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"A Comprehensive Study of use of E-Banking facilities in Rural India"

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ABSTRACT

In recent times, the rise of electronic banking has emerged as a promising avenue for enhancing financial inclusion, particularly in rural areas lacking traditional banking infrastructure. The country's economic trajectory hinges on the growth and effectiveness of the banking sector, with innovative solutions like mobile banking and digital payments playing a crucial role in boosting financial inclusion and economic development. Consequently, countries like India are prioritizing the automation of their banking industry.

This study examines the impact of electronic banking facilities in rural areas, focusing on aspects such as accessibility, adoption, challenges, trust, and satisfaction levels. It also delves into how age and trust influence adoption behaviors, using factor analysis to explore their relationship and implications for digital financial service uptake in rural communities. The research sheds light on how generational disparities and levels of trust affect the diffusion of e-banking innovations in rural settings, aiming to provide deeper insights into the diverse nature of e-banking adoption behaviors and the underlying mechanisms driving them.

Keywords – rural, e-banking, India, impact

INTRODUCTION

BANKING

Banks hold a significant role in the economy by providing essential financial services to both individuals and businesses. They offer secure storage for cash and various account options such as checking, savings, and certificates of deposit, facilitating everyday banking transactions like deposits, withdrawals, and bill payments. Additionally, individuals can earn interest on their deposits while banks utilize deposited funds to extend credit in the form of loans for various purposes such as purchasing homes, cars, or funding businesses. This lending activity helps inject liquidity into the market, thereby stimulating economic activity. Like any business entity, banks aim to generate profits, typically through charging higher interest rates on loans compared to the interest rates offered on savings accounts. Overall, banking encompasses managing financial transactions, providing secure storage for funds, and offering lending and credit services to support economic activities.

ELECTRONIC BANKING

Traditional banks offer a wide array of services to their clientele, including lending and deposit-taking activities conducted through physical branches. Electronic banking, on the other hand, revolutionizes the provision of financial services by enabling customers to access standard banking services online. This includes tasks such as opening accounts, transferring funds, and paying bills electronically. Electronic banking can be implemented in two main ways: established banks can supplement their brick-and-mortar presence with online platforms, or entirely virtual banks can provide services solely through electronic channels. Originating in Finland, electronic banking gained prominence globally, with pioneers like ICICI Bank introducing it in India as early as 1997 under the name Infinity. Also known as online banking, cyber banking, or virtual banking, electronic banking encompasses a range of activities accessible from anywhere, including RTGS, NEFT, ECS, credit and debit card services, check truncation, ATMs, telephone banking, internet banking, and mobile banking. In essence, electronic banking facilitates secure financial transactions through various delivery platforms like personal computers, mobile phones, telephones, and digital televisions, providing customers with flexibility and convenience.

LITERATURE REVIEW

[1] Liebana-Cabanillas, Muñoz-Leiva, and Rejón-Guardia (2012) conducted a study focusing on the factors that contribute to customer satisfaction with e-banking. Using secondary data from a financial institution's survey, they found that consumers generally prefer online banking and are satisfied with electronic banking services. **[2]** Monisha, Bhudhiraja, and Kaur (2017) examined the state of e-banking in India, highlighting the need for innovation and identifying challenges such as security risks and low computer literacy that hinder e-banking's progress. Their study, based on secondary data from RBI bulletins and reports, indicated that despite its growing popularity, these challenges persist. **[3]** Wadhe (2015) analysed the impact of e-banking on the profitability of commercial banks in India, finding significant growth and increased profits among banks that implemented electronic banking systems. The study categorized 31 banks and used secondary data, concluding that e-banking adoption leads to financial benefits. **[4]** Dixit and Datta (2010) explored the acceptance of electronic banking among adults over 35, revealing a positive trend towards acceptance. Their primary survey indicated increasing interest in online banking, though it was limited by factors such as education and computer literacy. **[5]** Agarwal, Rastogi, and Mehrotra (2009) investigated customers' perspectives on e-banking in Northern India, finding that trust and security are crucial factors influencing usage. Based on primary data collected via questionnaires, their study focused on customer satisfaction and perceptions of electronic banking. **[6]** Sandhu and Arora (2020) studied the usage behaviour of e-banking services, identifying preferences for debit/credit cards and ATMs among respondents from Luciana, Jalandhar, and Amritsar. The primary data collection revealed that a lack of awareness hindered the use of other e-banking services. **[7]** Bamoriya (2011) examined the issues and challenges of mobile banking in urban India, finding that while opinions were generally positive, security concerns remained prevalent. The study used primary data from questionnaires to assess urban dwellers' perspectives. **[8]** Rajasekhar, Anit, and Madhavi (2015) analysed the impact of service quality of SBI's e-banking on rural customers, emphasizing the importance of convenience and accessibility. Using the e-SERQUAL model, their research suggested that tailored educational initiatives and user-friendly designs could enhance trust and adoption in rural areas. **[9]** Sharma (2012) assessed rural customers' satisfaction with e-banking, noting low comfort levels among non-graduates and recommending the

promotion of regional languages to increase adoption. The study used primary data to advocate for regional language support in e-banking transactions. **[10]** Bapat (2010) investigated the effectiveness of banking services in rural India, highlighting factors such as education, occupation, and income that influence banking effectiveness. The study concluded with a satisfaction index and recommended tailored approaches to achieve financial inclusion and upliftment in rural areas.

NEED OF STUDY

The majority of existing research has primarily examined the utilization and effects of electronic banking (e-banking) in urban settings and the technological advancements in India's banking sector. This study, however, seeks to investigate the adoption and consequences of e-banking specifically within rural communities.

OBJECTIVE

1. Investigate the utilization of electronic banking (e-banking) services among rural populations.

2. Assess the level of trust rural individuals have in e-banking.

3. Understand the attitudes and perceptions of rural communities towards e-banking services.

LIMITATIONS OF THE STUDY

The research relies on data obtained from a survey conducted with 120 individuals, both users and non-users of e-banking services. Nevertheless, it's crucial to acknowledge that the results may be impacted by variables such as sample size, geographic location, as well as the financial and emotional traits of the participants surveyed.

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RESEARCH AND METHODOLOGY

DATA COLLECTION

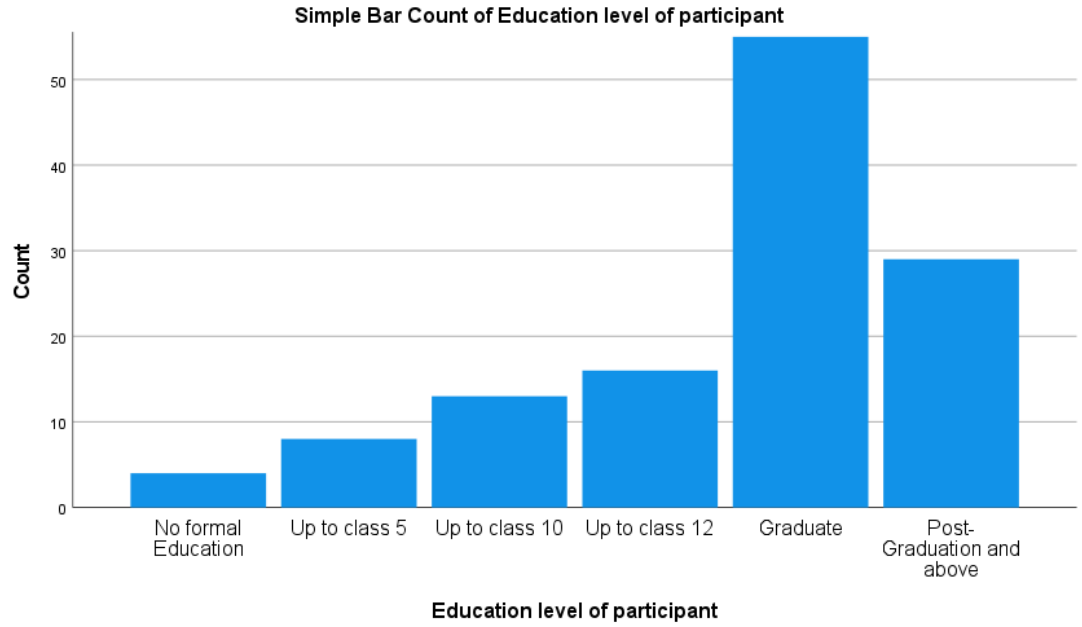
The research relies on primary data obtained through a questionnaire distributed among rural residents, including both users and non-users of e-banking, from various regions within Udupi district, such as Hebri, Brahmavar, and Kundapur. The questionnaire consists of 21 general inquiries, with variable selection informed by prior research efforts.

ANALYSIS OF DATA

The gathered data underwent analysis using IBM statistical software SPSS 27.0. Tests such as Kaiser-Meyer-Olkin and Bartlett's were performed to assess the adequacy of the sample data. In order to address multicollinearity issues, the degree of correlation was assessed. Upon identifying collinearity concerns, factor analysis was employed as a means of dimension reduction. Additionally, Linear Discriminant Analysis was utilized to gauge the level of trust in e-banking among rural individuals.

FINDINGS AND ANALYSIS

The number of participants from each stratum of education level

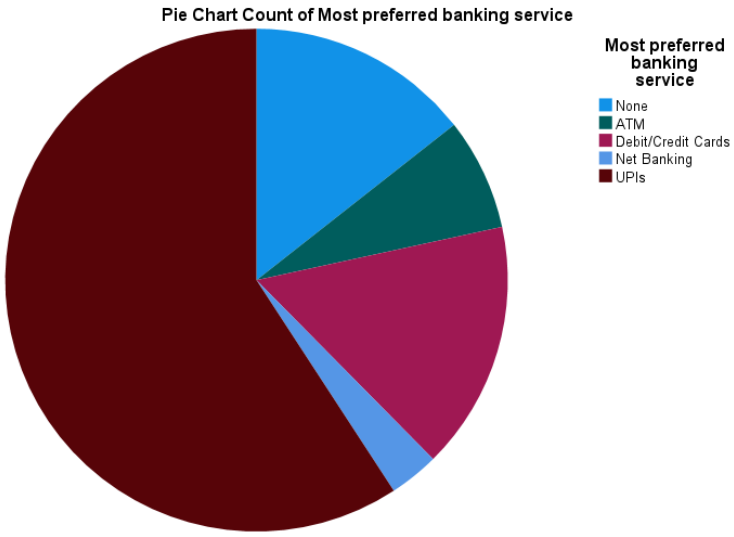


(Fig1)

Majority of the respondents are Graduate. The percentage of respondents who did not clear class 10 is below 15% (Fig-1).

Pie chart for the most preferred banking service

(Fig – 2)



The most preferred banking service is UPI. Due to the UPI revolution that swept the country in 2017 and 2018, many people switched to UPI as it was an easy method for quick and seamless transactions. UPI is also adopted widely by financial institutions and banks. This creates an atmosphere for seamless money transaction (Fig-2).

Table 1: Descriptive statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Does the participant own a smartphone?	124	0	1	.85	.362
Does the participant have a bank account?	125	0	1	.97	.177
Does the participant have good internet?	125	0	1	.70	.462
Is the participant aware of banking services	125	0	1	.62	.488
Preferred transaction mode for participant	125	1	2	1.61	.490
Does e-banking make participant's transactions easier?	124	0	1	.75	.435
Does participant think e-banking is safe and secure?	123	0	1	.72	.453

Will participant suggest others to use e-banking facilities?	125	0	1	.81	.395
Does every shopkeeper in participant's area have QR code?	124	0	1	.71	.456
Does the participant have ATM facilities in his area?	125	0	1	.78	.413
Is the participant aware of the Govt. initiatives?	125	0	1	.46	.501
Valid N (listwise)	121				

The descriptive statistics for all the questions. The questions with two options, 0: No and 1: Yes, an average greater than 0.5 indicates that the survey responses lean towards Yes.

TESTING SAMPLING ADEQUACY

Kaiser-Meyer-Olkin (KMO) test is used to identify whether sufficient correlation exist among the variables and check whether the sampling adequacy is present or not. It compares the magnitudes of the observed correlation coefficients with the partial correlation coefficients. The minimum acceptable value of KMO is 0.50. In the present study the value of KMO is found to be 0.912, The value of 0.912 indicates that the sampling adequacy is very high, suggesting that the data is highly suitable for factor analysis (Table 2).

To measure strength of relationship among variables of population correlation matrix Bartlett's test has been employed. The maximum acceptable value of the test is 0.05. In the present study the test statistic for Bartlett's Test is 1230.133 with 171 degrees of freedom, and the p-value is less than 0.001 (Sig. = .000). This indicates that the correlation matrix is significantly different from an identity matrix, providing evidence that the variables are sufficiently correlated for factor analysis (Table 2).

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.912

Bartlett's Test of Sphericity	Approx. Chi-Square	1230.133
	df	171
	Sig.	.000

Table 2: KMO and Bartlett's Test results

ANALYSIS OF MULIT-CO LINEARITY

Table 3: Corelation Matrix

Correlations

		Age of Participant	Education level of participant	Does the participant own a smartphone?	Does the participant have a bank account?	Does the participant have good internet?	Is the participant aware of banking services	Preferred transaction mode for participant	How many e-banking transactions does the participant perform in a day.	Does every shopkeeper in participant's area have QR code?	Does the participant have ATM faclities in his area?	Since how long participant uses e banking
Age of Participant	Pearson Correlation	1	-.555**	-.567**	-.235**	-.547**	-.463**	-.518**	-.495**	-.357**	-.291**	-.336**
	Sig. (2-tailed)		<.001	<.001	.008	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	125	125	124	125	125	125	125	125	124	125	125
Education level of participant	Pearson Correlation	-.555**	1	.651**	.221*	.642**	.579**	.584**	.570**	.464**	.278**	.512**
	Sig. (2-tailed)	<.001		<.001	.013	<.001	<.001	<.001	<.001	<.001	.002	<.001
	N	125	125	124	125	125	125	125	125	124	125	125
Does the participant own a smartphone?	Pearson Correlation	-.567**	.651**	1	.176	.446**	.498**	.535**	.565**	.391**	.264**	.466**
	Sig. (2-tailed)	<.001	<.001		.051	<.001	<.001	<.001	<.001	<.001	.003	<.001
	N	124	124	124	124	124	124	124	124	123	124	124
Does the participant have a bank account?	Pearson Correlation	-.235**	.221*	.176	1	.176*	.230**	.226*	.242**	.285**	.125	.122
	Sig. (2-tailed)	.008	.013	.051		.049	.010	.011	.007	.001	.163	.174
	N	125	125	124	125	125	125	125	125	124	125	125
Does the participant have good internet?	Pearson Correlation	-.547**	.642**	.446**	.176*	1	.587**	.538**	.401**	.554**	.498**	.477**
	Sig. (2-tailed)	<.001	<.001	<.001	.049		<.001	<.001	<.001	<.001	<.001	<.001
	N	125	125	124	125	125	125	125	125	124	125	125
Is the participant aware of banking services	Pearson Correlation	-.463**	.579**	.498**	.230**	.587**	1	.646**	.523**	.599**	.385**	.495**
	Sig. (2-tailed)	<.001	<.001	<.001	.010	<.001		<.001	<.001	<.001	<.001	<.001
	N	125	125	124	125	125	125	125	125	124	125	125
Preferred transaction mode for participant	Pearson Correlation	-.518**	.584**	.535**	.226*	.538**	.646**	1	.561**	.477**	.375**	.446**
	Sig. (2-tailed)	<.001	<.001	<.001	.011	<.001	<.001		<.001	<.001	<.001	<.001
	N	125	125	124	125	125	125	125	125	124	125	125
How many e-banking transactions does the participant perform in a day.	Pearson Correlation	-.495**	.570**	.565**	.242**	.401**	.523**	.561**	1	.411**	.208*	.474**
	Sig. (2-tailed)	<.001	<.001	<.001	.007	<.001	<.001	<.001		<.001	.020	<.001
	N	125	125	124	125	125	125	125	125	124	125	125
Does every shopkeeper in participant's area have QR code?	Pearson Correlation	-.357**	.464**	.391**	.285**	.554**	.599**	.477**	.411**	1	.413**	.481**
	Sig. (2-tailed)	<.001	<.001	<.001	.001	<.001	<.001	<.001	<.001		<.001	<.001
	N	124	124	123	124	124	124	124	124	124	124	124
Does the participant have ATM faclities in his area?	Pearson Correlation	-.291**	.278**	.264**	.125	.498**	.385**	.375**	.208*	.413**	1	.364**
	Sig. (2-tailed)	<.001	.002	.003	.163	<.001	<.001	<.001	.020	<.001		<.001
	N	125	125	124	125	125	125	125	125	124	125	125
Since how long participant uses e banking	Pearson Correlation	-.336**	.512**	.466**	.122	.477**	.495**	.446**	.474**	.481**	.364**	1
	Sig. (2-tailed)	<.001	<.001	<.001	.174	<.001	<.001	<.001	<.001	<.001	<.001	
	N	125	125	124	125	125	125	125	125	124	125	125

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The study estimates correlation of each variable to other variables for detecting the multi- co linearity of data. The correlation between different variables may be observed through (Table 3).

The maximum value of correlation is 0.651 which exists between education level and owning a smartphone. The least correlation is -.567 which exists between age and owning a smartphone. The result of correlation depicts the problem of co-linearity (as some variables have more than 0.50 degree of correlation). Therefore, factor analysis has been done as a tool of data reduction.

FACTOR ANALYSIS

A statistical method called factor analysis is used to reduce a large number of different variables into a manageable number that can adequately account for observed variance. The communalities of variables have been calculated to represent the amount of variation extracted from each variable. The extraction of variable is done by principal component analysis method (Table 4).

Table 4: Communalities

Communalities

	Initial	Extraction
Gender of participant	1.000	.636
Age of Participant	1.000	.614
Education level of participant	1.000	.688
Does the participant own a smartphone?	1.000	.682
Does the participant have a bank account?	1.000	.369
Does the participant have good internet?	1.000	.664
Is the participant aware of banking services	1.000	.638
Most preferred banking service	1.000	.658
Preferred transaction mode for participant	1.000	.653
How many e-banking transactions does the participant perform in a day.	1.000	.586

Does e-banking make participant's transactions easier?	1.000	.768
Does participant think e-banking is safe and secure?	1.000	.726
Will participant suggest others to use e-banking facilities?	1.000	.755
Since how long participant uses e banking	1.000	.575
How does participant rate e-banking service?	1.000	.615
Does every shopkeeper in participant's area have QR code?	1.000	.663
Does the participant have ATM facilities in his area?	1.000	.596
Is the participant aware of the Govt. initiatives?	1.000	.581
How often does participant visits Bank Branch?	1.000	.581

Extraction Method: Principal Component Analysis.

From the table 4 the variable “does e-banking make transaction easier” communalities which is followed by the variable “will participant suggest others to use e-banking facilities” and so on. All these variables could further be analysed through their Eigen values which represent the variances of the factors (Table 5). The extraction has been done through the method of principal component analysis.

Table 5: Total Variance explained.

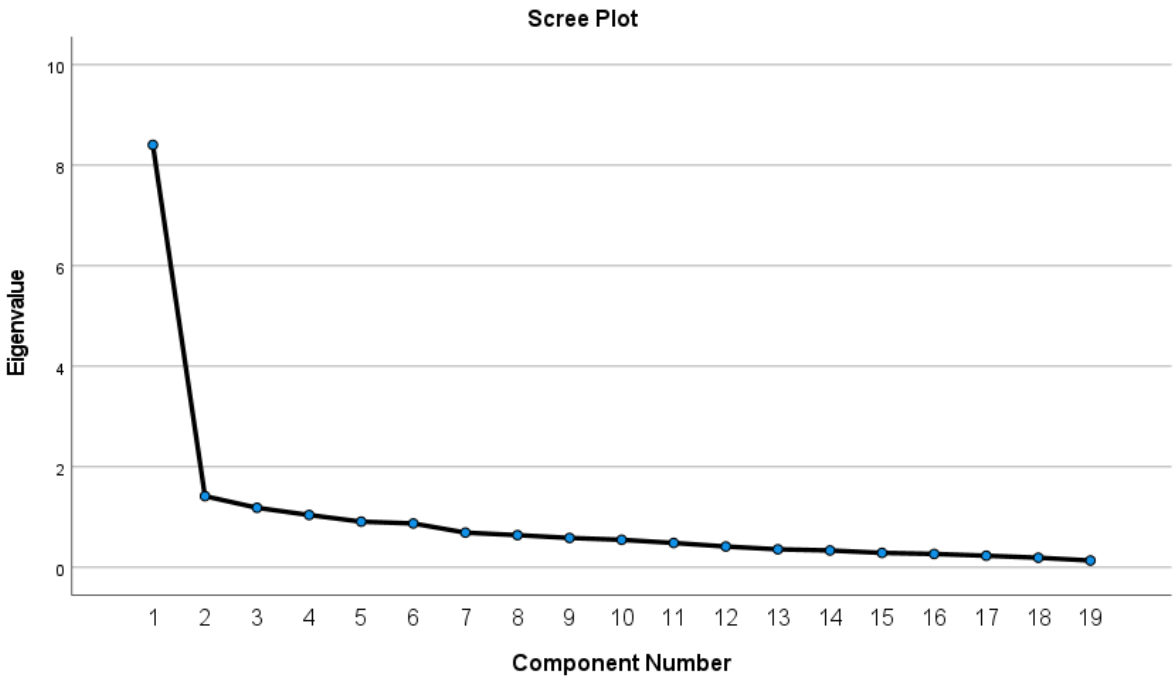
Total Variance Explained

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	8.405	44.236	44.236	8.405	44.236	44.236	6.172	32.485	32.485
2	1.416	7.455	51.690	1.416	7.455	51.690	3.340	17.578	50.063
3	1.185	6.237	57.927	1.185	6.237	57.927	1.341	7.059	57.122
4	1.041	5.481	63.407	1.041	5.481	63.407	1.194	6.286	63.407
5	.909	4.785	68.192						
6	.873	4.595	72.787						
7	.690	3.633	76.420						
8	.641	3.372	79.793						
9	.585	3.078	82.871						
10	.548	2.884	85.755						
11	.485	2.554	88.309						
12	.414	2.182	90.490						
13	.359	1.888	92.379						
14	.336	1.767	94.146						
15	.288	1.514	95.660						
16	.267	1.403	97.063						
17	.231	1.216	98.279						
18	.191	1.007	99.286						
19	.136	.714	100.000						

Extraction Method: Principal Component Analysis.

Since we have given the condition of eigen value to be greater than 1 hence as shown from table 5 there are four variables which have more than 1.000 Eigen value. The cumulative variance explained by these three components is 63.407%. Eigen values and associated components can further be studied through Scree Plot (Fig 3).

Fig 3: Scree plot



The graph clearly demonstrates that there are three components which are more crucial for the users of e-banking channels. The remaining variables also have exerted influence on the users but that is on a limited scale.

The result of principal component analysis has further been analysed through factor loading. Table 7 depicts the component matrix of the variables.

Table 6: Component Matrix

Component Matrix

	Component			
	1	2	3	4
Does e-banking make participant's transactions easier?	.870			
Does participant think e-banking is safe and secure?	.814		-.251	
Education level of participant	.807	.115		-.155
Preferred transaction mode for participant	.804			
Will participant suggest others to use e-banking facilities?	.802		-.335	
Does the participant have good internet?	.768	-.267		

Is the participant aware of banking services	.764		.181	.146
Most preferred banking service	.734	.280		-.194
Does the participant own a smartphone?	.721	.269		-.299
How many e-banking transactions does the participant perform in a day.	.711	.262		-.112
Age of Participant	-.710		.208	.258
Does every shopkeeper in participant's area have QR code?	.694	-.198	.217	.308
How does participant rate e-banking service?	.635	-.396		.235
Since how long participant uses e banking	.634	.124	.396	
Gender of participant		.615	.507	
How often does participant visits Bank Branch?	-.156	.489	-.324	.461
Does the participant have ATM facilities in his area?	.468	-.476	.382	
Does the participant have a bank account?	.375		-.457	.117
Is the participant aware of the Govt. initiatives?	.365	.209		.635

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Table 7 demonstrates the rotated component matrix based on Varimax criterion with Kaiser Normalization method. Rotated component matrix is a matrix of the factor loadings for different variables onto each factor. It represents the correlation of specific variable with different factors.

Table 7: Rotated Component Matrix

Rotated Component Matrix

	Component			
	1	2	3	4
Does the participant own a smartphone?	.804	.132	-.122	
Most preferred banking service	.795	.140		
Does e-banking make participant's transactions easier?	.775	.389		
Education level of participant	.767	.316		
Will participant suggest others to use e-banking facilities?	.738	.258	.340	.170
How many e-banking transactions does the participant perform in a day.	.727	.202		
Does participant think e-banking is safe and secure?	.725	.317	.291	.122
Age of Participant	-.714	-.187	-.239	.110
Preferred transaction mode for participant	.645	.469		.126
Since how long participant uses e banking	.487	.483	-.323	
Does the participant have ATM facilities in his area?	.114	.724		-.243
Does every shopkeeper in participant's area have QR code?	.347	.718		.158
How does participant rate e-banking service?	.298	.643	.330	
Does the participant have good internet?	.522	.593	.188	
Is the participant aware of banking services	.547	.561		.140
Gender of participant	.130		-.764	.175
Does the participant have a bank account?	.332		.455	.218
How often does participant visits Bank Branch?		-.311		.694

Is the participant aware of the Govt. initiatives?	.143	.362		.653

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Based on the results of the principal component analysis with varimax rotation, majority of the variance in the data can be explained by four components:

Component 1: Ownership of smartphone, preferred banking service, ease of transactions with e-banking, education level, willingness to suggest e-banking to others, number of e-banking transactions per day, perception of safety and security of e-banking, preferred transaction mode, duration of e-banking usage, rating of e-banking service, awareness of banking services, awareness of government initiatives, and availability of good internet are all strongly correlated with this component.

Component 2: Presence of ATM facilities in the area, presence of QR codes in shops, and having a bank account are highly correlated with this component.

Component 3: Age of the participant, gender of the participant, and frequency of visits to bank branches are strongly correlated with this component.

Component 4: Gender of the participant and frequency of visits to bank branches are strongly correlated with this component, with the opposite direction of correlation compared to Component 3.

These components suggest that factors such as technology adoption (smartphone ownership, internet access), user experience with e-banking, awareness of banking services and government initiatives, and availability of banking infrastructure in the area influence the use of e-banking services. Age, gender, and frequency of in-person banking interactions also play a role in shaping e-banking behaviour.

LINEAR DISCRIMINANT ANALYSIS

(Based on trust)

Table 8: Analysis case processing summary

Analysis Case Processing Summary

Unweighted Cases		N	Percent
Valid		121	96.8
Excluded	Missing or out-of-range group codes	1	.8
	At least one missing discriminating variable	2	1.6
	Both missing or out-of-range group codes and at least one missing discriminating variable	1	.8
	Total	4	3.2
Total		125	100.0

Valid Cases: Out of 125 total cases, 121 (or 96.8%) were considered valid for analysis.

Excluded Cases: Four cases (or 3.2%) were excluded from the analysis due to various reasons:

One case had missing or out-of-range group codes.

Two cases had at least one missing discriminating variable.

One case had both missing or out-of-range group codes and at least one missing discriminating variable.

Table 9: Group Statistics

Does participant think e-banking is safe and secure?		Mean	Std. Deviation
No	Gender of participant	1.64	.489
	Age of Participant	2.27	.626
	Education level of participant	3.30	1.468
	Does the participant own a smartphone?	.55	.506
	Does the participant have a bank account?	.88	.331

	Does the participant have good internet?	.21	.415
	Is the participant aware of banking services	.18	.392
	Most preferred banking service	2.52	1.787
	Preferred transaction mode for participant	1.12	.331
	How many e-banking transactions does the participant perform in a day.	1.39	.556
	Does e-banking make participant's transactions easier?	.24	.435
	Will participant suggest others to use e-banking facilities?	.30	.467
	How often does participant visits Bank Branch?	2.82	1.286
	Does every shopkeeper in participant's area have QR code?	.36	.489
	Does the participant have ATM facilities in his area?	.61	.496
	Is the participant aware of the Govt. initiatives?	.24	.435
	Since how long participant uses e banking	2.24	1.480
	How does participant rate e-banking service?	3.18	1.185
Yes	Gender of participant	1.57	.498
	Age of Participant	1.38	.532
	Education level of participant	5.08	.820
	Does the participant own a smartphone?	.97	.183
	Does the participant have a bank account?	1.00	.000
	Does the participant have good internet?	.88	.333
	Is the participant aware of banking services	.78	.414
	Most preferred banking service	4.34	1.071
	Preferred transaction mode for participant	1.82	.388
	How many e-banking transactions does the participant perform in a day.	2.45	.801

	Does e-banking make participant's transactions easier?	.94	.233
	Will participant suggest others to use e-banking facilities?	1.00	.000
	How often does participant visits Bank Branch?	2.60	1.435
	Does every shopkeeper in participant's area have QR code?	.83	.378
	Does the participant have ATM facilities in his area?	.85	.357
	Is the participant aware of the Govt. initiatives?	.53	.502
	Since how long participant uses e banking	3.56	1.123
	How does participant rate e-banking service?	4.43	.755
Total	Gender of participant	1.59	.494
	Age of Participant	1.62	.686
	Education level of participant	4.60	1.301
	Does the participant own a smartphone?	.85	.357
	Does the participant have a bank account?	.97	.180
	Does the participant have good internet?	.69	.463
	Is the participant aware of banking services	.62	.487
	Most preferred banking service	3.84	1.533
	Preferred transaction mode for participant	1.63	.485
	How many e-banking transactions does the participant perform in a day.	2.17	.879
	Does e-banking make participant's transactions easier?	.75	.434
	Will participant suggest others to use e-banking facilities?	.81	.394
	How often does participant visits Bank Branch?	2.66	1.394
	Does every shopkeeper in participant's area have QR code?	.70	.459
	Does the participant have ATM facilities in his area?	.79	.412

	Is the participant aware of the Govt. initiatives?	.45	.500
	Since how long participant uses e banking	3.20	1.358
	How does participant rate e-banking service?	4.09	1.049

Participants' Perception of Safety and Security:

Those who answered "No":

They tend to be younger on average (mean age: 2.27) compared to those who answered "Yes" (mean age: 1.38).

Their education level is relatively lower (mean education level: 3.30) compared to those who answered "Yes" (mean education level: 5.08).

A smaller percentage of them own smartphones (mean: 0.55) compared to those who answered "Yes" (mean: 0.97).

A larger percentage of them do not have bank accounts (mean: 0.88) compared to those who answered "Yes" (mean: 1.00).

General Trends:

Overall, the mean values for various factors (age, education level, smartphone ownership, etc.) are relatively lower among those who answered "No" compared to those who answered "Yes". This suggests that there may be differences in perceptions based on demographics and banking behaviour.

Table 10: Group mean statistics.

Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
Gender of participant	.996	.454	1	119	.502
Age of Participant	.658	61.923	1	119	.000
Education level of participant	.627	70.743	1	119	.000
Does the participant own a smartphone?	.723	45.570	1	119	.000
Does the participant have a bank account?	.909	11.937	1	119	.001
Does the participant have good internet?	.589	82.889	1	119	.000

Is the participant aware of banking services	.695	52.303	1	119	.000
Most preferred banking service	.716	47.126	1	119	.000
Preferred transaction mode for participant	.588	83.545	1	119	.000
How many e-banking transactions does the participant perform in a day.	.709	48.901	1	119	.000
Does e-banking make participant's transactions easier?	.478	130.141	1	119	.000
Will participant suggest others to use e-banking facilities?	.374	199.055	1	119	.000
How often does participant visits Bank Branch?	.995	.574	1	119	.450
Does every shopkeeper in participant's area have QR code?	.794	30.875	1	119	.000
Does the participant have ATM facilities in his area?	.929	9.132	1	119	.003
Is the participant aware of the Govt. initiatives?	.932	8.690	1	119	.004
Since how long participant uses e banking	.813	27.446	1	119	.000
How does participant rate e-banking service?	.716	47.222	1	119	.000

Based on the Wilks' Lambda values, it appears that all of the independent variables (gender, age, education level, smartphone ownership, bank account ownership, internet access, awareness of banking services, preferred banking services, transaction modes, number of e-banking transactions, ease of e-banking transactions, willingness to recommend e-banking, visit frequency to bank branches, availability of QR codes in the area, ATM facilities in the area, awareness of government initiatives, duration of e-banking usage, and rating of e-banking service) have a significant impact on the dependent variable. This suggests that these factors play a role in determining the participants' attitudes and preferences towards e-banking services.

Table 11: Pooled within groups matrices.

Pooled Within-Groups Matrices

		Gender of participant	Age of Participant	Education level of participant	Does the participant own a smartphone?	Does the participant have a bank account?	Does the participant have good internet?	Is the participant aware of banking services	Most preferred banking service	Preferred transaction mode for participant	How many e-banking transactions does the participant perform in a day.	Does e-banking make participant's transactions easier?	Will participant suggest others to use e-banking facilities?	How often does participant visits Bank Branch?	Does every shopkeeper in participant's area have QR code?	Does the participant have ATM facilities in his area?	Is the participant aware of the Govt. initiatives?	Since how long participant uses e banking	How does participant rate e-banking service?
Correlation	Gender of participant	1.000	.046	.093	.125	-.045	-.105	.082	.145	.116	.183	.099	-.025	.057	.037	-.057	.077	.194	-.084
	Age of Participant	.046	1.000	-.325	-.384	-.080	-.286	-.203	-.345	-.245	-.254	-.165	-.232	.062	-.134	-.173	.006	-.105	-.217
	Education level of participant	.093	-.325	1.000	.473	.057	.404	.372	.458	.327	.359	.404	.267	-.142	.268	.122	.165	.341	.193
	Does the participant own a smartphone?	.125	-.384	.473	1.000	.029	.140	.275	.502	.315	.381	.409	.176	-.097	.197	.114	.127	.298	.032
	Does the participant have a bank account?	-.045	-.080	.057	.029	1.000	-.021	.087	.190	.063	.104	.158	.245	.010	.173	.052	-.003	-.001	.150
	Does the participant have good internet?	-.105	-.286	.404	.140	-.021	1.000	.367	.165	.262	.071	.366	.183	-.137	.377	.421	.057	.296	.224
	Is the participant aware of banking services	.082	-.203	.372	.275	.087	.367	1.000	.291	.486	.312	.443	.101	-.066	.480	.287	.199	.337	.141
	Most preferred banking service	.145	-.345	.458	.502	.190	.165	.291	1.000	.266	.336	.463	.289	-.005	.219	.196	.144	.295	-.029
	Preferred transaction mode for participant	.116	-.245	.327	.315	.063	.262	.486	.266	1.000	.354	.458	.259	-.091	.319	.294	.212	.219	.207
	How many e-banking transactions does the participant perform in a day.	.183	-.254	.359	.381	.104	.071	.312	.336	.354	1.000	.380	.190	-.038	.223	.058	.105	.309	.170
	Does e-banking make participant's transactions easier?	.099	-.165	.404	.409	.158	.366	.443	.463	.458	.380	1.000	.413	-.091	.424	.169	.100	.360	.147
	Will participant suggest others to use e-banking facilities?	-.025	-.232	.267	.176	.245	.183	.101	.289	.259	.190	.413	1.000	.020	.200	.082	.113	.073	.124
	How often does participant visits Bank Branch?	.057	.062	-.142	-.097	.010	-.137	-.066	-.005	-.091	-.038	-.091	.020	1.000	-.099	-.189	.089	-.030	-.221
	Does every shopkeeper in participant's area have QR code?	.037	-.134	.268	.197	.173	.377	.480	.219	.319	.223	.424	.200	-.099	1.000	.334	.173	.374	.420
	Does the participant have ATM facilities in his area?	-.057	-.173	.122	.114	.052	.421	.287	.196	.294	.058	.169	.082	-.189	.334	1.000	.004	.281	.307
	Is the participant aware of the Govt. initiatives?	.077	.006	.165	.127	-.003	.057	.199	.144	.212	.105	.100	.113	.089	.173	.004	1.000	.083	.180
	Since how long participant uses e banking	.194	-.105	.341	.298	-.001	.296	.337	.295	.219	.309	.360	.073	-.030	.374	.281	.083	1.000	.110
	How does participant rate e-banking service?	-.084	-.217	.193	.032	.150	.224	.141	-.029	.207	.170	.147	.124	-.221	.420	.307	.180	.110	1.000

Strong Positive Correlations:

Participants who recommend banking services also tend to rate them highly, showing overall satisfaction and approval of the services (correlation coefficient: 0.891).

There's a strong positive correlation between participants' ratings of banking services and whether they have accounts in other areas (correlation coefficient: 0.857).

Participants with accounts in multiple areas are more likely to recommend banking facilities, indicating that broader service availability enhances endorsement (correlation coefficient: 0.834).

Awareness of bank initiatives is positively linked with having accounts in different areas, potentially indicating better-informed or more engaged customers (correlation coefficient: 0.741).

Those aware of bank initiatives tend to recommend banking facilities, possibly reflecting higher engagement or satisfaction with the bank’s efforts (correlation coefficient: 0.734).

Strong Negative Correlations:

Despite banking transactions being easier, there's a strong negative correlation with recommending banking facilities, suggesting other factors influence recommendations (correlation coefficient: -0.925).

Younger participants might be slightly less likely to have bank accounts compared to older ones (correlation coefficient: -0.328).

Table 12: Log Determinants

Log Determinants

Does participant think e-banking is safe and secure?	Rank	Log Determinant
No	18	-28.678
Yes	16	.[a]
Pooled within-groups	18	-28.586

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

a. Singular

For participants who answered "No":

The rank of the covariance matrix is 18, with a log determinant of -28.678.

For participants who answered "Yes":

The rank of the covariance matrix is 16, and it is noted as singular, represented by "a".

The pooled within-groups log determinant is -28.586.

These results indicate differences in the covariance structures between the two groups, particularly noting singularity in the covariance matrix for participants who answered "Yes".

Table 13: Eigen Values

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	2.598[a]	100.0	100.0	.850

Function 1 has an eigenvalue of 2.598, explaining 100.0% of the variance.
The cumulative percentage of variance explained by Function 1 is also 100.0%.
The canonical correlation associated with Function 1 is 0.850.
This suggests that Function 1 effectively captures all the variability in the data, indicating a strong relationship between the variables analysed.

Table 14: Wilk's lambda

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.278	140.855	18	.000

For the test of Function 1, Wilks' Lambda is 0.278.

The associated Chi-square statistic is 140.855 with 18 degrees of freedom.

The p-value for this test is less than 0.001 ($p < 0.001$), indicating a statistically significant effect.

This suggests that there are significant differences among the groups in terms of the variables included in Function 1.

Table 15: Standardized canonical discriminant function

Standardized Canonical Discriminant Function Coefficients

	Function 1
Gender of participant	-.047
Age of Participant	-.073
Education level of participant	-.075

Does the participant own a smartphone?	.095
Does the participant have a bank account?	-.010
Does the participant have good internet?	.309
Is the participant aware of banking services	.163
Most preferred banking service	.029
Preferred transaction mode for participant	.138
How many e-banking transactions does the participant perform in a day.	.056
Does e-banking make participant's transactions easier?	.150
Will participant suggest others to use e-banking facilities?	.618
How often does participant visits Bank Branch?	.049
Does every shopkeeper in participant's area have QR code?	-.233
Does the participant have ATM facilities in his area?	-.185
Is the participant aware of the Govt. initiatives?	-.031
Since how long participant uses e banking	.103
How does participant rate e-banking service?	.315

Overall, it appears that factors such as good internet access, awareness of banking services, perceived ease of transactions with e-banking, willingness to recommend e-banking to others, and satisfaction with e-banking services have a positive relationship with participant responses.

On the other hand, factors such as ownership of a smartphone, availability of ATM facilities in the area, and presence of QR codes in shops in the area have a negative relationship with participant responses.

Age, education level, having a bank account, preferred banking service, preferred transaction mode, number of e-banking transactions per day, frequency of visits to bank branches, awareness of government initiatives, and duration of e-banking use do not show strong correlations with participant responses.

The **standardized canonical discriminant function** can be represented as:

Y = (-.047 * Gender of participant) + (-.073 * Age of Participant)

+ (-.075 * Education level of participant) + (.095 * Does the participant own a smartphone?)

+ (-.010 * Does the participant have a bank account?) + (.309 * Does the participant have good internet?)

+ (.163 * Is the participant aware of banking services) + (.029 * Most preferred banking service)

+ (.138 * Preferred transaction mode for participant) + (.056 * How many e-banking transactions does the participant perform in a day)

+ (.150 * Does e-banking make participant's transactions easier?) + (.618 * Will participant suggest others to use e-banking facilities?) + (.049 * How often does participant visits Bank Branch)

+ (-.233 * Does every shopkeeper in participant's area have QR code?) + (-.185 * Does the participant have ATM facilities in his area)

+ (-.031 * Is the participant aware of the Govt. initiatives) + (.103 * Since how long participant uses e banking) + (.315 * How does participant rate e-banking service)

Table 16: Structure Matrix

Structure Matrix

	Function 1
Will participant suggest others to use e-banking facilities?	.802

Does e-banking make participant's transactions easier?	.649
Preferred transaction mode for participant	.520
Does the participant have good internet?	.518
Education level of participant	.478
Age of Participant	-.448
Is the participant aware of banking services	.411
How many e-banking transactions does the participant perform in a day.	.398
How does participant rate e-banking service?	.391
Most preferred banking service	.390
Does the participant own a smartphone?	.384
Does every shopkeeper in participant's area have QR code?	.316
Since how long participant uses e banking	.298
Does the participant have a bank account?	.196
Does the participant have ATM facilities in his area?	.172
Is the participant aware of the Govt. initiatives?	.168
How often does participant visits Bank Branch?	-.043
Gender of participant	-.038

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions.

Variables ordered by absolute size of correlation within function.

Based on the values in the table, the variables such as the ease of transactions with e-banking, the preferred transaction mode, good internet connectivity, education level, awareness of banking services, and the number of e-banking transactions performed daily have a strong positive relationship with participants suggesting others to use e-banking facilities. This suggests that participants who find e-banking easy to use, have good internet connectivity, and perform frequent transactions are more likely to recommend e-banking to others.

On the other hand, variables such as age, gender, frequency of visits to bank branches, and awareness of government initiatives have weaker or negative relationships with participants recommending e-banking to others. This indicates that these factors may not have as significant an impact on participants' likelihood to recommend e-banking.

Table 17: Functions at group centroid

Functions at Group Centroids

Does participant think e-banking is safe and secure?	Function 1
No	-2.610
Yes	.979

Unstandardized canonical discriminant functions evaluated at group means

For participants who think e-banking is not safe and secure (No), the value of Function 1 is -2.610.
For participants who think e-banking is safe and secure (Yes), the value of Function 1 is 0.979.
This indicates the relative positions of the two groups along the canonical discriminant function.

Table 18: Classification Statistics

Classification Processing Summary

Processed		125
Excluded	Missing or out-of-range group codes	0
	At least one missing discriminating variable	3
Used in Output		122

Out of the total 125 cases processed, 122 were used in the output after excluding cases with missing or out-of-range group codes, as well as those with at least one missing discriminating variable.

Table 19: Prior probabilities

Prior Probabilities for Groups

Does participant think e-banking is safe and secure?	Prior	Cases Used in Analysis	
		Unweighted	Weighted
No	.273	33	33.000
Yes	.727	88	88.000
Total	1.000	121	121.000

For "No": Prior probability is 0.273, with 33 cases used in the analysis.

For "Yes": Prior probability is 0.727, with 88 cases used in the analysis.

Total: The total prior probability for all groups is 1.000, with 121 cases used in the analysis.

Table 20: classification function coefficient.

Classification Function Coefficients

	Does participant think e-banking is safe and secure?	
	No	Yes
Gender of participant	5.913	5.574
Age of Participant	16.236	15.766
Education level of participant	2.792	2.533
Does the participant own a smartphone?	11.284	12.400
Does the participant have a bank account?	30.651	30.432
Does the participant have good internet?	7.183	10.293
Is the participant aware of banking services	-2.777	-1.345
Most preferred banking service	1.680	1.761

Preferred transaction mode for participant	10.381	11.708
How many e-banking transactions does the participant perform in a day.	.245	.514
Does e-banking make participant's transactions easier?	-13.770	-11.981
Will participant suggest others to use e-banking facilities?	1.708	10.873
How often does participant visits Bank Branch?	2.545	2.671
Does every shopkeeper in participant's area have QR code?	-6.989	-9.022
Does the participant have ATM facilities in his area?	.658	-1.009
Is the participant aware of the Govt. initiatives?	-4.789	-5.019
Since how long participant uses e banking	.301	.603
How does participant rate e-banking service?	6.735	8.006
(Constant)	-65.932	-78.802

Fisher's linear discriminant functions

For "No": The coefficients indicate the contribution of each predictor variable to the classification of participants who do not think e-banking is safe and secure.

For "Yes": Similarly, the coefficients represent the contribution of each predictor variable to the classification of participants who think e-banking is safe and secure.

These coefficients are used to calculate the linear combination of predictor variables for each group, which helps classify new observations into one of the two categories based on their characteristics.

Table 21: Classification Results

Classification Results[a,c]

		Does participant think e-banking is safe and secure?	Predicted Group Membership		
			No	Yes	Total
Original	Count	No	25	8	33
		Yes	0	88	88
		Ungrouped cases	0	1	1
	%	No	75.8	24.2	100.0
		Yes	.0	100.0	100.0
		Ungrouped cases	.0	100.0	100.0
Cross-validated[b]	Count	No	22	11	33
		Yes	3	85	88
	%	No	66.7	33.3	100.0
		Yes	3.4	96.6	100.0

a. 93.4% of original grouped cases correctly classified.

b. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

c. 88.4% of cross-validated grouped cases correctly classified.

Does participant think e-banking is safe and secure? ("No" and "Yes" Responses)

Out of 33 participants who think e-banking is not safe and secure, the model correctly predicted 25 as "No" and incorrectly predicted 8 as "Yes".

Out of 89 participants who think e-banking is safe and secure, the model correctly predicted 88 as "Yes" and incorrectly predicted 1 as "No".

Cross-Validated Grouped Cases Correctly Classified*: 88.4% of the cases were correctly classified in the cross-validation process, which is slightly lower than the original classification but still indicates a robust model.

The model performs well in predicting whether participants think e-banking is safe and secure, with a high accuracy rate initially and a slightly lower but still strong accuracy rate on cross-validation.

The drop in accuracy from the original to the cross-validated results suggests some overfitting in the original model, where the model is tailored too closely to the initial data set and does not generalize quite as well on new, unseen data.

The results are particularly strong for predicting positive perceptions ("Yes") of e-banking's security, with very high accuracy rates in both original and cross-validated scenarios.

Conclusion

E-banking serves as a significant driver for economic development. To increase its adoption, it should be customised to meet the needs of customers. The current study analysed the level of trust of customers towards e-banking. The study also found that most of the people included in the study are graduates also most of them did not even complete their primary education. Most of the people who were educated and less educated had smartphone and preferred upi as their mode of transaction due to its ease of use. It is also found that people had good user experience with e-banking and its services, however a very few proportions of people didn't trust the e-banking facilities like upi and other due to its fraudulent attacks.
Overall, there is a good sign of improvement in the usage of e-banking, but it still needs some enhancement, and more trust needs to be developed among the rural people. Also, few proportions of people had enough facility for e-banking (like network, ATM facilities etc) and some specific actions need to be taken to solve the problem.

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