaborated their outreach and service offerings. The adoption of digital banking solutions and the proliferation of mobile technology have played pivotal roles in enhancing accessibility to financial services across diverse demographics, particularly in rural areas. Moreover, regulatory reforms aimed at strengthening governance and risk management practices have bolstered the stability and resilience of these institutions amidst global economic fluctuations. As India continues on its path of economic growth and digital transformation, the evolution of its financial institutions remains integral to fostering inclusive development and sustainable prosperity.

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Code Availability: This manuscript is devoid of any code.

Appendix I: The items/indicators in the questionnaire.

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