Mobile Banking and Financial Inclusion: The Proximate Determinants of Adoption in Rural India

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A b s t r a c t This study aims to identify the proximate determinants of Mobile banking adoption in rural India. A research design has been developed to understand rural peoples' perspectives on mobile banking use. A survey instrument was developed and able to gather 551 sample responses. Data thus obtained has been analyzed using structural equation modeling to investigate research hypotheses. Relative advantage, ease of use, self-efficacy, social influence, and awareness have a significant positive influence on mobile banking use. Credibility has a significant negative influence on mobile banking use. The finance costs were found insignificant influence on mobile banking use. Relative advantages are positively influenced by the ease of use. Ease of use and credibility have positively influenced self-efficacy. The findings of this study have threefold implications, namely research implications, managerial implications, and regulatory implications. For researchers, to develop more sophisticated research models to investigate the perception of rural people regarding the adoption of digital and mobile products. For managerial personnel, to frame effective strategies for exploring rural markets and to design suitable digital products for rural people. Finally, regulatory bodies, frame and implement stringent laws to ensure the safety and security forum digital products and to develop policies and strategies for financial inclusion. This study investigated the rural peoples' perspectives on mobile banking adoption, which provides useful information for researchers, governments, and industry.

Keywords - Financial Inclusion, Rural People, Mobile Banking, Financial Services

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1. Introduction

Innovative technologies are reshaping business operations and models, especially information and communication technology (ICT) and mobile communication technology (MCT). The advancement of ICT and MCT enabled new industrialization, popularly known as industry 4.0 (Wellalage et al., 2021), and rapid growth of e-commerce and m-commerce (Madan & Yadav, 2018). On the other side, significant growth in the ownership of mobile phones and the use of mobile internet further drove the development and design of mobile applications and digital products (Zhou, 2014). Mobile applications and digital products are providing different utilities and solutions (Loh et al., 2021) for finger-touching touch convenience. Hence, corporates have affirmed technology is a competitive strategy for market penetration and sustainable growth (Eze et al., 2019).

Today, mobile phones are become integral part of human life and almost everyone carrying (Smura et al., 2009). Mobile phones are providing variety of services in the everyday of human life including financial planing and management. This study is aimed to understand determinants of mobile banking use, which in turn enables financial inclusion of rural people by removing certain physical barriers of accessing and using financial services. The phenomenon financial inclusion means providing suitable financial products for the financially vulnerable and excluded people to meet financial needs, improve living standards and eradication of poverty. Financial services are essential for the development and growth of the economy, but the use of financial services is uneven across the economies in view of unemployment, poverty, and regional imbalances. Holding an account at financial institution is the fundamental for the wide access of financial services, but the account ownership varied among the economies. For instance, in developing countries mere 63 percent hold accounts, whereas in developed countries, it is 94 percent (Klapper et al., 2018). This glaring difference has caught the attention of governments, financial institutions, and global institutions to address the challenges of financial exclusion.

Governments have been giving a priority for financial inclusion in the policy to achieve sustainable and

inclusive growth. Offering of financial services through traditional channels have not achieved desirable milestone of financial inclusion due to unavailability of suitable financial products, lack of access to financial institutions, lengthy documentation, and cost of financial products. NITI Aayog, (2021) emphasized that the digital channels are the more efficient and effective for the achievements of social and economic objectives of governments. Therefore, governments and financial institutions focusing on the delivery of financial products through digital channels, such as internet of things (IoT), digitalisation of financial products, virtual assistance, and direct benefit transfers (DBT) to achieve financial inclusion.

Khera et al., (2021) asserted that digital financial services are vital for the financial inclusion and financial technology (FinTech) facilitates for wider access to financial services. Further, Carrière-Swallow et al., (2021) suggested that offering financial services through mobile phones enhances the access and use of financial services. Mobile phone penetration is 91 percent around the globe, smartphone ownership alone 80 percent and 82 percent in developed and developing economies respectively (Deloitte, 2017). But there is a huge gap between mobile phone ownership and use of phone for banking purpose. Klapper et al., (2018) reported that around 52 percent of the world population is using digital payments, but in developing economies it is only 44 percent. Further, Brackert et al., (2021) articulated that only 30 percent of increase in use of mobile banking during COVID-19. Therefore, there is a need to understand the key facilitating and limiting factors of mobile banking adoption for the achievement of financial inclusion. Hence, this study attempts to explore the determining factors of mobile banking in the perception of rural people of India, an emerging economy and worlds second largest country facing issue of financial inclusion.

To date there are no comprehensive studies throwing light on the factors influencing mobile banking adoption in rural India. This study aims to fill the gap

2. Literature Review

Literature concerning mobile banking in India encompasses many themes. We tried to review two major themes relevant for this study namely i) role of mobile banking in financial inclusion and ii) factors influencing mobile banking usage or adoption.

2.1 Role of mobile banking in financial inclusion

In recent times financial inclusion has attracted researchers due to governments and central banks framing special policies for unserved and underserved stakeholders by proving suitable financial products to achieve inclusive growth and eradication of poverty. Liu et al., (2021) stated that a sound financial inclusion is an essential for the financial growth of an economy. Adjei et al., (2020) in their empirical study on determinants of continuous use of mobile financial services asserted that providing financial services through mobile devices has accelerated financial inclusion in Ghana. Fernandes et al., (2021) empirically emphasized that digital financial services played a significant role in expansion of financial inclusion in Mozambique. Several other researchers have also highlighted that provision of digital financial services has been vital for financial inclusion (Khera et al., 2021; Shen et al., 2021; Wang & He, 2020)

Mobile phones are inexpensive devices to support digital financial services compare with other alternatives like personal computers and laptops. Ghosh and Chaudhury(2020) stated that mobile banking is one of the key driving factors of exponential growth in digital transactions in India. Further they stated that digital financial services adoption has not reached all the stakeholders of the society as expected. Kunt *et al.*, (2018) reported only two-thirds of account holders use digital payments. Therefore, understanding of determining factors of digital and mobile financial services is essential for achieving financial inclusion and inclusive growth of economies.

2.2 Determinants of mobile banking usage

Researchers from different countries empirically investigated the key determinants of mobile banking, internet banking, and digital financial services with the assistance of technology adoption research models. Diffusion of Innovation theory (DOI) (Rogers, 1983), social cognitive theory (SCT) (Bandura, 1999), technology acceptance model (TAM) (Davis, 1989), the planned behavior (TPB) (Ajzen, 1991), decomposed theory of behavior (DTPB) (Taylor and Todd, 1995), task fit technology (TFT) (Goodhue and Thompson, 1995), and unified theory of acceptance and use of technology (UTAUT) (Venkatesh *et al.*, 2003) are popular and widely used research models to explain determinants of digital services adoption.

For instance, Al-Jabri and Sohail, (2012) employed DOI to investigate determinants of mobile banking adoption and found relative advantage, compatibility, and observability are the key determinants of mobile banking. Koenig-Lewis et al., (2010) examined that compatibility, perceived usefulness, and risk are the key drivers of mobile banking through the Integrated model of TAM and DOI. Yu, (2012) examined the UTAUT model and claimed social influence, perceived financial cost, performance expectancy, and perceived credibility have a significant impact on mobile banking adoption. Sobti, (2019) examined antecedents of mobile payment adoption with an extended UTAUT model and concluded that in the extent of constructs of the UTAUT model, perceived cost and risk are found significant predictors of mobile payments.

Indian context, Yadav *et al.*, (2015) examined an integrated model of TPB and TAM to understand intentions to adopt internet banking among youth and the empirical results asserted that perceived usefulness, attitudes, subjective norms, and perceived behavioral controls were significant. Singh & Srivastava, (2018) examined an integrated model of UTAUT, TAM, and SCT. They empirically claimed that self-efficacy, perceived ease of use, perceived financial cost, and security have a significant impact on behavioral intention of mobile banking adoption.

Further, Sharma *et al.*, (2017) tested mobile banking adoption using extended TAM in Omani and empirically found that trust, perceived usefulness, compatibility, and social influence have a significant impact on mobile banking adoption. Anouze and Alamro, (2020) formulated a model with a blend of the different variables of popular models to assess the barriers to digital banking in Jordan and found the ease of use, perceived usefulness, selfefficacy, perceived price, and awareness to have a significant impact on digital banking. Daud *et al.*, (2011) empirically identified perceived usefulness, perceived credibility, and mobile banking awareness as the critical success factors of mobile banking adoption in Malaysia.

Many of the existing studies of mobile banking adoption were confined to urban, students, youth, and wealthy people. But scant research is available in the context of rural people. Therefore, this study aimed to understand the perception of rural people bout mobile banking usage, which in turn contributes to the expansion of financial inclusion.

3. Research Model and Hypotheses

To gain a better understanding of rural people's perception of what factors would influence mobile banking adoption, a research model is proposed with seven independent variables including relative advantage, ease of use, self-efficacy, credibility, social influence, financial cost, and mobile banking awareness. The model is presented in Figure 1. The variables/determining factors of mobile adoption have been identified from the existing literature. The Following factors are tentatively identified for possible inclusion in the model.

3.1 Relative Advantage

Relative advantage is defined as the more frequent use of an innovation as compared to its existing alternatives (Rogers, 1983; Moore & Benbasat, 1991; Jung et al., 2020). Mobile banking provides relative benefits compared to debit cards, ATMs, and internet banking. Mobile banking operations can be performed round the clock and globe and do not have any facial and temporal limits as like internet banking. Initiating and performing of financial transactions through mobile banking is more convenient, efficient, and inexpensive. Mombeuil, (2020) found that relative advantage has a significant positive influence on mobile wallet adoption. The previous studies on mobile banking and digital payments observed that the relative advantage has a significant positive influence on mobile banking adoption (Püschel et al., 2010; Lu et al., 2011; Teoh et al., 2013).

Thus, it may be hypothesized that:

H1: Relative advantage has a significant influence on mobile banking use.

3.2 Ease of Use

Ease of use is the extent to which mobile banking is perceived as easy to understand and operate (Lin 2011). The users' efforts required to understand and operate mobile banking have a significant impact on mobile banking adoption. Many existing studies of TAM, UTAUT, and DOI asserted that ease of use has a significant impact on adoption behavior either directly or indirectly through perceived usefulness (Koenig-Lewis *et al.*, 2010; Deb & Agrawal, 2017; Priya *et al.*, 2018; Chawla & Joshi, 2017). Therefore, to examine the impact of ease of use following hypotheses have been proposed.

- **H2:** Ease of use has a significant influence on mobile banking use.
- **H2a**: Ease of use has a significant influence on relative advantage.

3.3 Self-Efficacy

Compeau and Higgins, (1995) defined self-efficacy as the judgment of one's ability to use a computer. Mobile banking is a self-service offered by banks through mobile applications and mobile browsers. The success of mobile banking is determined by the users' ability to operate and execute. Therefore, it was asserted that users' ability is a key driving factor in mobile banking use. Alalwan et al., (2016) emphasized that self-efficacy is one of the key determinants of mobile banking adoption has trust in mobile banking. Wang et al., (2003) in their study on determinants of acceptance of internet banking found that self-efficacy has a significant positive influence on perceived ease of use and perceived credibility. Therefore, to examine the impact of self-efficacy the following hypotheses have been proposed.

- **H3:** Self-efficacy has a significant influence on mobile banking use.
- **H3a**: Self-efficacy has a significant influence on ease of use.
- **H3b:** Self-efficacy has a significant influence on credibility.

3.4 Credibility

Consumers may perceive mobile banking poses uncertainties, which may lead to loss of money and theft of personal and financial information. Privacy and security settings ensures and enhances credibility on mobile banking, which expands the adoption of mobile banking. Wang et al., (2003) in their study on internet banking proposed credibility by integrating privacy and security, and empirically asserted that credibility has significant influence on internet banking adoption. They defined credibility as an individual's believe or trust on internet banking which is free from potential threats of privacy and security. Thakur & Srivastava, (2013) examined impact of credibility on mobile banking and found as one of the significant determining factors. Therefore, customers' perception of privacy and security of mobile banking have significant influence on adoption and continuous use. Therefore, to examine the impact of credibility, following hypothesis has been proposed.

H4: Credibility has a significant influence on mobile banking use.

3.5 Social Influence

Social influence refers to an individuals' behavior influenced by the social networks (Alalwan et al., 2017). Al-Ajam and Md Nor, (2015) showed that mass media and family has significant impact on adoption of internet banking. Baabdullah et al., (2019) stated that family, friends, relatives, and other technology users influences views and perceptions. The existing literature however found mixed results of social influence impact on digital banking adoption, but it was observed that social influence has significant impact in emerging economies (Kesharwani and Bisht, 2012; Liébana-Cabanillas et al., 2014; Sharma and Govindaluri, 2014; Patel and Patel, 2018; Kaur and Arora, 2021). Therefore, to reexamine the impact of social influence, following hypothesis has been proposed.

H5: Social influence has significant influence on mobile banking use.

3.6 Financial Cost

Using mobile banking services may cause incurring additional cost for purchase of devices, subscription of internet, subscription of mobile banking, annual charges, and transaction fee. Therefore, the cost associated with mobile banking has an impact on adoption and continuous use of mobile banking. Sun *et al.*, (2012) defined financial cost as an individual's perception of additional cost of using mobile banking. Hanafizadeh *et al.*, (2014) and Tran and Corner, (2016) found that perceived cost has significant negative impact on mobile banking adoption. Therefore, to examine the impact of financial cost, following hypothesis has been proposed.

H6: Financial cost has significant impact on mobile banking use.

3.7 Mobile Banking Awareness

The level of knowledge and kind of information imparted by the users' have significant impact on use of mobile banking. Customers who have information about products, usage, benefits, and security will use mobile banking services. Daud *et al.*, (2011) stated that knowledge about mobile banking is essential for initial adoption and continuous use. Elhajjar and Ouaida, (2020) showed that digital literacy and awareness have significant influence on mobile banking adoption. Therefore, to examine the impact of awareness on mobile banking adoption, following hypothesis has been proposed.

H7: Mobile banking awareness has significant influence on mobile banking use.

Figure 1. Research Model



4. Research Methodology

4.1 Survey instrument

A survey instrument is designed for the data collection in two parts. Part – A designed for the demographic profiles of sample respondents and Part – B designed with 32 items to measure eight latent constructs including one endogenous construct (mobile banking use) and seven exogenous constructs (relative advantage, ease of use, self-efficacy, credibility, social influence, financial cost, and mobile banking awareness). Appendix 1 presents the list of items and their sources, which are measured on sevenpoint Likert-scale with anchoring points from 1 to 7 based on respondents' degree of agreement, where 1 for strongly disagree and 7 for strongly agree.

4.2 Data collection

The target population of the study was mobile banking users of rural India, who were less access to traditional financial services. Data has been collected through personal distribution of survey instrument. Snowball sampling method had been followed for the data collection due to COVID-19 and able to collect 551 samples. Details of the demographic profiles of the respondents presented in Table 1.

Table 1. Demographic promes of respondents	Table 1.	Demographic	profiles of	respondents.
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Demographics	Frequency	Percentage
Gender		
Female	184	33.33
Male	367	66.67
Age		
Up to 20	86	15.61
21-30	142	25.77
31 - 40	163	29.58
41 - 50	94	17.10
Above 50	66	11.98
Educational Qualifications		
Primary School	56	10.16
High School	145	26.32

Graduation	237	43.01
Postgraduation	113	20.51
Occupation		
Daily wage earner	174	31.58
Business	146	26.50
Employed	97	17.60
Student	134	24.32
Monthly Income (in ₹)		
Monthly Income (in ₹) Up to 10,000	124	22.50
Monthly Income (in ₹) Up to 10,000 10,001 - 20,000	124 137	22.50 24.86
Monthly Income (in ₹) Up to 10,000 10,001 – 20,000 20,001 – 30,000	124 137 83	22.50 24.86 15.06
Monthly Income (in ₹) Up to 10,000 10,001 – 20,000 20,001 – 30,000 30,001 – 40,000	124 137 83 73	22.50 24.86 15.06 13.25
Monthly Income (in ₹) Up to 10,000 10,001 – 20,000 20,001 – 30,000 30,001 – 40,000 40,001 – 50,000	124 137 83 73 70	22.50 24.86 15.06 13.25 12.70

Note: Total respondent are 551

4.3 Statistical methods and software

The Structural Equation Modelling (SEM) framework has been adopted. The proposed model has been tested using a two-step approach. Normality of data and common method bias have been tested to obtain fair results. R and Microsoft excel software have been employed for the statistical analysis.

5. Data computation and Interpretation:

5.1 Normality of data

Normality of the data is one of the basic assumptions of SEM using maximum likelihood (ML) estimation. Skewness and kurtosis statistical methods have been used to examine univariate normality of all measurement variables (Kline, 2016; Gana & Broc, 2019). Computed values of skewness and kurtosis presented in Table 1 were within the range of recommended values ± 2.

5.2 Common method bias

The data has been collected from the sample respondent using survey instrument, where all items are measured on seven-point Likert scale. The scale may have an inherent bias known as common method bias (CMB). Harman's single factor method has been employed to examine CMB as had been done by Podsakoff *et al.,* (2003) and Kuo(2020). Exploratory factor analysis (EFA) has been performed without rotation and results found only 26 percent of variance explained by the single factor, which is lower than threshold value of 50 percent. Further, computed fit indices produced poor single factor model; RMSR = 0.18, RMSEA = 0.191, and TLI = 0.285. Hence, the results confirmed that there is no potential threat of CMB.

5.3 Measurement model

Confirmatory factor analysis (CFA) has been performed using R software to examine measurement model. Measurement model reliability and validity is the pre-condition to use SEM.

5.3.1 Measurement model fit

Measurement model fit investigates how well data fits the model. Fit indices examined through X²/df, CFI, TLI, NFI, RFI, IFI, RNI, RMSEA, GFI, and AGFI. Table 2. lists all fit indices of measurement model, except GFI and AGFI, all other fit indices are over the recommended values (Hair *et al.*, 2014; Kline, 2016; Lin *et al.*, 2017); X²/df = 2.45, CFI = 0.956, TLI = 0.950, NFI = 0.928, RFI = 0.918, IFI = 0.956, RNI = 0.956, RMSEA = 0.051, GFI = 0.891, and AGFI = 0.868. Lin et al., (2017) recommended that if GFI and AGFI greater than 0.80 is adequate for model fit.

rable 2. Measurement model and structural model in maters.								
Fit Measures	Threshold	MM	SM	Model Fit				
Normed Chi-square (X ² /df)	Between 3-5	2.45	2.81	Excellent				
Comparative Fit Index (CFI)	> 0.9	0.956	0.943	Excellent				
Tucker-Lewis Index (TLI)	> 0.9	0.950	0.937	Excellent				
Bentler-Bonett Normed Fit Index (NFI)	> 0.9	0.928	0.915	Good				
Bollen's Relative Fit Index (RFI)	> 0.9	0.918	0.906	Good				
Bollen's Incremental Fit Index (IFI)	> 0.9	0.956	0.943	Excellent				
Relative Noncentrality Index (RNI)	> 0.9	0.956	0.943	Excellent				
Root Mean Square Error of Approximation (RMSEA)	< 0.8	0.051	0.057	Excellent				
Goodness of Fit Index (GFI)	> 0.8	0.891	0.877	Adequate				
Adjusted Goodness of Fit Index (AGFI)	> 0.8	0.868	0.855	Adequate				

Table 2. Measurement model and structural model fit indices.

Note: MM is measurement model and SM is structural model.

5.3.2 Construct Reliability & Validity

5.3.2.1 Construct reliability

Reliability refers to consistency of scale to measure intended constructs. Consistency of scale has been examined through Cronbach's alpha (α) and composite reliability (CR) (Ho & Ko, 2008; Lu *et al.*, 2011; Verma & Sinha, 2018). Computed values of Cronbach's alpha (α) and CR presented in Table 3 are over the threshold value of 0.07 for all constructs (Nunnally *et al.*, 1976; Fornell & Larcker, 1981; Bagozzi & Yi, 1988). Hence, computed values of Cronbach's alpha and CR confirmed reliability for all constructs of the measurement model.

5.3.2.2 Construct validity

Validity refers to accuracy of scale to measure intended constructs. Data validity examined through convergent validity and discriminant validity. Convergent validity examined through factor loadings (standardized), CR, and AVE (Fornell & Larcker, 1981; Bagozzi & Yi, 1988; Hair *et al.*, 2014). Computed values presented in Table 3 over the recommended values; factor loadings > 0.50, CR > 0.70, and AVE > 0.50.

Discriminant validity examined through square root of AVE confirms that each construct is distinct from each other (Fornell & Larcker, 1981). Discriminant validity confirms when the square root of AVE should be more than the correlations of corresponding constructs (Zhou, 2012). Computed values of square root of AVE presented in Table 4 confirmed discriminant validity for all the constructs.

Factors	Items	Loadings	Skewness	Kurtosis	α	CR	AVE
	RA1	0.892	-0.401	-0.478			
Relative Advantage	RA2	0.897	-0.554	-0.256	0 0 2 7	0.930	0.769
(RA)	RA3	0.879	-0.436	-0.316	0.927		
	RA4	0.839	-0.573	-0.710			
	EU1	0.932	-1.159	0.777		0.920	
Easo of Liso (ELI)	EU2	0.963	-1.157	0.838	0 022		0 7/15
	EU3	0.725	-0.865	0.150	0.522		0.745
	EU4	0.812	-1.070	0.876			
	SE1	0.893	-1.221	1.438			0.647
Solf-Efficacy (SE)	SE2	0.824	-1.566	2.329	0 880	0.879	
Sell-Lineacy (SL)	SE3	0.750	-1.003	1.368	0.880		
	SE4	0.741	-1.143	1.384			
	CD1	0.866	-0.492	-0.497		0.945	0.813
Credibility (CD)	CD2	0.933	-0.469	-0.558	0.945		
creationity (CD)	CD3	0.924	-0.611	-0.606			0.015
	CD4	0.881	-0.393	-0.772			
Social Influence (SI)	SI1	0.838	-0.878	2.395		0.873	0.633
	SI2	0.806	-1.139	2.876	0 870		
Social influence (SI)	SI3	0.680	-0.952	3.161	0.870		
	SI4	0.848	-1.322	2.877			
	FC1	0.864	-0.454	-0.148			0.743
Einancial Cost (EC)	FC2	0.870	-0.518	-0.022	0 0 1 9	0 0 2 0	
	FC3	0.889	-0.526	0.312	0.918	0.920	
	FC4	0.823	-0.509	-0.546			
Mobile Banking	MA1	0.847	-0.641	0.455			
	MA2	0.862	-0.449	-0.422	0 023	0 92/	0.750
Awareness (MA)	MA3	0.897	-0.533	-0.168	0.525	0.524	0.752
	MA4	0.861	-0.809	-0.092			
	U1	0.877	-1.084	0.938			
Mobile Banking Use	U2	0.857	-1.167	1.312	0 802	0 805	0 680
MODILE Daliking OSE	U3	0.792	-1.138	0.950	0.092	0.090	0.680
	U4	0.768	-0.720	-0.302			

Table 3. Reliability and validity measures of measurement model.

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Constructs	RA	EU	SE	CD	SI	FC	MA	Use
Relative Advantage	0.873							
Ease of Use	0.498	0.868						
Self-Efficacy	0.369	0.410	0.901					
Credibility	0.471	0.237	0.230	0.809				
Social Influence	0.302	0.433	0.255	0.160	0.808			
Financial Cost	0.015	-0.085	-0.054	-0.035	-0.079	0.794		
Mobile Banking Awareness	0.030	-0.002	-0.055	-0.015	-0.007	0.357	0.859	
Mobile banking Use	0.497	0.811	0.496	0.168	0.596	-0.057	0.083	0.867

Table 4. Computed values of discriminant valuaty and constructs correlation	Table 4. Com	puted values	of discriminant	validity and	constructs	correlations.
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Note: Figures presented diagonal bold italic are discriminant validity and off-diagonal are correlations of contracts.

5.4 The Structural Model and Hypotheses

Structural model fitness and proposed hypotheses examined using structural equation modeling (SEM). Structural model fitness examined with the same fit indices of measurement model. Table 2 contained computed values of fit indices were vield good structural model fit; X²/df = 2.81, CFI = 0.943, TLI = 0.937, NFI = 0.915, RFI = 0.906, IFI = 0.943, RNI = 0.943, RMSEA = 0.057, GFI = 0.887, and AGFI = 0.855.

SEM results of research model presented in Table 5 and Figure 2. Except financial cost (H6), all other hypotheses have found significant at P value < 0.05 and supported H1, H2, H2a, H3, H3a, H3b, H4, H5, and H7. The SEM results emphasized that mobile banking usage is positively influenced by Relative advantage (H1: β = 0.103, t = 3.12, p = 0.002), ease of use (H2: β = 0.629, t = 16.13, p < 0.001), self-efficacy (H3: β = 0.173, t = 4.99, p < 0.001), social influence (H5: β = 0.295, t = 9.29, p < 0.001), and mobile banking awareness (H7: β = -0.101, t = 3.32, p < 0.001). Mobile banking use negatively influenced by credibility (H4: β = - 0.105, t = - 3.65, p < 0.001). Further, ease of use (H3a: β = 0.429, t = 9.81, p < 0.001) and credibility (H3b: β = 0.242, t = 5.29, p < 0.001) positively influenced by self-efficacy, and relative advantage positively influenced by ease of use (H2a: β = 0.501, t = 12.03, p < 0.001). Financial cost has not influence on mobile banking use (H6: β = - 0.017, t = - 0.55, p = 0.584). The proposed research model explained 75.4 percent ($R^2 = 0.754$) of variance in mobile banking use, 25.1 percent (R² = 0.251) of variance in relative advantage, 18.4 percent (R² = 0.184) of variance in ease of use, and 5.8 percent ($R^2 = 0.058$) of variance in credibility.

	Table 5. Hypotheses results.							
Нуро	thesis	β – coefficients	t – value	p – value	Results			
H1:	Use \leftarrow RA	0.103	3.12	0.002	Supported			
H2:	$Use \leftarrow EU$	0.629	16.13	< .001	Supported			
H2a:	$RA \leftarrow EU$	0.501	12.03	< .001	Supported			
H3:	$Use \leftarrow SE$	0.173	4.99	< .001	Supported			
H3a:	$\text{EU} \leftarrow \text{SE}$	0.429	9.81	< .001	Supported			
H3b:	$CD \leftarrow SE$	0.242	5.29	< .001	Supported			
H4:	$Use \leftarrow CD$	-0.105	-3.65	< .001	Supported			
H5:	$Use \leftarrow SI$	0.295	9.29	< .001	Supported			
H6:	$Use \leftarrow FC$	-0.017	-0.55	0.584	Rejected			
H7:	$Use \leftarrow MA$	0.101	3.32	< .001	Supported			

Table F. Uvnothoses results

6. Discussion

The study aimed to understand the perception of rural people about mobile banking use, which facilitate financial inclusion of all stakeholders of the society by removing physical barriers to access financial services. Though mobile banking has variety of benefits, its usage has not reached all stakeholders. There is rural-urban divide in the use of digital financial services. To address the gap in this study examined a model developed with seven independent variables including relative advantage, ease of use, self-efficacy, credibility, social influence, financial cost, and mobile banking awareness.

Figure 2. Results of research model



The empirical results of the study (Table 5 and Figure 2) indicated that the proposed model explained 75.4 percent of variation in mobile banking adoption, which is very high comparing with existing studies. Further, except financial cost all other variables have significant impact on mobile banking use. The results supported H1, H2, H2a, H3, H3a, H3b, H4, H5, H7 and rejected H6.

Relative advantage has significant positive impact on mobile banking use (H1), which implies that more the relative benefits derived from mobile services compared to other existing products more is the people's use. The results of relative advantages are consistent with the existing studies on digital banking services (Riquelme & Rios, 2010; Lin, 2011; Al-Jabri and Sohail, 2012; Teoh *et al.*, 2013; Cruz *et al.*, 2010; Jamshidi and Kazemi, 2020; Mombeuil, 2020) **Ease of use** emerged as the vital factor of mobile banking use (H2) for rural people and ease of use has significant positive impact on relative advantage (H2a). This result implies that more the ease of use of the mobile banking services more is the people's use. These results support the findings of the existing studies (Çelik, 2008; Kim *et al.*, 2010; Lin, 2011; Sangle & Awasthi, 2011; Aggarwal & Bhardwaj, 2014; Adjei *et al.*, 2020; Chawla & Joshi, 2019; Ahmed and Sur, 2021) . Therefore, to achieve wide acceptance of mobile banking usage, service providers must design mobile applications with more user-friendly interface

Self-Efficacy has significant impact on mobile banking use (H3). Further, self-efficacy has significant effect on ease of use (H3a) and credibility (H3b) of mobile banking. These results show that the users' confidence and ability to use the technology products influences vast usage of digital services through mobile devices. Hence, it may be claimed that self-efficacy is an important factor for the use of any innovative product, which makes easy to use innovative products and improves credibility on digital products and service providers. These results also support the findings of existing studies on digital services adoption (Wang *et al.*, 2003; Lin, 2011; Amin *et al.*, 2012; Teoh *et al.*, 2013; Susanto *et al.*, 2016; Chawla and Joshi, 2019; Ahmed and Sur, 2021)

Results found that *credibility* has significant negative effect on mobile banking use (H4). This result asserts that people give priority for safety and privacy while using digital services. Generally, people fear to use digital services due to hacking and lack trust on service providers, who may misuse personal and financial information. Hence, service providers should implement appropriate security system while designing digital services and make aware of various digital vulnerabilities to ensure trust on digital products. Our results of credibility consistence with previous studies (Chen, 2008; Crabbe *et al.*, 2009; Daud *et al.*, 2011; Amin *et al.*, 2012; Tran & Corner, 2016; Arora and Sandhu, 2018 Gupta *et al.*, 2019)

Social influence construct has significant positive impact on mobile banking adoption (H5). This result exerts that family, friends, colleagues, experts, and important others' opinions and suggestions have significant influence on rural peoples' behavior. Furthermore, rapid spread of mass media and social media were also influencing human behavior. Findings of social influence aligned with existing studies (Abushanab and Pearson, 2007; Riquelme and Rios, 2010; Zhou *et al.*, 2010; Al-Ajam and Md Nor, 2015; Deb & Lomo-David, 2014; Farah *et al.*, 2018; Kaabachi *et al.*, 2019; Jung *et al.*, 2020; Sharma *et al.*, 2020)

Empirical results of *financial cost* indicate insignificant impact on mobile banking use (H6). This may be due to the fact that all the respondents owned mobile phones and subscribers of internet. Further, most of the mobile banking service providers are charging low or nominal transaction fees and annual charges. Therefore, mobile banking users are not much concerned about the financial cost. This finding is at variance with existing research findings (Cruz *et al.,* 2010; Sangle & Awasthi, 2011; Yu, 2012; Hanafizadeh *et al.,* 2014; Tran and Corner, 2016; Singh and Srivastava, 2018; Baabdullah *et al.,* 2019)

Awareness has significant impact on mobile banking use (H7). Results claims that awareness is essential for effective use of mobile services. The more aware of mobile financial service, benefits, usability, and operation of mobile devices would enhances the use of mobile banking service. We claim that awareness is essential for effective and efficient use of digital services. This result extends support to the existing empirical findings (Kim *et al.*, 2010; Daud *et al.*, 2011; Chen, 2013; Hota and Mishra, 2018; Giovanis *et al.*, 2019)

7. Conclusion and Implications

The present study attempted to explore the rural peoples' views of mobile banking use with a selfdesigned research model. The model has explained 75.4 percent of variance in the mobile banking use. The empirical results show that except financial cost, all other proposed independent variables have significant effect on mobile banking use. The construct ease of use is established as a crucial factor for rural people to accept mobile banking, followed by social influence, self-efficacy, credibility, awareness, and relative advantage. The results indicate that rural people accept the digital products if the products are easy to use and are suggested to them by important other people in their social circle. Further, users' confidence and ability will make the system easier to use and enhances credibility on digital products. It is also observed from our results, that the awareness of digital products is always an essential element of usability and relative advantage has a little priority to use innovative products. Finally, we conclude that enhanced use of mobile banking accelerates financial inclusion.

This study has threefold implications, namely – research implications, managerial implications, regulatory implications.

7.1 Research implications

This study has important contributions to the academic and research. This empirical study investigated the perspectives of the rural people to adopt mobile banking services. The large extent of existing literature in the technology adoption and digital products adoption investigated in the urban context, but very scant researchers examined in the rural context. For the financial inclusion and inclusive growth, it is important to providing access to finance for all stakeholders. Therefore, this study attempts to fil the gap in the technology adoption literature by incorporating rural people views. The proposed model has been empirically validated and explained higher variation in mobile banking use, that is 75.4 percentage. Therefore, the variable proposed in the model extend the better understanding of the influencing factors of mobile banking in the rural context and lends theoretical contributions in the research of digital products adoption and diffusion of technology for the sustainable and inclusive growth.

7.2 Managerial implications

The empirical findings of the study have important implications for the managerial personnel to develop competitive marketing strategies to untap rural market. Ease of use is the highly influential factor of mobile banking, which suggests that the service providers should consider designing digital services that have user-friendly interaction and the easiness of use. This helps them penetrate into the rural markets. Social influence is the second most influential factor of mobile banking adoption. It shows that the behaviour of rural people has the potential to be influenced by the surrounding people and media. Further, self-efficacy is also another important factors of mobile banking usage. Relative advantage and awareness have little impact on mobile banking among rural people. Therefore, digital services providers must focus on employing people to assist and educate rural people about usability, benefits, and enhance abilities to use of digital services. It is also observed from our results that credibility has a negative impact on use of mobile banking services. That might be a cause for the discontinue of using mobile banking. The results of credibility suggest that the digital financial service providers should implement stringent security system to prevent from unauthorized use of customers information and protecting from cyber-attacks.

7.3 Regulatory implications

The findings also have important implications for the regulatory bodies, such as government and central bank. Results of the study contributes for developing financial inclusion policies through digital channel, which is inexpensive and ubiquitous, to achieve sustainable development goals. Digital services are enabled to provide equal access to digital services, improves livelihood of poor and financially vulnerable people by providing wide access of quality products at their convenience at low price ubiquitously. The result of the credibility of mobile banking has negative effect. Therefore, it emphasizes that regulatory bodies should be vigilant about possible cyber-attacks and implement stringent information technology laws to protect customers from cyberattacks and cyber vulnerabilities.

8. Limitations of the study

This research study has three major limitations. First, respondents of the study were already using mobile banking services. Hence, perceptions of these respondents may not represent the entire rural India. Second, data has been collected through snowball sampling method at single point of time (cross-sectional), which has the limitation for generalizability of findings. Last, this study is limited to the Indian rural context, the findings may not be fully generalized.

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Appendix 1.

	Constructs and Measurement Items	Source
Relativ	e Advantage:	
PA1. PA2. efficien PA3. PA4. money.	Mobile banking is more convenient to initiate financial transactions. Mobile banking allows me to conduct financial transactions effectively and tly. Mobile banking allows me monitor financial transactions. Mobile banking allows me to transact online and offline without physical	Al-Jabri & Sohail, (2012)
Ease of	Use:	
EY1. EY2. EY3. EY4.	Mobile banking easy to use. Mobile banking's interface is user friendly. Mobile banking does not require much mental physical efforts. Interaction with mobile banking is clear and understandable.	Deb & Agrawal, (2017); Siyal et al., (2019)
Social I	nfluence:	
ΣI1. ΣI2. ΣI3. banking	People at my workplace suggest me to use mobile banking. Family and friends suggested me to use mobile banking. It is an emerging trend to use mobile banking, hence I am using mobile g.	Sobti, (2019)
214.		
Self-Eff ΣΕ1. ΣΕ2. ΣΕ3. ΣΕ4.	icacy: I can use mobile banking without help. I can use mobile banking by following manual. I can use mobile banking if someone assist at first time. I have confidence to use mobile banking.	Gu et al., (2009); Boonsiritomachai & Pitchayadejanant, (2019)
Credibi	litv:	
ΧΔ1. ΧΔ2. ΧΔ3. ΧΔ4.	Mobile banking does not divulge my personal information. Mobile banking ensures security for financial transactions. Mobile banking ensures financial information confidential. I believe that the mobile banking technology is safe.	Yu, (2012)
Financi	al Cost:	
ΦX1. ΦX2. ΦX3. ΦX4.	I believe that there hidden charges for mobile banking. I have to incur internet charges to use mobile banking. It is expensive to purchase smartphone. I believe that mobile banking is expensive to use.	Sobti, (2019); Sun et al., (2012)
Mobile	Banking Awareness:	
MA1. MA2. MA3. MA4.	I have enough knowledge about Mobile banking services. I have enough knowledge about mobile banking benefits. I have enough knowledge of how to use mobile banking. I receive text message of every transaction detail from bank.	Anouze & Alamro, (2020)
Mobile	Banking Use:	
Y1. Y2. Y3. Y4.	I use mobile banking for transfer Money. I use mobile banking to purchase goods and services. I use mobile banking to pay domestic bills. I use mobile banking to check bank balance and transactions history.	Zhou et al., (2010)