RESEARCH PAPER

FACTORS AFFECTING THE ADOPTION OF E-BANKING CHANNELS FOR FINANCIAL INCLUSION

Inderpreet Kaur[1], Dr Raj Kumari[2]
[1]Research Scholar, Sant Baba Bhag Singh University, Jalandhar, 144030
[2]Associate Professor, Sant Baba Bhag Singh University, Jalandhar, 144030

ABSTRACT

Financial inclusion has emerged as a significant policy objective for governments and financial institutions, particularly in developing countries like India, where a large section of the population still lacks access to formal financial services. The present study aims to identify the major factors affecting the adoption of e-banking channels for financial inclusion among consumers. A structured and pre-tested questionnaire was administered to respondents from both rural and urban areas. The collected data were analyzed using percentage analysis, Exploratory Factor Analysis (EFA), and Confirmatory Factor Analysis (CFA). The findings indicate that accessibility, affordability, convenience, trust, security, and digital literacy significantly influence the adoption of e-banking services. E-banking channels positively contribute to financial inclusion by improving access to banking services, enhancing financial independence, and reducing geographical barriers. However, challenges such as inadequate digital literacy, fear of cyber fraud, and poor internet connectivity continue to hinder adoption, particularly among rural and elderly populations. The study concludes that strengthening digital infrastructure, improving financial literacy, and enhancing cybersecurity measures are essential for promoting wider adoption of e-banking services and achieving inclusive financial development.

Keywords: Financial Inclusion, E-Banking, Digital Banking, UPI, Accessibility, Trust & Security, Financial Literacy, Technology Adoption, India.
How to cite this article: Kaur I, Kumari R. Factors Affecting the Adoption of E-Banking Channels for Financial Inclusion. Int J Drug Deliv Technol. 2026;16(56s): 235-250. DOI: 10.25258/ijddt.16.56s.24

Source of support: Nil.

Conflict of interest: None.

Introduction

A major policy goal for governments and financial institutions around the world is financial inclusion. It refers to the process of guaranteeing that all segments of society, especially vulnerable and low-income groups, have access to timely, sufficient, and reasonably priced financial services. Financial inclusion is thought to be crucial for lowering poverty, fostering economic growth, and raising people's standards of living in emerging nations like India.However, due to a lack of knowledge, po or banking infrastructure, low literacy rates, an d restricted financial accessibility, a sizable seg ment of the population still does not use the off icial banking system (World Bank, 2020).

With the emergence of electronic banking (e-banking) channels, information and communication technology advancements have completely changed the banking industry. The provision of banking services via electronic platforms, including internet banking, mobile banking, automated teller machines (ATMs), debit and credit cards, mobile wallets, Point of Sale (POS) systems, and Unified Payments Interface (UPI), is referred to as e-banking. Customers can receive banking services quickly, easily, and securely using these digital platforms without having to physically visit bank branches (Reserve Bank of India, 2021).

By linking underbanked and unbanked people with formal financial institutions, the use of e-banking channels has grown in importance as a tool for advancing financial inclusion. The use of digital banking services has increased in India thanks to government programs including Digital India, the Pradhan Mantri Jan Dhan Yojana (PMJDY), Aadhaar-enabled payment systems, and direct benefit transfer programs (Government of India, 2015). Consumer access to and use of digital financial services has expanded due to the quick uptake of smartphones and internet connectivity.

Despite the expansion of digital banking, a number of factors, including perceived utility, simplicity of use, trust, security concerns, internet accessibility, financial literacy, income level, and technological awareness, influence

the adoption of e-banking channels. Customers are more inclined to employ technology services if they believe they are practical and simple to use, according to Davis (1989). In a similar vein, Rogers (2003) clarified that variables including compatibility, complexity, and relative advantage influence the adoption of innovations.

Due to a lack of technological expertise, insufficient digital infrastructure, and fear of cyber crime, many customers are still hesitant to use e-banking services, particularly in rural and semi-urban areas. However, because e-banking is convenient, time-saving, and easily accessible, younger and educated consumers are more likely to use it (Kesharwani & Bisht, 2012). Therefore, enhancing financial inclusion and creating efficient banking regulations require an understanding of the variables influencing the adoption of e-banking channels.

The goal of the current study is to investigate the key variables affecting the uptake of e-banking channels for financial inclusion. The study focuses on customer awareness, views, technological variables, and obstacles linked with digital banking adoption. The study's conclusions could aid banks, legislators, and other financial organisations in developing plans to boost e-banking service uptake and bolster financial inclusion programs.

Review of Literature

Due to its increasing significance in advancing financial inclusion, the use of e-banking channels has garnered significant attention from scholars in recent years. Between 2020 and 2026, a number of studies looked at customer behaviour, technology acceptance, impediments to e-banking adoption, and factors influencing the use of digital banking services.

Kaur et al. (2020) used the extended Technology Acceptance Model (TAM) to investigate the factors impacting the adoption of payment banks in India. According to the study, consumers' intentions to utilise digital banking services are greatly influenced by perceived utility, social influence, trust, and enabling circumstances. The researchers also emphasised how customers' behavioural intentions about the adoption of e-banking are influenced by demographic factors including age, income, and self-efficacy.

Mer and Virdi (2021) used the Unified Theory of Acceptance and Use of Technology (UTAUT) paradigm to examine millennials' intentions to adopt e-banking services in India. The study found that the intention to use digital banking services is positively impacted by trust, effort expectancy, performance expectancy, and social influence. The researchers stressed that two of the most significant factors influencing the uptake of e-banking are security and trust.

The Reserve Bank of India (2021) study states that government efforts like PMJDY and Digital India, as well as rising smartphone penetration, contributed to the rapid expansion of digital payment systems and e-banking channels. However, the study found that digital illiteracy, cyber security issues, and poor digital infrastructure are the main obstacles preventing the uptake of e-banking services, particularly in rural and semi-urban areas.

Shaista Alvi et al. (2022) investigated the adoption of digital banking among Indian digital natives using the UTAUT model. The results showed that gender, geographic location, performance expectations, and enabling factors all had a major impact on the adoption behaviour of digital banking. The survey also found that due of improved technology infrastructure and awareness, urban customers are more inclined to use digital banking channels.

Jabir Ali (2023) examined the factors influencing the adoption of digital banking in India using data from the Global Findex Survey. The study discovered that the adoption of e-banking channels is highly influenced by factors such as age, occupation, income, education level, and internet connectivity. The study highlighted the importance of socioeconomic factors and digital literacy in enhancing financial inclusion through digital banking services.

Rabindra Jena (2023) investigated the factors influencing older citizens' acceptance of e-banking services in poat-COVID India. The study found that older consumers' adoption of e-banking is positively impacted by trust, social influence, effort expectancy, and enabling circumstances. However, the main obstacles preventing senior individuals from using digital banking were found to be fear of fraud, limited digital literacy, and technological complexity.

A number of research on the adoption of digital banking between 2020 and 2024 were evaluated by Divyajyoti Das et al. (2024). The researchers came to the conclusion that customers' desire to use digital banking services is greatly influenced by perceived ease of use, trust, security concerns, social impact, and demographic characteristics. The study also emphasised the increasing significance of sociocultural and psychological elements in influencing digital banking activity.

Rabindra Kumar Jena (2025) looked into what influences rural India's embrace of FinTech for financial inclusion. The results showed that the adoption of digital financial services among rural communities is highly influenced by digital literacy, internet accessibility, government backing, financial awareness, and trust. FinTech and digital banking services can significantly improve financial inclusion in disadvantaged areas, according to the study's findings.

Similarly, Lee et al. (2025) used the Technology Acceptance Model to study the uptake of online banking in post-pandemic India. The study discovered that consumers' intentions to utilise online banking services are highly influenced by accessibility, dependability, and perceived simplicity of use. The study also showed that consumers' digital banking conduct is positively impacted by banks' perceived social and environmental responsibilities.

Asim et al. (2026) examined South Asian women's financial inclusion and gendered adoption of digital financing. According to the study's findings, women's access to formal financial services is greatly enhanced by mobile money services, education, smartphone ownership, and digital literacy. However, women's adoption of digital finance is still hampered by sociocultural hurdles and ignorance.

Research Gap

Numerous academics have examined the uptake of e-banking and digital financial services from various angles, according to the literature study. The majority of research concentrated on technology aspects such perceived utility, trust, usability, security, and digital literacy. Numerous studies also looked at how socioeconomic and demographic factors affected the uptake of e-banking. However, little study has been done on how behavioural, technological, and demographic factors work together to influence the adoption of various e-banking channels for financial inclusion, especially in India's rural and semi-urban areas. Studies that have already been conducted have mostly concentrated on online and mobile banking separately, but integrated e-banking channels like UPI, digital wallets, ATMs, and digital payment systems have received less attention.Additionally, there is still a dearth of research on low-income groups, women, and older consumers in the context of financial inclusion through e-banking. Thus, by analysing the key elements influencing the adoption of e-banking channels for financial inclusion among various customer categories, the current study aims to close these gaps.

Objectives of the Study

The major objective of this study is to identify the factors affecting the adoption of e-banking channels for financial inclusion among consumers.

Database and Research Methodology

To determine the parameters impacting the use of e-banking channels for financial inclusion, a methodical and standardised research approach was used. Two sections of a well-structured, pretested questionnaire were used to gather primary data. While the second section concentrated on elements associated with e-banking adoption, such as accessibility, trust, security, perceived usefulness, ease of use, digital literacy, and adoption behaviour, the first section contained demographic information such as age, gender, education, occupation, income, and place of residence. A five-point Likert scale was used to gauge responses.

Expert comments from academicians, financial counsellors, and banking specialists guaranteed content validity. Weak and ambiguous statements were eliminated by item analysis. To determine the primary factors influencing the adoption of e-banking, the collected data were examined using factor analysis, Chi-square test, mean analysis, correlation analysis, and percentage analysis.

Universe of the Study

In addition, Table 1 shows the sampled population's demographic characteristics. The table shows that 50% of responders were men and 50% were women, demonstrating a fair gender representation. Additionally, the majority of respondents are in the age range of 31–40 years old (27.83%), followed by 21–30 years old (25.66%) and 41–50 years old (21.83%). This indicates that the sample population is mostly concentrated in the economically active age groups. Respondents over 50 make up the next group (14.16%), and those under 20 make up just 10.50% of the sample.

Table 1: Demographic Profile of Respondents

		Frequency	Per cent	Cumulative Percent
Gender	Male	300	50	50.00
	Female	300	50	100.00
	Total	600	100	
	Less than 20	63	10.5	10.50
	21-30	154	25.6	36.17

Age (Yrs)			6	
	31-40	167	27.83	64.00
	41-50	131	21.83	85.83
	Above 50	85	14.16	100.00
	Total	600	100	
Marital Status	Single	247	41.17	41.17
	Married	344	57.33	98.50
	Divorcee/separated	09	1.5	100.00
	Total	600	100	
Residence	Urban	300	50	50
	Rural	300	50	100.00
	Total	600	100	
Family Size	1-3 members	167	27.83	27.83
	4-6 members	196	32.67	60.50
	Above 6 members	237	39.5	100.00
	Total	600	100	

Source: Compiled through survey

The majority of respondents (57.33%) are married, while 41.17% are single. This suggests that a significant percentage of respondents have financial obligations. The study's comparative nature is strengthened by the sample's equal distribution across urban (50%) and rural (50%) locations of residence. Furthermore, the bulk of responders come from larger households.

Development, Refinement and Validity of the Scale

A five-point Likert scale was used to measure items pertaining to accessibility, trust, security, usefulness, simplicity of use, digital literacy, and adoption behaviour. A thorough analysis of the literature and discussions with academics, banking professionals, experts in digital finance, and e-banking users served as the foundation for the creation of the items. To increase the scale's reliability and clarity, a pilot survey and item analysis were carried out. To lessen response bias, certain statements with negative wording were added.

Reliability Analysis for E-Banking Channels and Financial Inclusion Indicators

As indicated in Table 2, Cronbach's Alpha rose from 0.677 to 0.955 following the removal of these items, showing an adequate degree of reliability (Sekaran, 2000). The underlying features of e-banking channels and financial inclusion metrics were then determined using factor analysis using the refined scale.

Table 2: Reliability Analysis

Reliability Statistics	
Cronbach's Alpha	**N of Items**
0.955	33

Source: Calculated through SPSS

Before performing Exploratory Factor Analysis (EFA), it is essential to make sure that there is enough variance across the variables, according to Joseph F. Hair Jr. et al. (1998). The correlation between variables and the suitability of the sample for factor analysis were thus assessed using the Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy.

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**0.900**
Bartlett's Test of Sphericity	Approx. Chi-Square	19795.788
	df	528
	Sig.	0.000

Source: Calculate through SPSS

A KMO value more than 0.5 is deemed appropriate for factor analysis, according to Henry F. Kaiser (1974). Table 3 displays the results of KMO and Bartlett's Test of Sphericity. The findings show that the data is adequate and suited for factor analysis in the investigation of financial inclusion indicators and e-banking channels**Principal Component Analysis**

Additionally, the 33 items were reduced to a fixed number of components using Principal Component Analysis of factor analysis, and the factors in the current study were rotated using the Varimax Rotation method.

Furthermore, Naresh K. Malhotra (2006) suggested that for a factor solution to be deemed acceptable, the extracted factors should account for at least 50% of the overall variance. As seen in Table 4, the retrieved components in the current study explained 69.330 percent of the total variation in the data, suggesting excellent explanatory power.**Table 4: Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.564	41.104	41.104	13.564	41.104	41.104	4.398	13.326	13.326
2	2.392	7.249	48.352	2.392	7.249	48.352	3.924	11.891	25.218
3	2.321	7.032	55.385	2.321	7.032	55.385	3.733	11.313	36.531
4	2.205	6.682	62.067	2.205	6.682	62.067	3.696	11.201	47.732
5	1.422	4.308	66.375	1.422	4.308	66.375	3.281	9.942	57.674
6	1.384	4.193	70.568	1.384	4.193	70.568	2.869	8.693	66.367
7	1.106	3.353	73.921	1.106	3.353	73.921	2.493	7.554	73.921
Extraction Method: Principal Component Analysis.									

The summarized results of factor analysis have been shown in Table 5.

Table 5: Summary of Factors Affecting the Adoption of E-Banking Channels for Financial Inclusion

Sr. No.	Factor Name	Variable Number	Loading	Statements Included in the Factor	Eigen Value	Cronbach Alpha	(Variance Explained %)
F_1	**E-Banking Usage (EBU)**	X06	0.812	I frequently use mobile banking applications.	13.564		
		X07	0.798	I use internet banking for financial transactions.			
		X18	0.786	I regularly use UPI or digital payment platforms.			
		X13	0.774	I prefer e-banking over traditional banking methods.			
		X24	0.74	I use			

Sr. No.	Factor Name	Variable Number	Loading	Statements Included in the Factor	Eigen Value	Cronbach Alpha	(Variance Explained %)
			0	ATM, debit, or credit cards for transactions.			
F_2	**Accessibility (ACC)**	X19	0.801	E-banking services are easily accessible to me.			
		X09	0.800	I can access banking services anytime and anywhere.			
		X33	0.79	Digital banking services are available in my locality.			
		X02	0.762	E-banking has reduced my need to visit bank branches.			
		X17	0.754	E-banking has reduced geographical barriers in			

Sr. No.	Factor Name	Variable Number	Loading	Statements Included in the Factor	Eigen Value	Cronbach Alpha	(Variance Explained %)
				accessing banking services.			
F3	**Affordability (AFF)**	X20	0.773	E-banking reduces my transaction costs			
		X28	0.769	Digital banking services are economical for me.			
		X08	0.725	I save money by using e-bankin			
				g services.			
		X16	0.725	Charges for e-banking services are reasonable			
		X29	0.624	E-banking helps me in regular saving.			
F4	**Convenience & Efficiency (CON)**	X03	0.831	E-banking services are easy to use.			11.201
		X32	0.824	Transactions through			

Sr. No.	Factor Name	Variable Number	Loading	Statements Included in the Factor	Eigen Value	Cronbach Alpha	(Variance Explained %)
				e-banking are completed quickly.			
		X27	0.713	Digital banking platforms are user-friendly.			
		X26	0.711	E-banking saves my time.			
		X12	0.595	I can perform multiple banking activities easily using e-banking.			
		X31	0.571	E-banking has improved my financial management.			
F5	**Financial Inclusion Outcomes (FIO)**	X01	0.866	E-banking has increased my access to financial services.			9.942
		X30	0.861	I can easily send			

Sr. No.	Factor Name	Variable Number	Loading	Statements Included in the Factor	Eigen Value	Cronbach Alpha	(Variance Explained %)
				and receive money using e-banking.			
		X25	0.849	E-banking has enhanced my financial independence.			
		X11	0.728	My participation in formal financial systems has increased due to e-banking.			
F6	**Trust & Security (TRS)**	X04	0.786	I feel secure while using e-banking services.			
		X10	0.722	I trust digital payment systems.			
		X21	0.708	Banks provide adequate security for online transactions.			

Sr. No.	Factor Name	Variable Number	Loading	Statements Included in the Factor	Eigen Value	Cronbach Alpha	(Variance Explained %)
		X23	0.660	I am confident about the safety of my financial information.			
F7	**Barriers (BAR) – Reverse Statements**	X05	0.701	I find e-banking difficult to understand.			
		X22	0.635	Poor internet connectivity limits my use of e-banking.			
				g.			
		X14	0.571	Fear of fraud discourages me from using e-banking.			
		X15	0.510	Lack of digital literacy affects my use of e-banking.			

Source: Compiled from the results of SPSS

Naming of Factors

Factor 1: E-Banking Usage (EBU)

The findings of a factor analysis about what drives consumers to adopt e-banking services are shown in Table 5. With an Eigen value of 13.564 and a Cronbach Alpha value of 0.930, the first dimension, "E-Banking Usage (EBU)," appeared as the most significant factor explaining 13.326% variation in the data, demonstrating the construct's excellent dependability. This factor comprises five items: "I regularly use UPI or digital payment platforms (0.786)," "I use internet banking for

financial transactions (0.798)," and "I frequently use mobile banking applications (0.812)." "I use ATMs, debit cards, or credit cards for transactions (0.740)" and "I prefer e-banking over traditional banking methods (0.774)". The objects' factor loading varied from 0.740 to 0.812, "I frequently use UPI or digital payment platforms (0.786)," "I use internet banking for financial transactions (0.798)," "I use ATMs, debit cards, or credit cards for transactions (0.740)" and "I prefer e-banking over traditional banking methods (0.774"). The objects' factor loading varied from 0.740 to 0.812. Customers are strongly inclined to adopt and use digital banking platforms on a regular basis, according to the data. Customers' increased acceptance of technology-driven financial services is demonstrated by the rise in the use of digital payment methods, internet banking, and mobile banking.

Factor 2: Accessibility (ACC)

With an Eigen value of 2.392 and a Cronbach Alpha value of 0.909, the second dimension, "Accessibility (ACC)," accounted for 11.891 per cent of the variation in the data. "E-banking services are easily accessible to me (0.801)," "I can access banking services anytime and anywhere (0.800)," "Digital banking services are available in my locality (0.797)," "E-banking has reduced my need to visit bank branches (0.762)," and "E-banking has reduced geographical barriers in accessing banking services (0.754)" are the five items that make up this factor. The factor loading ranged from 0.754 to 0.801. The findings show that consumers are encouraged to use e-banking services since they are easily accessible and available, regardless of time or location. It also shows how access to financial services has been less hampered by physical and regional constraints thanks to digital banking.

Factor 3: Affordability (AFF)

With an Eigen value of 2.321 and a Cronbach Alpha value of 0.904, the third component, "Affordability (AFF)," explained 11.313% of the variation in the data. Five items make up this factor: "E-banking lowers my transaction costs (0.773)," "Digital banking services are affordable for me (0.769)," "I save money by using e-banking services (0.725)," "Charges for e-banking services are reasonable (0.725)," and "E-banking helps me in regular saving (0.624)." The range of the factor loading was 0.624 to 0.773. This dimension shows that clients are highly motivated to adopt e-banking services by lower transaction costs, affordable banking services, and savings-related advantages. The results imply that the adoption of electronic banking platforms is significantly influenced by affordability.

Factor 4: Convenience & Efficiency (CON)

With an Eigen value of 2.205 and a Cronbach Alpha value of 0.890, the fourth dimension, "Convenience & Efficiency (CON)," accounted for 11.201% of the variation in the data. It consists of four items namely 'E-banking services are easy to use (0.831)', 'Transactions through e-banking are completed quickly (0.824)', 'Digital banking platforms are user-friendly (0.713)' and 'E-banking saves my time (0.711)'. The range of the factor loading was 0.711 to 0.831. The results indicate that the adoption of e-banking services is mostly driven by convenience, usability, and speedy transaction processing. Customers prefer digital banking because it saves time and provides efficient banking operations.

Factor 5: Financial Inclusion Outcomes (FIO)

With an Eigen value of 1.422 and a Cronbach Alpha value of 0.896, the fifth dimension, "Financial Inclusion Outcomes (FIO)," accounted for 9.942% of the variation in the data. "E-banking has improved my financial management (0.866)," "E-banking has increased my access to financial services (0.861)," "I can easily send and receive money using e-banking (0.849)," and "E-banking has enhanced my financial independence (0.728)" are the four items that make up this factor. The range of the factor loading was 0.728 to 0.866. According to the results, e-banking greatly advances financial inclusion by facilitating simple financial transactions, increasing financial independence, and expanding access to financial services. Customers' financial management techniques have also improved as a result of using e-banking services.

Factor 6: Trust & Security (TRS)

With an Eigen value of 1.384 and a Cronbach Alpha value of 0.871, the sixth factor, "Trust & Security (TRS)," accounted for 8.693% of the variation in the data. "I feel secure while using e-banking services (0.786)" is one of its four items. "I am confident about the safety of my financial information (0.660)," "I trust digital payment systems (0.722)," and "Banks provide adequate security for online transactions (0.708)." The range of the factor loading was 0.660 to 0.786. The findings show that key factors influencing consumers' adoption of e-banking services include trust, security, and confidence in financial transactions. When consumers believe that digital banking is safe and dependable, they are more likely to use it.

Factor 7: Barriers & Reverse Statements (BAR)

With an Eigen value of 1.106 and a Cronbach Alpha value of 0.858, the seventh dimension, "Barriers & Reverse Statements (BAR)," accounted for 7.554% of the variation in the data. Four elements make up this factor: "I find e-banking difficult to understand (0.701)," "My use of e-banking is limited by poor internet connectivity (0.635)," "I don't use e-banking because I'm afraid of fraud" (0.571) and "My use of e-banking is impacted by my lack of digital literacy (0.510)." The range of the factor loading was 0.510 to 0.701. The results show that even if consumers acknowledge the value of e-banking services, adoption of these services is still influenced by a number of obstacles, including technological challenges, inadequate internet access, fear of fraud, and a lack of digital competence.

Confirmatory Factor Analysis for e-banking

The factors and their loadings were verified using CFA. To verify the factors and their loadings, CFA using AMOS 18.0 was performed. Figure 1 displays the measurement model.

Model Fit

One measure of a model's quality is model fit. Additionally, it displays the suitability of the data for CFA. Table 6's AMOS report displays a $\chi 2$ of 1,471.503 with 561 df. The model fits the data well, as indicated by the CMIN/DF ratio of 2.623, which is within the suggested range of less than 5 (Carmines and McIver, 1981). The AGFI is 0.927 and the GFI is 0.953. The RMSEA of 0.057 is within the 0.06 limit value (Hu and Bentler, 1999). The CFI is 0.931 and the TLI is 0.901. Bollen's IFI is 0.922 and the Bentler-Bonett NFI is 0.962.

Table 6 displays the fit index values, which either surpass the suggested threshold of 0.90 or an acceptable value of more than 0.80, indicating the model's fitness.

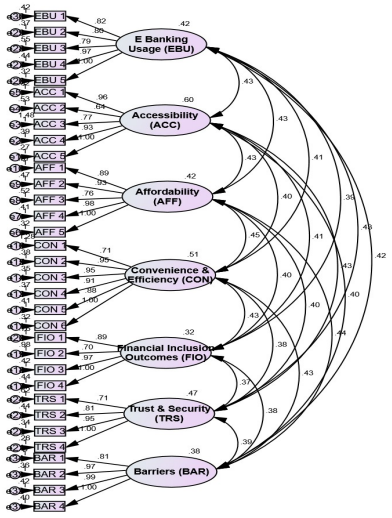
Table 6: Model Fit Indices of the Measurement Model

Index of Fit	Chi-Square(df)	CMIN/DF	GFI	AGFI	NFI	IFI	TLI	CFI	RMSEA
Val ue	1,471.503	2.623	0.9 53	0.9 27	0.9 62	0.9 22	0.9 11	0.9 31	0.06 2

Source: Calculated through AMOS

Composite Reliability and Average Variance Extracted (AVE)

"Composite reliability is a measure of the internal consistency of the construct indicators, which depicts the degree to which the items indicate the common unobserved construct," according to Hair et al. (1998). It is shown below in Table 7



. **Table 7: Parameter Estimates, Average Variance Extracted and Composite Reliability**

Latent Variables	Item Label	Standardized Factor Loading	CR	AVE
E-Banking Usage (EBU)	**EBU1**	0.859	0.938	0.837
	EBU2	0.864		
	EBU3	0.691		
	EBU4	0.884		
	EBU5	0.869		
Accessibility (ACC)	**ACC 1**	0.842	0.815	0.858
	ACC 2	0.836		
	ACC 3	0.752		
	ACC 4	0.834		
	ACC 5	0.634		
Affordabilit	**AFF1**	0.762	0.85	0.81

Latent Variables	Item Label	Standardized Factor Loading	CR	AVE
y (AFF)	AFF2	0.789	8	5
	AFF3	0.881		
	AFF4	0.735		
	AFF5	0.784		
Convenience & Efficiency (CON)	CON 1	0.895		
	CON 2	0.795		
	CON 3	0.685		
	CON 4	0.795		
	CON 5	0.784		
	CON 6	0.759	0.898	0.781
Financial Inclusion Outcomes (FIO)	FIO1	0.925		
	FIO2	0.938		
	FIO3	0.725		
	FIO4	0.758	0.986	0.879
Trust & Security (TRS)	TRS1	0.865		
	TRS2	0.880		
	TRS3	0.781	0.868	0.788
	TRS4	0.843		
Barriers (BAR)	BAR 1	0.689		
	BAR 2	0.942		
	BAR 3	0.915		
	BAR 4	0.859	0.884	0.821

Source: Calculated through AMOS

The composite reliability for different structures is displayed in Table 7. Composite consistency was more than 0.70 for every build. "AVE measures the amount of variance that is captured by the construct in relation to the amount of variance due to measurement error," according to Fornell and Larcker (1981). For constructs to be deemed credible, AVE values greater than 0.50 are deemed sufficient (Bagozzi & Yi, 1988 ; Hair et al., 1998). Additional proof of item reliability may be found in Table 4.8, where AVE values for all dimensions are close to or higher than 0.50.

Scale Validation

The validity of the instrument must be evaluated after the scale's internal consistency and structure have been verified.

- **Convergent Validity**

"A measure is said to possess convergent validity if independent measures of the same construct converge, or are highly correlated," according to Netemeyer et al. (2003). Furthermore, "convergent validity can be evaluated from the measurement model by determining whether or not each indicator's estimated pattern coefficient on its posited underlying factor is significant" (Anderson and Gerbing, 1988). The convergent validity is supported by Table 8, which shows that the standardised factor loading for every item is greater than 0.5 (Hair et al., 1998). Fornell and Larcker (1991) state that "when the average variance extracted is above 0.50, convergent validity of the construct is also demonstrated."

- **Discriminant Validity**

According to Brown et al. (1993), "the degree to which measures of theoretically unrelated constructs do not correlate highly with one another" is known as discriminant validity. By comparing the average variances derived with the squared correlation between two constructs, the discriminant validity of the measure in this study was proven.

Table 8: Discriminant Validity Analysis

	CR	AVE	EBU	ACC	AFF	CON	FIO	TRS	BAR
EBU	0.9388	0.8377	0.8655						
ACC	0.8155	0.8588	0.0116	0.8155					
AFF	0.8588	0.8155	0.0444	0.0344	0.8122				
CON	0.8998	0.7811	-0.0112	0.0117	0.0114	0.7844			
FIO	0.9866	0.8779	-0.0021	-0.0064	0.0043	-0.1155	0.9211		
TR	0.	0.	-	0.	-	-	-	0.	

S	868	788	0.021	054	0.021	0.011	0.046	887	
BAR	0.8844	0.8211	-0.032	0.043	-0.081	0.054	-0.034	0.062	0.868

E- Banking Usage (EBU), Accessibility (ACC), Affordability (AFF), Convenience & Efficiency (CON), Financial Inclusion Outcomes (FIO), Trust & Security (TRS), Barriers (BAR)Source: Calculated through AMOS

Each construct may have greater error-free discrepancy if the squared correlation between them is smaller than either of their separate AVEs (Malhotra, 2006). Table 4 shows that every AVE is greater than the squared inter-construct correlations. These results offer more evidence for discriminant validity.

Findings of the study

According to the survey, accessibility, price, convenience, trust, security, and digital literacy all have a big impact on the use of e-banking channels. Due to their cost-effectiveness, time-saving features, and convenience of use, consumers are choosing mobile banking, internet banking, UPI, and digital payment systems more and more. The results also demonstrated that by increasing access to banking services and boosting financial independence, e-banking services favourably contribute to financial inclusion. However, obstacles like lack of digital understanding, inadequate internet connectivity, and fear of fraud continue to hinder the adoption of digital banking services, especially among older and rural users. The measuring model's validity and suitability for elucidating the elements influencing e-banking adoption and financial inclusion were validated by the reliability and factor analysis results.

Conclusion

According to the findings of the study, e-banking channels are now a crucial instrument for advancing financial inclusion and expanding access to official financial services. The traditional banking system is now a more practical, accessible, and effective financial platform thanks to technological developments, digital payment methods, mobile banking apps, and online banking services.

The results show that consumers' adoption of e-banking services is greatly influenced by elements including accessibility, price, convenience, trust, security, and digital literacy. By increasing access to banking facilities, boosting financial independence, and lowering geographic obstacles, e-banking services also positively contribute to financial inclusion, according to the study.

The study does, however, also point out that there are still a number of obstacles preventing e-banking channels from being widely used. The adoption of digital banking services is nevertheless hampered by a lack of digital awareness, fear of cyber fraud, inadequate internet infrastructure, and technological challenges, particularly among older and rural people.

Overall, the study indicates that e-banking channel use may be greatly increased and the goal of inclusive financial development supported by bolstering digital infrastructure, raising financial literacy, and increasing security measures.

Recommendations

On the basis of findings, it is recommended that banks, financial institutions, and the government promote e-banking use through awareness campaigns, digital literacy programmes, and specific training for customers who are older, less tech-savvy, or reside in rural regions. Improving cybersecurity, digital infrastructure, and internet connectivity are essential for increasing accessibility, reducing concerns about fraud, and building consumer trust. The paper also suggests developing user-friendly digital banking platforms, reducing transaction costs, strengthening customer support and grievance redressal services, and promoting the benefits of digital banking through advertising. Additionally, the availability, efficacy, and use of e-banking services can be significantly increased by collaboration between banks, telecom companies, and FinTech companies as well as by supporting government legislation, thereby strengthening financial inclusion.

Scope for Future Research

The study offers insightful information about the factors driving the use of e-banking channels for financial inclusion. Additional research might evaluate the uptake of e-banking among rural and urban consumers, look at how FinTech, blockchain, and artificial intelligence are used in digital banking, and assess customer happiness and service quality on various e-banking platforms. Future studies can also examine how adoption trends vary by demographic, how consumer behaviour evolves over time, and how government digital

initiatives affect financial inclusion. Furthermore, research on fraud prevention, cybersecurity, and comparative international analysis of e-banking usage might offer a better understanding of digital financial inclusion in various economies.

References

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411–423.

Asim, M., Khan, S., & Rehman, A. (2026). Gendered digital financing adoption and women's financial inclusion in South Asia. *International Journal of Financial Studies, 14*(1), 45–61.

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science, 16*(1), 74–94.

Brown, T. J., Churchill, G. A., & Peter, J. P. (1993). Research methods in marketing. *Dryden Press*.

Carmines, E. G., & McIver, J. P. (1981). Analyzing models with unobserved variables: Analysis of covariance structures. In G. W. Bohrnstedt & E. F. Borgatta (Eds.), *Social Measurement: Current Issues* (pp. 65–115). Beverly Hills, CA: Sage Publications.

Churchill, G. A. Jr. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research, 16*(1), 64–73.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340.

Divyajyoti Das, P., Sharma, K., & Gupta, R. (2024). Factors affecting digital banking adoption: A review of recent literature. *Journal of Internet and Digital Economy, 6*(2), 85–101.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39–50.

Government of India. (2015). *Digital India Programme*. New Delhi: Ministry of Electronics and Information Technology.

Hair, J. F. Jr., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate Data Analysis* (5th ed.). New Jersey: Prentice Hall.

Henry F. Kaiser Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika, 39*(1), 31–36. https://doi.org/10.1007/BF02291575

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55.

Jabir Ali. (2023). Determinants of digital banking adoption in India: Evidence from Global Findex Survey. *Journal of Digital Banking, 57*(2), 341–358.

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika, 39*(1), 31–36.

Kaur, H., Singh, R., & Kaur, P. (2020). Factors influencing adoption of payment banks in India: An extended TAM approach. *Vision: The Journal of Business Perspective, 24*(4), 421–432.

Kesharwani, A., & Bisht, S. S. (2012). The impact of trust and perceived risk on internet banking adoption in India. *International Journal of Bank Marketing, 30*(4), 303–322.

Kesharwani, A., & Bisht, S. S. (2012). The impact of trust and perceived risk on internet banking adoption in India: An extension of technology acceptance model. *International Journal of Bank Marketing, 30*(4), 303–322.

Ko, Y. J., & Pastore, D. L. (2005). A hierarchical model of service quality for the recreational sport industry. *Sport Marketing Quarterly, 14*(2), 84–97.

Lee, J., Park, S., & Kim, H. (2025). Online banking adoption in post-pandemic India: An application of the Technology Acceptance Model. *Digital Economy and Sustainable Banking Journal, 5*(4), 112–128.

Malhotra, N. K. (2006). *Marketing Research: An Applied Orientation* (5th ed.). New Delhi: Pearson Education. Netemeyer, R. G., Bearden, W. O., & Sharma, S. (2003). *Scaling Procedures: Issues and Applications*. Thousand Oaks, CA: Sage Publications.

Mer, A., & Virdi, J. (2021). Millennials' adoption intention toward e-banking services in India: An extension of UTAUT model. *Journal of Banking and Financial Technology, 5*(3), 201–216.

Naresh K. Malhotra Malhotra, N. K. (2006). *Marketing research: An applied orientation* (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Rabindra Jena, R. K. (2023). Factors affecting senior citizens' adoption of e-banking services in post-COVID India. *Journal of Risk and Financial Management, 16*(9), 380–395.

Rabindra Kumar Jena, R. K. (2025). FinTech adoption and financial inclusion in rural India. *International Journal of Financial Studies, 18*(3), 150–168.

Reserve Bank of India. (2021). *Report on Trends and Progress of Banking in India 2020–21*. Mumbai: RBI.

Reserve Bank of India. (2021). *Report on trends and progress of banking in India 2020–21*. Mumbai: RBI.

Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). New York: Free Press.

Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). New York: Free Press.

Sekaran, U. (2000). *Research Methods for Business: A Skill Building Approach* (3rd ed.). New York: John Wiley & Sons.

Shaista Alvi, S., Ahmad, N., & Khan, F. (2022). Digital banking adoption among Indian digital natives: An empirical analysis using UTAUT framework. *International Journal of Bank Marketing, 40*(6), 1120–1138.

Uma Sekaran Sekaran, U. (2000). *Research methods for business: A skill-building approach* (3rd ed.). New York, NY: John Wiley & Sons.

World Bank. (2020). *Financial Inclusion Overview*. Washington, DC: World Bank.

World Bank. (2020). *Financial inclusion overview*. Washington, DC: World Bank.