Journal of Business and Management Sciences, 2021, Vol. 9, No. 3, 101-113
Available online at http://pubs.sciepub.com/jbms/9/3/2
Published by Science and Education Publishing
DOI:10.12691/jbms-9-3-2

Challenges to Mobile Banking Adaptation in COVID-19 Pandemic

Mohammad Abdus Salam[1], Trisha Saha[1], Md Habibur Rahman[1,*], Prantika Mutsuddi[2]

[1]Department of Management Information Systems, Noakhali science and Technology University, Bangladesh
[2]Department of Business Administration, Noakhali Science and Technology University, Bangladesh
*Corresponding author: habib.mis@nstu.edu.bd

Received June 09, 2021; Revised August 09, 2021; Accepted August 11, 2021

Abstract We contribute to the identification of challenges of using mobile financial services focusing on COVID-19 pandemic by extending Technology acceptance model. The pandemic has caused significant shifts in online transactions that will influence individuals, organizations, communities, and nations. In this paper, we will apply partial least square method to explore challenges of mobile banking adoption in crisis situation which people consider in mobile financial transactions. The challenges include perceive risk, perceive privacy, cost, privacy, and customer satisfaction. Perceived risk and perceived privacy also result in perceived security of customer information but quality of mobile banking services and perceived capability have positive impact on customer satisfaction to mobile banking services. Our results, in line with mobile banking literature, show that users are confronting challenges in using mobile financial services though they want to conduct banking staying at home and ensure health safety. In particular, people want to get a stress free life that is being hit by the pandemic itself. Indeed, these challenges were vulnerable before crisis and still exist. Investment to enhance integrity, transparency, and communication can help to eliminate the challenges of using mobile financial services and enhance the well-being of users.

Keywords: *mobile banking, challenges, COVID-19 pandemic, financial transactions*

Cite This Article: Mohammad Abdus Salam, Trisha Saha, Md Habibur Rahman, and Prantika Mutsuddi, "Challenges to Mobile Banking Adaptation in COVID-19 Pandemic." *Journal of Business and Management Sciences*, vol. 9, no. 3 (2021): 101-113. doi: 10.12691/jbms-9-3-2.

1. Introduction

The growth of electronic communication has significant effects in conducting banking activities where banking industry becomes increasingly competitive. People now rely on using technology as a driving force for the advancement of economic systems and their quality of life [1]. Bank is considered as a highly dynamic business entity in the world network which offers better facilities to those people who decide to use online banking services [2]. In this way, banks can offer their products and services and even buy and sell them. One of the newest activities using electronic services is offering banking and financial services through mobile phone. As a result, the world is experiencing an increasingly competitive banking sector with increasingly demanding customers [3]. Covid-19 pandemic has enhanced the demand for using mobile banking services for financial transactions.

Mobile-banking is considered as one approach for providing financial services through ICT which facilitates selection of mobile services in even low-incomes countries [4]. Perceived compatibility had the strongest effect on behavioral intention; and on the other hand, credibility, performance expectancy, effort expectancy, and social influence, ordered by their effect size, significantly influence attitude toward mobile banking, which in turn influenced behavioral intention [5].

Researchers have conducted studies using the Technology Acceptance Model (TAM) to describe an individual's mobile banking adoption [6,7]. They have added only few factors to explain users' intentions to adopt mobile banking. [1,8] identified normative beliefs, ease of use, privacy, security, usefulness, previous experience, technology competency, life style, trust and credibility. Another study [9] in Tanzania has revealed two additional factors cost and demographic status. Further study [10] highlighted satisfaction, trust and use are the variables to determine customers' loyalty to mobile banking. That is why, mobile banking has become the major ways of conducting financial transactions without being infected by Coronavirus. But most of the research missing the challenges of adopting mobile banking for financial services.

Mobile banking of financial entities allows users to access their facilities at any time and from any location. Such facilities represent an advantage over traditional banks. Since the number of cell-phones is more than PCs, mobile-banking has become more popular than e-banking among bankers. Also, mobile phones enhance the quality of services because clients can perform their financial jobs

in every time and place. Therefore, it is clear that use of cell-phones for banking affairs is useful for both clients and the bank. This leads to establishment of a stronger relationship between the financial institutions and clients [11]. Consumers reluctance to adopt mobile banking was related to the knowledge of technology, perceived ease of use, effectiveness and risk of using technology [12]. Aspects such as the lack of differentiation between banks, lack of trust in the system, impersonal treatment or lack of security and uncertainty have caused reluctance to adopt mobile banking services [2,13].

German consumers revealed that only 12% use their cell phones for banking or shopping [14]. According to a recent study by Price Waterhouse conducted in 2013 involving 157 managers for technology and systems for financial institutions in 14 major markets in America, Europe and the Asia-Pacific, the weight of digital channels in retail banking will grow significantly in the coming years. The number of mobile banking (or m-banking) users will increase by 64% until 2016; and those who make purchases through social networks and use online banking will also significantly increase, 56% and 37% respectively Younger people (aged 25–34) are particularly interested in mobile-banking [15]. Also, young people, in comparison to other users, are more predisposed to adopt and use mobile-banking service, for these services are usually low-cost and fit more with their lifestyle [16].

Despite, increasing desire of bank owners to offer financial services through mobile technology, the number of users is much lower that what is expected by the experts of the industry [11,17]. Under such situation, technological advances and increase in the accessibility of electronic services will not lead users to the adoption and use of third-generation technologies [18]. Researchers have conducted many studies to examine the factors determining mobile banking adaptation for financial services [1,8,19].

Research on adaptation of mobile banking for financial services has revealed different types of challenges. Customers consider privacy and security risk [20] of mobile banking posed upon their financial information. In mobile-banking, the data input and output mechanisms of mobile banking might prevent individuals from trusting in those services, as some users show anxiety that they may make mistakes when doing their bank affairs via mobile phone [11]. Mobile banking services' value to consumers which save time, supply real-time information, and give customers a greater control [21] which are expected by users during COVID-19 pandemic. Despite all of this, it is important to highlight that the number of clients that operate through online banking has not increased as much as it was expected. Therefore, this paper aims to identify the challenges which limit the use of mobile banking. The findings should help banking entities understand the problems of their customers and, thus, be able to address and deliver reliable mobile banking services that meet their customers' expectations for their well-being in pandemic.

2. Review of the Literature

Factors influencing acceptance and adoption of mobile banking have been the area of focus to many studies. The common determinant factors are individual awareness, perceived usefulness, perceived benefit, and cost effect of mobile banking technology. Mobile banking has become the source of major purchase in COVID-19 pandemic. This technology helps to maintain safety for the people across the world by purchasing goods online and making online payment.

Online transactions conducted via mobile devices, such as smartphones, is expected to play a larger role in the near future, with more than half a million customers worldwide shopping via mobile devices by 2015 [22]. Rapid growth in the use of mobile phones has driven many businesses to develop mobile enabled commerce transactions. For instance, mobile banking provides a convenient avenue for customers to meet their banking needs by allowing access to complete and timely information at the customers' convenience [23]. Several prior studies have been conducted to examine users' behavior in an effort to understand how users behave when using mobile banking. In one such study, [3] examined among consumers living in Finland and South Africa and found that trust plays a significant role in promoting continuous usage of mobile banking. Another study on sustained use of mobile banking services [24] indicated that perceived usability, channel preference, and perceived value are three major determinants of sustained mobile banking usage. [7] revealed that usefulness and facilitating conditions were the most important factors separating mobile banking users from non-users. Mobile banking enables its users in getting both location and time independent access to banking services thus it assists users in making ubiquitous payment [25]. Another study by [26] indicated that trust creates a positive relationship with mobile banking satisfaction.

Mobile banking: all banking activities are conducted using mobile application.

Conventional banking: personal interactions are required to conduct transactions.

Figure 1. Mobile banking and conventional banking comparison

However, there remains some challenges regarding privacy maintenance of users' confidential information, users' confidence level in handing new technology, service usages cost, users fear of incurring financial loss etc. and all of these may inhibit users' mobile banking adoption rate. Several researchers have revealed some factors that are influential for mobile banking service rejection [27]. Six dimensions of risk perception highlighting social, performance, perception, financial, time, security and privacy issue had been examined to find out the relationship of perceived risk with behavioral intention to use [28]. To protect the security and privacy issues of users, it is essential to develop perceived trustworthiness or credibility [20]. Again, if user can believe that their personal information will remain protected and their banking activities will be accomplished in a secured way will motivate users to accept mobile banking and for that reason, perceptions regarding security and privacy are essential to generate trust or credibility [29]. Moreover, users' perceived trust of using mobile banking is significant for intention behavior. As, lack of trust will motivate the users to reject or not to continue with this digital banking services. Therefore, banking industry providing mobile financial services should prioritize all of these critical issues. As, overcoming mobile banking obstacles will ensure massive acceptance of mobile banking services [30]. [31] demonstrated that relative attitude and relative subjective norm positively motivated respondents to switch from Internet to mobile banking while relative perceived behavior control deterred respondents from transitioning.

There have been a number of studies regarding mobile banking concepts and users' adoption behavior over the last few years. The following table depicts some studies reflecting influential and resisting factors towards users' intention to accept mobile banking services. In association with the TAM theory, indicating users' tendency to accept new technology [32], this study tried to explore the challenging issues that are critical for the continuation of mobile banking technology. This study will be supportive for both mobile telecommunication and banking industry in minimizing the adoption resistance of mobile banking services.

Table 1. Several studies conducted on factors influencing or inhibiting users' attitude towards mobile banking services adoption

Researcher	Independent variables	Dependent variables	Key findings
[7]	TAM and theory of planned behavior (TPB)	Internet banking adoption	Security, privacy, self-efficacy, govt. and technology support affect the adoption of internet banking.
[33]	Perceived risk	Internet banking adoption	Time, financial, performance, security and privacy risk have significant negative effect on the intention to adopt Internet banking.
[8]	usefulness, Ease of use, social norms, social risk, previous experience, security perception	Mobile banking adoption	All variables positively influence adoption of mobile banking except social risk.
[28]	Perceptions regarding usefulness, benefit, social risk, performance risk	Attitude to adopt mobile banking service	These benefit and risk dimensions have direct impact among young users' adoption behavior.
[27]	traditional financial setting	Banking for poor people using mobiles	The traditional financial setting does not allow the poor to access to the financial services by mobile phone.
[21]	Information and guidance	Mobile banking resistance	These two factors are significant in mitigating mobile banking resistance like usage barrier, value barrier, risk barrier, image barrier.
[34]	Cost, lack of relative advantage, perceived risk, unsuitable device, complexity, lack of information, lack of observability	Non-users mobile banking adoption	Perception of cost, perceived risk, low perceived relative advantage and complexity are the main reasons of not using mobile banking.
[30]	Knowledge and learning needs, additional banking charges, poor telecommunication network, preferences for traditional means	Mobile banking rejection	These four factors inhibit mobile banking adoption rate.
[35]	Perceived risk, perceived cost	Intention to use mobile banking	These antecedents have negative influence towards mobile banking use intention mediated by users' attitude.
[31]	Social influence, financial cost, performance expectancy, credibility perceptions	Individuals' tendency to accept mobile banking	All dimensions are remarkable for mobile banking adoption.
[25]	Initial trust	Perceived usefulness	This construct has impact on perceived usefulness and both initial trust and perceived usefulness are significant for usage intention.
[29]	Trust, adaptation with life style, need for interaction, perception regarding creditability, usefulness, ease of use, risk, cost	Individuals' intention to use	All determinants are influential for mobile banking service adoption. Trust and compatibility with life style had been the most important determinants in this study.
[26]	Mobile network trust, mobile banking website trust, mobile phone trust	Mobile banking satisfaction	These three trust groups are positively correlated with mobile banking satisfaction.
[18]	Poor network coverage, poor security of network, ATM breakdown and threats, lack of users' knowledge	Obstacles towards mobile banking adoption	These barriers have negative influence towards adoption behavior.
[20]	Perceived security, perceived privacy, trust	Behavioral intention to adopt	These three constructs are influential for mobile banking service adoption

3. Research Model and Research Hypothesis

TAM has been used heavily for modeling user acceptance of information technology [36]. Many researchers have used TAM to study the use of mobile banking; in Iran by [29], in China by [37]. This research is based on the following extensions of technology acceptance model to identify challenges of using mobile financial services for day-to-day transactions specially during pandemic.

3.1. Personal Interaction

Mobile technology adoption occurs in the context of banking when interaction of the customer occurs with that of technology in banking activities not with customers. Mobile banking service users do their transactions using mobile phone and remain business customers until the time they do so. There is a continuous interaction between the mobile customer and service providers. Service encounters involve interpersonal interactions between customers and service providers [38]. [39] investigated the effect of the need for personal interaction on the intention to use internet banking and found out a negative relationship. In this study, by need for interaction it is meant a personal tradeoff between the client and bank clerk which may cause the infections of COVID-19. Thus, those who need less personal interaction would use more mobile banking services. In this regard, the following hypothesis is presented:

Hypothesis 1: Absence of personal interaction (PI) positively effects attitude toward the usage of mobile banking.

3.2. Perceived Capability

Perceived capability is the ability of technology to formulate and develop new products and related processes and in the context of mobile banking, perceived capability is efficacy of mobile banking technologies to perform banking activities. [40] suggest that successful digital transformation requires an organization to develop several capabilities in many different areas and these capabilities may differ depending on the particular sector and the specific needs of the organization. Perceived capability affects perceived behavioral control, rather than having an impact on behavioral intention to adopt mobile banking [31]. Where there is a higher perceived capability of mobile banking to conduct transactions, the higher will be the capability to use mobile banking for the purpose there of. Mobile banking requires different technological capabilities to maximize usage across diverse areas to keep users away from direct transactions and provide safety from Coronavirus. Thus the proposed hypothesis:

Hypothesis 2. Limited perceived capability (PC) has negative impact on behavioral intention in mobile banking adoption.

3.3. Perceived Cost of Use

The cost of acquiring and using of new technology is another barrier of technology adoption. Besides, the real costs of acquiring and using new technologies usually involve a range of relatively hidden costs which are mostly affect the costs of adoption of business via mobile phone [41]. Previous studies [17] have revealed that perceived costs can be a large barrier to M-banking adoption. In a study on the effect of cost on usage intention [35], concluded that there is a negative relationship between perceived cost and intention to use M-banking. People are getting work less during COVID-19 pandemic and extra cost may deter people from using mobile banking technology. In Bangladesh, customers have to pay BDT18.5 for per 1000 BDT cash out via mobile banking (Source: Bangladesh bank). In this regard, a hypothesis is formulated as following:

Hypothesis 3. Existing perceived costs of use (PCU) negatively influences the adoption of mobile banking.

3.4. Quality of Mobile Banking Services

Quality of service in electronic businesses is the overall evaluation of the excellence and quality of the customers' services in the virtual market [42]. Quality of service is increasingly considered as an important factor of online business because the online comparison of products and services usually has no cost and is faster than the comparison of products using traditional channels [43]. As the quality of the service improves, the customer's satisfaction increases, meaning greater levels of satisfaction lead to positive results in the customer's behavior [44]. Improving the quality of service can increase the intention to use mobile banking to minimize the uncertainty of getting infected by COVID-19. High level of quality mobile banking services may motivate to use technology-based mobile financial services. Therefore, the following hypothesis proposes that;

Hypothesis 4. Quality of mobile banking services (QoMBs) positively influences to mobile banking adoption.

3.5. Perceived Risk

Perceived risk constitutes a multidimensional construct built from financial, physical, psychological, or social risks in online transactions [45]. Some studies on the new technology adoption indicate that an individual's perception of risk is important in the adoption of that technology [46]. The risk factor is considered very important in mobile services, because mobility increase the possibility of financial loss. [47] found out that the risk associated with M-banking is high because of the high probability of theft and loss of a mobile device. Perceived risk negatively influences attitude [35] of adopting remote or mobile payment systems [48]. In our research, perceived risk is crucial since it is considered an antecedent of conducting transactions during COVID-19. Therefore, we propose this research hypothesis:

Hypothesis 5. Perceived risk (PR) demotivates users' in using mobile financial services.

3.6. Perceived Risk and Perceived Security

Security issues have deterred customers from resorting to m-banking options [49] which mainly arise from risk. There is more risk in M-banking in comparison to other

fixed devices due to distant connection. Trust is highly important in purchasing products or service online [50] besides coronavirus pandemic because customers want to maintain the secrecy of their financial information. Mobile banking is perceived as the association of higher risk compared to conventional bank [19] the primary risk of the customers in services is expressed as the necessary security factor for using mobile banking. Coronavirus pandemic across the world has added extra security requirements for customers. Thus the proposed hypothesis:

Hypothesis 6: Perceived risk (PR) has an influence on perceived risk usage challenge to mobile banking.

3.7. Perceived Privacy

Privacy is defined as the protection of individuals from the collection, storage, and dissemination of information about themselves and the possible compromises resulting from unauthorized release of that information. Privacy invasion is a situation in which someone illegally tries to find out details about another person's private affairs. The construct perceived privacy is the possibility of collecting data about individuals and use them inappropriately. The concern regarding the protection of consumers' privacy has become a major obstacle to the spread of E-commerce [13]. A study conducted by [51] revealed that 95% of Internet users in the United States declined to provide their personal information because they do not trust most websites. [52] reported that customers' willingness to transact online depended on their perceived privacy control. Based on this reasoning, it is postulated that:

Hypothesis 7. Perceived privacy (PP) negatively influences the intention towards mobile banking adoption.

3.8. Perceived Privacy and Perceived Security

Customer perceptions regarding security depend largely on how confident a bank can make them feel that their financial data are risk free and secure. Information security issues prohibits customers from using mobile banking options [49] instead of relying on conventional banking options. Perceived risk and perceived privacy are the two components forming perceived security in mobile banking. Overall perceived security creates a circumstances, conditions or event with the potential to cause economic hardship to data or network resources in the form of demolition, divulgence, modification of data, refusal of services or fraud. Perceived security is a subjective probability of viewing, storing, and manipulating customers' personal information during transactions and storing in a manner inconsistent with their confidence expectations [45]. COVID-19 results in financial crisis to many people across the world. That is why, people are more cautious about the loss of their money. Therefore, we propose the following hypothesis:

Hypothesis 8: Perceived privacy (PP) has negative effect on users' security to use mobile banking.

3.9. Perceived Security and Mobile Banking Challenge

The generation of security has been considered as decisive force to stimulate mobile banking adoption. The absence of any practical guarantee, the customer cannot be certain that the seller will not restore to undesirable transactions in online such as unauthorized use of credit card information or unauthorized transactions [53]. Thus, the users will be affected by a sense of insecurity and concern about the privacy. As financial crisis exists during COVID-19, people are more careful about the security and privacy of their financial information. Therefore, the hypothesis is;

Hypothesis 9: The element of perceived security (PS) deters customers from using mobile banking services.

3.10. Quality of Mobile Banking and Satisfaction

Quality of service is defined as the customers' overall evaluation about the excellency and quality of offering in electronic businesses [42]. Quality of service is increasingly considered as an important issue in online business and online comparison substantially has no cost and is faster than the comparison of products using conventional channels [43]. Customer satisfaction depends on the quality of service and is a key factor of customer retention because buyers become satisfied when they are truly offered everything they expect. It is necessary to know customers' expectations well in mobile baking to offer a service that meets their needs. Thus, the quality of the mobile banking service has a positive influence on customer satisfaction and accordingly the following hypothesis proposes:

Hypothesis 10: The quality of mobile banking services (QoMBs) influences satisfaction of mobile banking users.

3.11. Perceived Cost of Use and Satisfaction

Mobile banking cost is a factor that determine the satisfaction and adoption of mobile banking. Most of the users' in Tanzania witnessed that the service helped them access financial services in an easy way [9]. Adoption of internet banking involves internet access cost, device cost and service access cost which are determinates of mobile banking adoption. Because users may dissatisfy if the cost involve in using mobile banking services becomes burden to them. Perceived cost of use has negative effect on behavioral intention for using mobile banking [41] and the satisfaction of customers. COVID-19 motivates people to involve in mobile banking in different ways to make them feel satisfied. Therefore, the hypothesis relating to perceived cost of use and satisfaction is as;

Hypothesis 11: Perceived cost of use (PCU) significantly influences the level of satisfaction of mobile banking users.

3.12. Satisfaction and the Intention to use Mobile Banking

Customer satisfaction is one of the key factors of measuring success of the use of mobile banking [39]. A satisfied customer is a committed to the service of the organization and likely to be a faithful customer. Successful companies across the world try to maximize their customer satisfaction. It is a potential determinants of customer loyalty to generate a long-term profitable

relationship. Satisfaction increases the perception of credibility and benevolence of the other party and increases the probability that customer renew trust [11]. It has been proven that the propensity to continue financial transactions using mobile technology is dependent on the satisfaction of previous transaction experiences [11]. At the very beginning of coronavirus pandemic, government and WHO are inspiring people to use internet banking (especially mobile banking) for the safety of users. In addition, different features are adding to help users adopt mobile financial services. But mobile banking users continuously face low quality and cost burden in conducting transactions. Thus, the following hypothesis proposes;

Hypothesis 12: Customer satisfaction has a positive impact on the use of mobile banking.

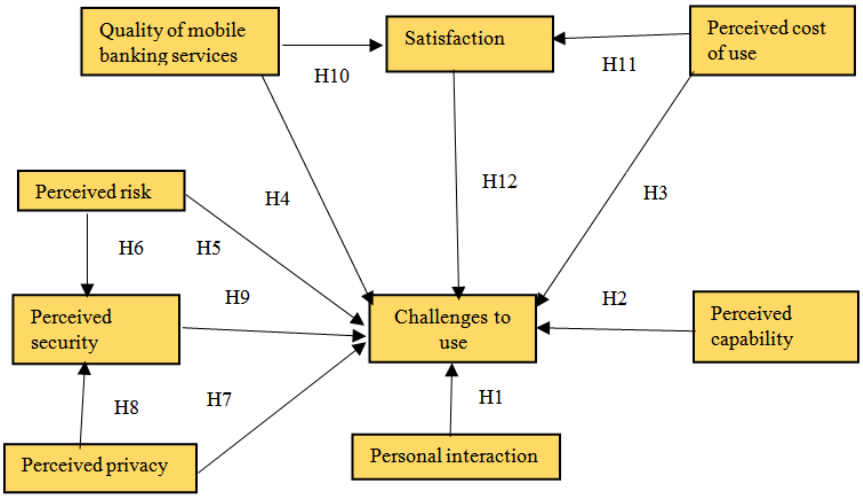

Figure 2. Analyzed Research Model

Based on the hypothesis and literature review of the study, the proposed model is developed for investigation in Figure 2. The proposed model shows the challenges of adaptation in terms of a combination of perceived risk, cost, satisfaction, perceived privacy, perceived security, quality of mobile banking services, personal interaction, and perceived capability.

4. Methodology of Research

Table 2. Sample characteristics

Respondent		Frequency	Percentage
Gender	Male	191	76.1
	Female	60	23.9
Age	Under 19	6	2.4
	19-30	134	53.4
	31-40	85	33.9
	41-50	19	7.6
	51 and Above	7	2.8
Use smartphone	Yes	249	99.2
	No	2	.8
Monthly Income	<20000	84	33.5
	20001-35000	55	21.9
	35001-50000	47	18.7
	>50000	57	22.7
	No answer	8	3.2
Occupation	Job holder	123	49
	Businessman	65	25.9
	Student	55	21.9
	other	8	3.2
Transaction frequency (Per Month)	1 to 5	133	53
	6 to 10	46	18.3
	More than 10	40	15.9
	None	32	12.8

The research was primarily quantitative. The nature of the study is an explanatory. The research was carried out using convenience sampling. Direct sampling of individuals in the population was performed because it enabled cheap, quick access to information. We collect data by gathering answers from an online questionnaire designed in Google Docs sent to the systematically selected respondents who are user of mobile banking or familiar with mobile Banking. The invitation to the online survey was conducted by social media and email due to their faster response which involve a group of 15 students from department of management information systems at Noakhali science and technology university. Questions used to measure other additional constructs are adapted from prior studies [11,29].

The largest portion of respondents were 10-30 years of age (53.4%) and majority of the respondents were 19-50 years of old (94.9%). 53% of the respondents made 1 to 5 transactions per month and 18.3% of the respondents made 6 to 10 transactions per months. Besides, 49% of the respondents were job holder, 25.90% were businessmen and 25.1% were students and others. The respondents were mostly from below 20000 incomes which were 33.50%, 21.90% were from 20001-35000 monthly income level and 18.70% were from 35001-50000 monthly income level followed by 22.70% were from more than 50000 monthly income level. In addition, the portion of females (23.9%) was fewer than males (76.1%).

According to reserve bank of India annual report for 2017-18, mobile banking experienced growth 92% and 13% volume and values. The number of customers increased to 251 million at the end of march 2018 from 163 million at the end of march 2017 [54]. A study report on 2018 showed 53% UK respondents use mobile device for their last bill payment which is 40% average in Europe. Smartphone was predicted to overtake online banking in

2019 and its forecast that around 72% of adults will use mobile banking apps by 2023; in the Netherlands, mobile payments and mobile banking have also grown extremely popular [55].

4.1. Surveys and Measurement Scales

The constructs used in this study are measures adopted from the literature and adapted to suit the context of the study. The final questionnaire consisted of 32 items. The questions were divided into two sections: 1) questions relating to sociodemographic data; and 2) questions relating to the subject of the investigation. All these questions correspond to the conceptual theoretical model defined above, collecting the hypothesized relationships. The majority of items (25) presented a graduation according to the Likert-type scales: from 1 (strongly disagree) to 5 (strongly agree). The data collected for these measurement scales were subsequently analyzed using smart PLS software.

4.2. Reliability and Validity Analysis

To verify the suitability of data and the measurement scales, a convergent validity test was performed to get assurance that different items of the study used to measure the constructs are in agreement. To assess the convergent validity, factor loadings, composite reliability and average variance extracted were used as indicators [5]. The loadings value for items exceeded .7 as per recommendations [27]. The Average Variance extracted (AVE) is between 0.631 and 0.810 where composite reliability (CR) is between 0.836 and 0.927. If Average variance extracted is more than 0.5 and composite reliability is higher than 0.7, then convergent validity of the construct is still adequate [56]. The Cronbach's Alpha values are more than 0.7 for all constructs, which support the value recommended by [27] and, also rho_A values for all constructs. So, the model is good enough for the investigation purpose. Table 3 depicts the result of convergent validity.

We compute the HTMT criteria on the basis of the item correlations (Table 4) defined in the equation (1) for each pair of constructs. The computation yields values below the threshold values defined $HTMT_{.85}$, $HTMT_{.90}$ and $HTMT_{inference}$. So, the discriminant validity has been established [56] under three different heteromethod-heterotrait (HTMT) validity determination critera. The HTMT criteria displays discriminant validity of inter-construct correlations in which the construct is actually different from one another. It shows that any approach points to discriminant validity issues at comparatively high levels of inter-construct correlations as values are below the threshold values (Table 4) which are between (.022 and .624).

$$\frac{1}{k(k-1)}\cdot\left(\sum_{g-1}^{k}\sum_{h-1}^{k} r_{g h-K}\right)\frac{1}{K^2}\left(\sum_{g-1}^{k} r_g\right)^2 \quad (1)$$

Table 3. Measurement Validity

Constructs	Items	Loadings	Cronbach's Alpha	rho_A	CR	AVE
PI	PI1	0.723	0.763	0.786	0.863	0.680
	PI2	0.880				
	PI3	0.861				
PC	PC1	0.788	0.828	0.892	0.895	0.740
	PC2	0.877				
	PC3	0.911				
PCU	PCU 1	0.801	0.721	0.730	0.840	0.637
	PCU 2	0.822				
	PCU 3	0.771				
QoMBs	QoMBs1	0.839	0.753	0.757	0.859	0.670
	QoMBs2	0.832				
	QoMBs3	0.783				
PR	PR1	0.701	0.715	0.754	0.836	0.631
	PR2	0.844				
	PR3	0.836				
PP	PP1	0.871	0.882	0.884	0.927	0.810
	PP2	0.934				
	PP3	0.895				
PS	PS1	0.938	0.742	0.854	0.881	0.787
	PS2	0.834				
Satisfaction	Satisfaction1	0.823	0.753	0.755	0.859	0.670
	Satisfaction2	0.847				
	Satisfaction3	0.784				
Challenges to use	Challenges to use 1	0.868	0.795	0.805	0.879	0.708
	Challenges to use 2	0.824				
	Challenges to use 3	0.832				

Table 4. Discriminant Validity Using HTMT Criterion

	Challenges to use	PC	PP	PR	PS	PCU	PI	QoMBs
Challenges to use								
PC	0.361							
PP	0.554	0.284						
PR	0.376	0.395	0.074					
PS	0.022	0.034	0.124	0.334				
PCU	0.181	0.219	0.130	0.502	0.618			
PI	0.456	0.113	0.294	0.440	0.332	0.327		
QoMBs	0.347	0.175	0.311	0.262	0.200	0.154	0.346	
Satisfaction	0.410	0.490	0.323	0.624	0.109	0.308	0.414	0.412

4.2. Structural Model

The relationships among research constructs developed in the theoretical model during hypothesis development can be examined using structural model. We proceeded with hypothesis testing assuming that the measurement model meet validity and reliability estimation. The predictive accuracy of the model was assessed in terms of the variance portion explained. The result of structural equation modelling is presented in Table 5.

Table 5. Result of Hypothesis Testing

Hypothesis	Path	Path Coefficient	t statistics	p values	Decision
H1	PI -> Challenges to use	0.200	3.070	0.001	Supported
H2	PC -> Challenges to use	0.143	1.957	0.025	Supported
H3	PCU -> Challenges to use	-0.028	0.401	0.344	Not supported
H4	QoMBs -> Challenges to use	0.087	1.632	0.052	Not supported
H5	PR -> Challenges to use	-0.161	2.008	0.023	Supported
H6	PR -> PS	-0.279	4.325	0.000	Supported
H7	PP -> Challenges to use	-0.345	5.410	0.000	Supported
H8	PP -> PS	-0.116	1.730	0.042	Supported
H9	PS -> Challenges to use	-0.062	0.903	0.184	Not supported
H10	QoMBss-> Satisfaction	0.296	3.974	0.000	Supported
H11	PCU -> Satisfaction	-0.207	3.411	0.000	Supported
H12	Satisfaction -> Challenges to use	0.023	0.309	0.379	Not supported

Table 5 displays the path coefficient, t-statistics, P-value, and status of each hypothesis proposed in the study. The results of hypothesis testing reveal that the absence of personal interaction motivates users to adopt mobile banking for financial transactions while perceived capability of conducting transactions, perceived risk, and perceived privacy are some of the existing challenges to mobile banking adoption. Besides, in this study, perceived risk and perceived privacy are two components of perceived security while quality of mobile banking satisfaction and perceived cost of use are two components of satisfaction of mobile financial users. Path coefficient analysis and t-statistics examine the relationship between dependent and independent variables. From these results, H3, H4, H9 and H12 are rejected while rest of the hypothesis are supported.

Table 6. R square

	R Square	R Square Adjusted
Challenges to use	0.353	0.329
Perceived Security	0.088	0.080
Satisfaction	0.139	0.132

Moreover, the value of R^2 is 0.353 (see Table 6) which means that these independent variables can explain 35.3 percent of the variance about the intention to use mobile banking for financial transactions with the existence of those challenges while R^2 are 0.088 and 0.139 for Perceiver Security and Satisfaction . Eight hypothesis of the study were supported, while four hypotheses were rejected. Thus, H1 (t value = 3.070), H2 (t value = 1.957), H5 (t value = 2.008), H6 (t value = 4.325), H7 (t value = 5.410), H8 (t value = 1.730), H10 (t value = 3.974), and H11 (t value = 3.411) are supported.

5. Discussion of Results: Hypotheses Testing and the Structural Model

This study considers the TAM to determine the antecedents of challenges to mobile banking challenges adaptation for users during worldwide coronavirus pandemic. The study is an extension of prior empirical works by focusing specially on challenges of mobile baking adoption in crisis situation to keep people away from other people contract. After analyzing the reliability and validity of the measurement scales of constructs, analysis of the resulting structural relationships was performed using partial least square method to test the hypothesis. The significance ($p<.05$) of the variables was used to test hypothesis using the structural equation model.

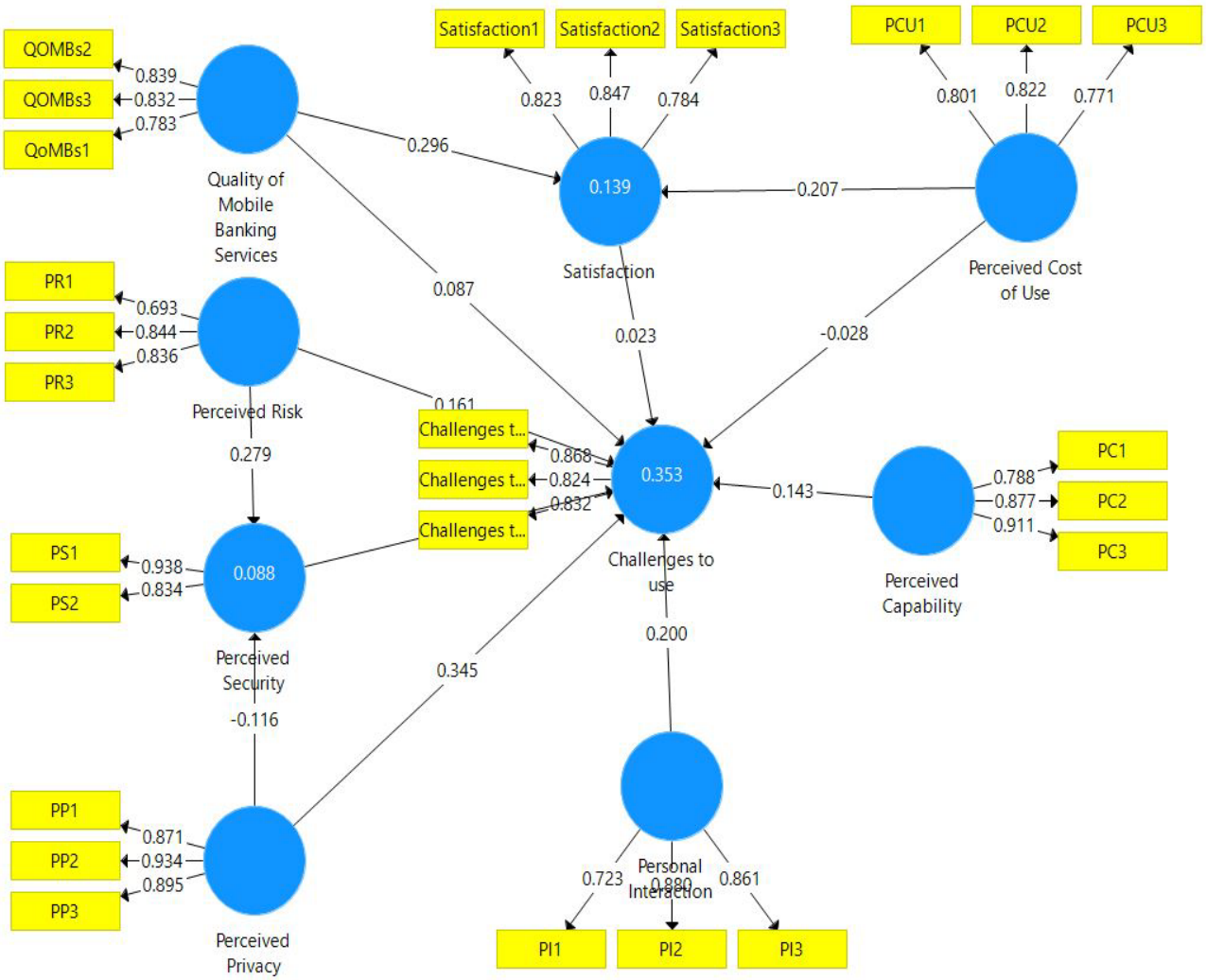

Figure 3. Analyzed Research Model (Standardized betas)

To evaluate the SEM, the statistical significance of its structural loads was analyzed. Table 5 and Figure 3 show the results of the structural equation analysis and the results of the research hypotheses. With regard to relationships, the study has to take into account the p-value column corresponding to each variable where the associated p-value less than 0.05 show significant relationships associated with respective variables. In our analysis, nine relationships are significant and four relationships are insignificant. First, with respect to the effects of perceived cost of use, the result shows evidence to contradict the statements of the hypotheses H3. Specifically, the importance of perceived cost of use variable regarding the adoption of the existing mobile banking is demonstrated through the challenge toward such banking (β= -0.028; p = 0. 0.344). Thus, perceived cost of use does not negatively affect the intentions to mobile banking adoption as it was pointed out by [3] in mobile banking context or [2] for travel 2.0 tools and quality of mobile banking services does not support hypothesis (H4). Regarding existing quality of existing mobile banking services (β= 0.087; p = 0.052) which does not motivate users to rely on mobile financial transactions, thus could be a challenge.

There is empirical evidence of the study to accept the proposed hypothesis on the negative influence of perceived privacy (H7). Also, perceived privacy poses challenge on the use of mobile banking (β= -0.345; p = 0.000) is shown, as noted in researches of [20] that credibility significantly affects mobile banking adoption. Thus, the negative effect of perceived privacy creates insecurity (H8) and challenge towards adopting mobile banking by users. We can also confirm the negative effect of perceived risk of mobile banking services demotivates users to mobile banking services that support the statement of hypothesis (H5) (β= -0.161; p = 0.023), as perceived risk creates challenges on usage of mobile banking [44] and results in security related challenge supporting (H6) that perceived risk negatively effects the use of mobile banking (β= -0.279; p = 0.000). The study also supports quality of mobile banking services expected by users' and confirms the positive effect of quality on the satisfaction of using mobile banking for financial services H10 (β= 0.296; p = 0.000). As for the effect of cost of use, empirical evidence is found to accept H11, demonstrating the relevance of cost as the challenge to mobile banking users' level of satisfaction (β= -0.207; p = 0.000), as it appeared in research by [29]. Where, there is no empirical

evidence to reject H2 (β= 0.143; p = 0.025), thus supporting to demonstrate the positive impact of perceived capability with the intention to use mobile banking. So, Regarding the effects of personal interaction, empirical evidence is found to accept hypothesis H1. Therefore, we can confirm that personal interaction does not get importance in banking motivating customers to involve in human free mobile banking (β= 0.200; p = 0.001), which is a contradiction of the findings demonstrated in research by [29] in the mobile banking context. So, the absence of personal interaction poses no challenge in banking activities and therefore motivates using mobile baking technology.

Furthermore, there is empirical evidence of the study on the impact of perceived security (H9) deterring users from using mobile banking [10,44,53]. Also, the importance of perceived security on the use of mobile banking (β= -0.062; p = 0.184) is rejected in the study that security deters users from mobile banking adoption. Thus, the study does not prove that perceived security deters users from adopting mobile banking services. In addition, hypothesis (H12) regarding positive impact of customer satisfaction on the use of mobile banking is not supported (β= 0.023; p = 0.379). So, customer satisfaction causes a big challenge to use mobile banking services for financial transactions.

6. Conclusions and Implications

6.1. Main Conclusions

The main objective of this study was to identify the challenges that have the greatest influence on the intentions to adopt mobile banking, as well as providing conclusions beyond mere descriptive analysis. To achieve such objectives of the study, we have added some constructs based on TAM model, which are relevant to challenges to mobile banking adoption such as perceived capability. cost, quality. risk, privacy, and customer satisfaction. An online survey has been launched to collect and analyze data of the proposed hypotheses using smart PLS. This is an important issue because customers may not adopt mobile banking technology due to existing challenges of mobile banking technology adaptation. It is the prediction of banking institutions that once customers begin to use mobile banking technology and become well-known with the service, they may be willing to continue using it, especially when a challenges are resolved with high-quality service [26]. Therefore, the higher the challenges of quality of mobile banking service are, the greater the level of user dissatisfaction will be, which will translate into avoidance of mobile banking technology adoption. On the other hand, according to the results, quality of mobile banking services act as a key antecedent to the use of mobile banking and customer adaptation along with perceived cost of use, which effect customer satisfaction. In this sense, the more satisfied customers are with the technology, the more likely they will be 'provided challenges are mitigated' to continue using the mobile service. But perceived cost of use and quality of mobile banking services to use have not proven to create direct challenge in mobile banking services, only we can state that the relationship is very poor having no explanatory power to demonstrate in the case.

Based on these challenges identified in the study, a model was proposed. This process enabled the integration of the structural relationships with the variables performed through discriminant validity analysis and made it possible to demonstrate which of these challenges best explains reluctance to mobile banking adaptation. From the structural model, the analysis and review of the results displays that the variables that have the greatest challenges on mobile banking adaptation are perceived capability, quality of mobile banking services, perceived cost, perceived privacy, and customer satisfaction. Quality of mobile banking services and perceived cost of use also become major challenges, though indirectly with the involvement of internet access cost and sometimes failure to get quality products. According to these results, perceived risk creates challenge to mobile banking adoption. Thus, research and data analysis of the research make several theoretical and practical contributions in the mobile banking technology. First, and after the analyses were done, we found that the perceived capability, with the strongest challenge, determines intention to use mobile banking.

These findings imply that as customer challenges to mobile banking adoption exists, customers will be more likely to avoid using mobile banking technology. In addition, if banking institutions want to maintain solid relationships with their customers, this will generally occur automatically when they provide services minimizing challenges in mobile banking. It can be confirmed that privacy of the use of mobile banking has a direct impact on adoption to mobile banking. That is why, privacy of the use of mobile banking has to be ensured to provide security of customers' information. However, in this study, the cost of use, and quality were significant factors in the customer satisfaction of mobile banking use. This result may represent the attributes of the respondents in the sample, who were mostly professionals familiar with and accustomed to interacting with mobile banking. This challenges probably occur because of the level of existing technologies which are incorporated into the design of all mobile banking applications in the market identifying different challenges for their use that prohibit users' from free use of mobile banking during COVID-19 pandemic. In other words, customers need to think about the level of trust when using mobile banking because they want to live their lives constantly connected to this type of service due to widespread COVID-19 pandemic. Perceived Security is a major challenge, on the use of mobile banking and on Privacy. As for its challenges on use, customers will adopt the mobile banking technology less when they associate it with a high risk because of the unpredictability that the application entails for the customers and/or the possible opposing consequences of conducting online transactions. Moreover, the influence of this effect has been widely verified in several fields before Covid-19 pandemic, and the results of this study do not support and strengthen the previously formulated proposal [1]. On the other hand, the effect on privacy displays that when customers think about the acquisition of mobile

banking to be risky, trust declines. Regarding trust, with the help of work by different researchers [17], this study validates that it has a direct relationship to accept mobile financial technologies. Thus, customers will be less loyal when the mobile banking services provided by banks build lower levels of trust. Therefore, banks' greatest challenge is to reduce perceived risks to increase user recognition regarding consumers' perceptions of risk and trust can be a barrier for mobile banking transactions. Thus, it may be declared that customers affixed greater value to banking entities that convey trust and concern over reducing the risk associated with these services.

6.2. Contributions to Literature

First, the variables that explain the challenges on the use of mobile banking and their effects on the use of mobile financial technologies were examined. The study contributes by discovering the causal relationships between quality of mobile banking service and satisfaction, cost of use and satisfaction, satisfaction and challenges, quality and challenge, cost of use and challenge, perceived risk and perceived security, perceived privacy and perceived security, perceived security and challenge, personal interaction and challenge, and perceived capability and challenge to use mobile banking, as well as the relationship that inspired this study, namely between challenges and use of mobile banking in COVID-19. Consequently, for this ever increasing destructive impact of COVID-19 Pandemic, where mobile banking technology facilitates normal life of people across the world, the study's corroboration of a significant relationship between mobile banking and challenges to use is an attractive finding in the financial literature because it is new and useful for developing a novel research perspective.

Second, a model was developed for the analysis, in which the relationships between variables that describe challenges to use mobile banking were integrated. To construct the model, some of the most widely recognized models on mobile banking were reviewed. It is worth noting that this model describes a new relationship (between challenges and use of mobile banking), whereas other studies have explained only the intention to use [3]. Third, according to the study of the variables that hinders to the use of mobile banking, some constructs are not significant. These constructs include perceived risk, quality of mobile banking services and satisfaction, mainly because the focus of this study was on challenges to use mobile banking in COVID-19 pandemic, unlike other studies that have primarily focused on exploring the factors that influence the intention to use mobile banking [1,49]. Therefore, it is worth mentioning that when analyzing the background of the challenge of a new technology such as use mobile banking in pandemic situation, these aforementioned variables need not be examined because the results will possibly be the same, as described in the conclusion part of this paper. Finally, the measurement tool was designed using the existing literature, with tests of its validity and reliability. It can be used for further studies in future.

6.3. Managerial Implications

Challenges influence on adaptation means that banks must continuously and systematically analyze the factors of the use of mobile banking that lead to reluctance of user to adopt mobile banking for financial transactions (especially satisfaction to use). As in previous studies, it has been found that a greater degree of satisfaction means a higher number of loyal customers [6]. Therefore, banks should focus on understanding existing challenges and introducing high-quality mobile banking services. The impact of trust on challenges to the use of mobile banking suggests the need for a series of actions to enhance trust level on mobile banking. First, integrity and transparency are exquisite matters because they must follow any promises and commitments made. Second, the bank's communication policy must promote the accomplishment of objectives that accompany those of customers while supporting the recognition of customer well-being.

Third, banking entity should ensure considerable investment and provide resources to improve task performance and confirm that customers perceive greater competence and skill in the use of mobile banking. The role of perceived capability in the use of mobile banking must be managed properly as customers will conduct their transactions using mobile banking services due to deadly spread of COVID-19. Banks must ensure their clients that the personal information will remain confidential and that there are encoded data platforms to guarantee privacy and safety in mobile banking transactions. Specifically, for users to perceive the lowest possible risk, clear and understandable privacy regulations should be publicized on the bank's website. Banks must also explain the process and information on how to deal with challenges in case they arise, as well as providing instructions about how to use mobile banking services safely to decrease security and risk involved in mobile banking transactions [6]. Therefore, to expand mobile banking users' intention, banks must work on minimizing the challenges that users have about the service. Finally, through technological improvements, they must minimize the challenges associated with mobile banking specially in pandemic.

References

[1] Changchit, C., Lonkani, R., & Sampet, J. (2017). Mobile banking: Exploring determinants of its adoption. *Journal of Organizational Computing and Electronic Commerce*, *27*(3), 239-261.

[2] Muñoz-Leiva, F., Luque-Martínez, T., & Sánchez-Fernández, J. (2010). How to improve trust toward electronic banking? *Online Information Review*.

[3] Shaikh, A. A., Karjaluoto, H., & Chinje, N. B. (2015). Consumers' perceptions of mobile banking continuous usage in Finland and South Africa. *International Journal of Electronic Finance*, *8*(2-4), 149-168.

[4] Anderson, J. (2010). M-banking in developing markets: competitive and regulatory implications. *info*.

[5] Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2013). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications.

[6] AlSoufi, A. (2014). Customers perception of m-banking adoption in Kingdom of Bahrain: an empirical assessment of an extended TAM model. *International Journal of Managing Information Technology (IJMIT) Vol*, *6*.

[7] Nasri, W., & Charfeddine, L. (2012). Factors affecting the adoption of Internet banking in Tunisia: An integration theory of acceptance model and theory of planned behavior. *The journal of high technology management research*, *23*(1), 1-14.

[8] Riquelme, H. E., & Rios, R. E. (2010). The moderating effect of gender in the adoption of mobile banking. *International Journal of bank marketing*.

[9] Abdinoor, A., & Mbamba, U. O. (2017). Factors influencing consumers' adoption of mobile financial services in Tanzania. *Cogent Business & Management*, *4*(1), 1392273.

[10] Alonso-Dos-Santos, M., Soto-Fuentes, Y., & Valderrama-Palma, V. A. (2020). Determinants of mobile banking users' loyalty. *Journal of Promotion Management*, *26*(5), 615-633.

[11] Laukkanen, T. (2007). Internet vs mobile banking: comparing customer value perceptions. *Business process management journal*.

[12] Yousafzai, S., & Yani-de-Soriano, M. (2012). Understanding customer-specific factors underpinning internet banking adoption. *International journal of bank marketing*.

[13] Islam, S., (2014) Systematic literature review: Security challenges of mobile banking and payments system. *International Journal of U- and E- Service, Science and Technology*, 7(6), pp. 107-116.

[14] Tanner, J. C. (2008). Consumers still wary of m-commerce.

[15] Sraeel, H. (2006). Hold the phones: mobile commerce is here, Bank Technology News.

[16] Bigne, E., Ruiz, C., & Sanz, S. (2005). The impact of internet user shopping patterns and demographics on consumer mobile buying behaviour. *Journal of Electronic Commerce Research*, *6*(3), 193.

[17] Kleijnen, M., De Ruyter, K., & Wetzels, M. (2004). Consumer adoption of wireless services: discovering the rules, while playing the game. *Journal of interactive marketing*, *18*(2), 51-61.

[18] Wang, C. C., Lo, S. K., & Fang, W. (2008). Extending the technology acceptance model to mobile telecommunication innovation: The existence of network externalities. *Journal of Consumer Behaviour: An International Research Review*, *7*(2), 101-110.

[19] Kim, G., Shin, B., & Lee, H. G. (2009). Understanding dynamics between initial trust and usage intentions of mobile banking. *Information Systems Journal*, *19*(3), 283-311.

[20] Luarn, P., & Lin, H. H. (2005). Toward an understanding of the behavioral intention to use mobile banking. *Computers in human behavior*, *21*(6), 873-891.

[21] Laukkanen, T., & Kiviniemi, V. (2010). The role of information in mobile banking resistance. *International Journal of bank marketing*.

[22] Deng, X., & Zhang, J. (2014). Differentiating the effects of Internet usage and wireless usage on business-to-business and business-to-consumer e-commerce. *Journal of Internet Commerce*, *13*(2), 138-157.

[23] Baptista, G., & Oliveira, T. (2015). Understanding mobile banking: The unified theory of acceptance and use of technology combined with cultural moderators. *Computers in Human Behavior*, *50*, 418-430.

[24] Kang, H., Lee, M. J., & Lee, J. K. (2012). Are you still with us? A study of the post-adoption determinants of sustained use of mobile-banking services. *Journal of Organizational Computing and Electronic Commerce*, *22*(2), 132-159.

[25] Zhou, T. (2011). An empirical examination of initial trust in mobile banking. *Internet Research*.

[26] Masrek, M. N., Mohamed, I. S., Daud, N. M., & Omar, N. (2014). Technology trust and mobile banking satisfaction: a case of Malaysian consumers. *Procedia-Social and behavioral sciences*, *129*, 53-58.

[27] Hinson, R. E. (2011). Banking the poor: The role of mobiles. *Journal of Financial Services Marketing*, *15*(4), 320-333.

[28] Akturan, U., & Tezcan, N. (2012). Mobile banking adoption of the youth market: Perceptions and intentions. *Marketing Intelligence & Planning*.

[29] Hanafizadeh, P., Behboudi, M., Koshksaray, A. A., & Tabar, M. J. S. (2014). Mobile-banking adoption by Iranian bank clients. *Telematics and informatics*, *31*(1), 62-78.

[30] Iddris, F. (2013). Barriers to adoption of mobile banking: Evidence from Ghana. *International Journal of Academic Research in Business and Social Sciences*, *3*(7), 356-370.

[31] Yu, C. S. (2014). Consumer switching behavior from online banking to mobile banking. *International Journal of Cyber Society and Education*, *7*(1), 1-28.

[32] Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management science*, *35*(8), 982-1003.

[33] Hanafizadeh, P., & Khedmatgozar, H. R. (2012). The mediating role of the dimensions of the perceived risk in the effect of customers' awareness on the adoption of Internet banking in Iran. *Electronic Commerce Research*, *12*(2), 151-175.

[34] Cruz, P., Neto, L. B. F., Muñoz-Gallego, P., & Laukkanen, T. (2010). Mobile banking rollout in emerging markets: evidence from Brazil. *International Journal of bank marketing*.

[35] Wessels, L., & Drennan, J. (2010). An investigation of consumer acceptance of M-banking. *International Journal of bank marketing*.

[36] Bagozzi, R. P. (2007). The legacy of the technology acceptance model and a proposal for a paradigm shift. *Journal of the association for information systems*, *8*(4), 3.

[37] Song, H. L. (2015). Customer Adoption of Mobile banking: An integration of TAM with Trust and Social influence. In *Applied Mechanics and Materials* (Vol. 701, pp. 1323-1327). Trans Tech Publications Ltd.

[38] Curran, J. M., & Meuter, M. L. (2005). Self-service technology adoption: comparing three technologies. *Journal of services marketing*.

[39] Rahman, M. H., Al-Amin, M., & Lipy, N. S. (2020). An Investigation on The Intention to Adopt Mobile Banking on Security Perspective in Bangladesh. *Risk and Financial Management*, *2*(2), p47-p47.

[40] Carcary, M., Doherty, E., & Conway, G. (2016, September). A dynamic capability approach to digital transformation: a focus on key foundational themes. In *The European Conference on Information Systems Management* (p. 20). Academic Conferences International Limited.

[41] Wu, J. H., & Wang, S. C. (2005). What drives mobile commerce? An empirical evaluation of the revised technology acceptance model. *Information & management*, *42*(5), 719-729.

[42] Marimon, F., Petnji Yaya, L. H., & Casadesus Fa, M. (2012). Impact of e-Quality and service recovery on loyalty: A study of e-banking in Spain. *Total Quality Management & Business Excellence*, *23*(7-8), 769-787.

[43] Chu, P. Y., Lee, G. Y., & Chao, Y. (2012). Service quality, customer satisfaction, customer trust, and loyalty in an e-banking context. *Social Behavior and Personality: an international journal*, *40*(8), 1271-1283.

[44] Tahseen Arshi, A., & Al Lawati Jassim, M. (2013). Customer satisfaction in banking sector in Oman: what do they care for?. *Advances in Management*.

[45] Forsythe, S. M., & Shi, B. (2003). Consumer patronage and risk perceptions in Internet shopping. *Journal of Business research*, *56*(11), 867-875.

[46] Yang, A. S. (2009). Exploring adoption difficulties in mobile banking services. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de administration*, *26*(2), 136-149.

[47] Coursaris, C., Hassanein, K., & Head, M. (2003). M-commerce in Canada: an interaction framework for wireless privacy. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration*, *20*(1), 54-73.

[48] Liébana-Cabanillas, F., Muñoz-Leiva, F., & Sánchez-Fernández, J. (2018). A global approach to the analysis of user behavior in mobile payment systems in the new electronic environment. *Service Business*, *12*(1), 25-64.

[49] Bhatt, A., (2016). Factors affecting customer's adoption of mobile banking services.. *Journal of Internet Banking and Commerce*, 21(1), pp. 1-22.

[50] Al-Amin, M., Rahman, M. H., & Islam, S. N. (2020). Investigating the factors influencing customers towards e-commerce shopping in Bangladesh. *Journal of Noakhali Science and Technology University (JNSTU)*, *4*(1&2), 39-47.

[51] Liu, C., Marchewka, J. T., Lu, J., & Yu, C. S. (2004). Beyond concern: a privacy–trust–behavioral intention model of electronic commerce. *Information & Management*, *42*(1), 127-142.

[52] Zorotheos, A., & Kafeza, E. (2009). Users' perceptions on privacy and their intention to transact online: a study on Greek internet users. *Direct Marketing: An International Journal*.

[53] Reichheld, F. F., & Schefter, P. (2000). E-loyalty: your secret weapon on the web. *Harvard business review*, *78*(4), 105-113.

[54] Times, T. E., (2018). *Mobile banking catching on fast: Here's the proof.* [Online] Available at: https://economictimes.indiatimes.com/wealth/personal-finance-news/mobile-banking-catching-on-fast-heres-the-proof/articleshow/65593432.cms [Accessed 10 18 2020].

[55] Buswell, G., (2020). Mobile banking in the UK. [Online] Available at: https://www.expatica.com/uk/ finance/banking/mobile-banking-in-the-uk-291627/[Accessed 18 8 2020].

[56] Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science, 43(1), 115-135.