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Does COVID -19 Effect Intention to Adopt Mobile Banking Services? Role of Decomposed Theory of Planned Behavior

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ABSTRACT

Abstract: Current study aims to measure the impact of this disruption on customers' intention to adopt Mobile Banking Services (MBS) offered during the pandemic. This model is designed based on DTPB with a modification of COVID-19. The data were collected from 150 respondents through the convenience sampling technique. The data was analyzed using SPSS and Jamovi, to measure the structure model. According to the results, the relationship of attitude with behavioral intention is significantly positive. However, Social influence does not show any significant direct relationship with behavioral intention. The results also showed the significant positive effect of the direct impact of perceived behavioral control over behavioral intention. The variable representing COVID-19 also showed a direct significant effect on behavior. Study provides implications for banking managers to optimize their advanced MBS to attract customers and enhance their attraction towards mobile banking applications. The incorporation of DTPB in the banking sector during COVID-19 could implicate theoretical contribution in disruption situations.

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Introduction

A smooth, efficient, and productive business is the dream of every organization (Coe & Yang, 2022). However, disruptions occur and significantly distort the smooth function of a productive business (Sarwar & Marria, 2021). The global financial crises, international functions in oil prices, and currency instability are the economic disruptions. However, natural disruptions like the Swine flu, MERS, SARS, and Ebola viruses are the natural disruptions noted in history (Khan & Manzoor, 2021). The COVID-19 pandemic started in China in December 2019 and has slowly engulfed the entire globe including Pakistan. The COVID-19 is a highly contagious and transmissible virus and spreads very easily towards a large number of people (Khan et al., 2020). It is dangerous for people with older age or having health problems that lead to a poor immunity system. Scientists are trying to find a cure for this disease. However, the only way to fight it now is through prevention through quarantine and complete lockdown (Arumugasamy, 2020). The World Health Organization (WHO) has also endorsed the way of lockdown to prevent COVID-19. This lockdown has resulted in the shutdown of major industries that include manufacturing, tourism, and travel and hospitality, etc. According to World Economic Forum (Scott, 2020), 50 million jobs are at risk worldwide. The impact of this lockdown on one hand is affecting the people worldwide and on the other hand, creating a global economic crisis (Zhang; Rasheed & Luqman, 2020). This lockdown due to Covid has drastically affected the global economy, eventually economy of Pakistan. Along with the effect on almost all industries, the effect on the financial sector is also alarming. The number of consumers has reduced. The protocols of the COVID-19 adopted by banks have also discouraged consumers to visit the branches. To survive in this condition, commercial banks are looking up ways to continue providing services to their consumers. The solution to this problem was found in Mobile banking services (Manu & Girish, 2020).

Mobile banking is transformative (Porteous, 2006). Mobile banking services refer to mobile wallets and over-the-counter transactions that replace the conventional brick to brick banking activities with mobile applications (Rizvi et al., 2017). It is one of the latest financial services that enables the banks to make their services available to their customers at any time and any place. Consumers can conveniently avail all banking facilities through their mobiles, including checking account status and transactions, making electronic bill payments, depositing checks, making P2P payments, and transferring funds to another account or for C2C, C2B, B2C, or B2B, etc. with simple operations in their mobile devices. Some apps also enable copies of statements to be downloaded and sometimes printed by the customers. The built-in mobile security mechanisms and protocols set by banks make all the transactions and information safe and secure.

This has resulted in higher accessibility with the ease of staying within social distancing protocol with lower costs of operations. It has the potential to radically reduce the cost of delivery and increase convenience, flexibility, and mobility for customers. Consequently, mobile banking can increase the financial inclusion of the large public and can provide easy access to services. The growth of banks getting into mobiles is a major opportunity for financial institutions. It has grown worldwide as many practitioners invested in the service to deliver more efficient and convenient services through mobile applications. A major advantage of banking becoming mobile is the ease of handling and maintaining banking products and services with convenience with less space, cost, and time, prompt complaint handlings, quick deliveries, and stress-free banking (Giovanis et al., 2019). Broeders and Khanna (2015) of McKinsey & Co., declared that “Revenues and profits will migrate toward banks that successfully use digital technologies to automate processes, create new

products, improve regulatory compliance, transform the experiences of their customers, and disrupt key components of the value chain."

Despite the advantages of mobile banking, consumers in some forms are reluctant to use it majorly due to security issues. Hence, marketing practitioners in banking industry must realize factors that can stimulate their customers towards adopting mobile banking services. This will help the banks and financial institutions adopt effective means to promote their new offerings related to mobile services and gain a competitive advantage over their rivals (Shih & Fang, 2004). Most poor M-PESA customers said that they chose the service because of its low cost (Morawczynski & Pickens, 2009). This makes it an attractive proposition to introduce it with modified banking services to low-income potential markets having less access to conventional banking facilities (Liu, Hassan; Chupradit; Ageli; Shoukry; & Aldeek, 2021).

Besides this, disruptions like COVID-19 have recently closed all doors for physical activities. Similarly, the banking sector has drastically converted from traditional to online banking. This study aims to evaluate the role of COVID-19 as a mediator between constructs of DTPB and customer's intention to adopt mobile application services of banks. Besides this, the study addresses the role of COVID-19 in customer intention to use MBS? The rest of the paper is designed as: section 2 discussed the relevant literature review and theoretical underpinning. Section three discussed the methodology used and section four discussed the findings and results.

Literature Review

The history of mobile banking starts with the introduction of SMS services, which later was converted to mobile applications that are still progressing towards innovations. "*Fokus Bank*" of Norway launched its application for the first time in 1999 ("Mobile Banking," 2020). This venture has subsequently attracted considerable attention and speculation in both the financial and information technology communities (Shih & Fang, 2004).

In South Africa, Standard Bank and Mobile Telecommunication Group (MTN) launched one of the first smartphone mobile banking services anywhere in the world in 2005 and invested an estimated US$ 80 million in the service but fell afoul of the regulator around their application of KYC standards and saw very low uptake. In 2009, the Royal Bank of Scotland (RBS) took the initiative with iPhone and launched an application that provided two basic facilities of viewing a statement and checking account transactions. RBS further launched complete banking services in 2011, but only for Apple users, which was soon available to Blackberry users as well. More than one million users started using this application and transferred around one billion pounds. This was just the beginning of success (Pandey, 2019).

According to the **State Bank of Pakistan (SBP) payment systems review** 2019 — Pakistan, branchless banking, especially mobile banking services is growing at a fast pace. The statistics support this statement as the growth in the number of electronic transactions shows 6.6% in volume and 12.9% in value in 2018-19. The quarterly review of October –December 2019 of SBP gives the following statement that signifies the importance of mobile banking services in Pakistan (*Payment Systems Review*, 2019).

	FY19 Quarter – 04		**FY20 Quarter – 01**		**FY20 Quarter – 02**		**Growth in FY20 Quarter - 02**	
	Value	**Volume**	**Value**	**Volume**	**Value**	**Volume**	**Value**	**Volume**
Total	150,413	347	160,402	340.3	149,746.60	361.3	-7%	6%

E-Banking	16,943	233	15,615	224.3	17,628.60	239.2	13%	7%
Share of e-banking	11%	67%	10%	66%	12%	66%	21%	0%
Internet banking	546.2	11.9	574.4	12.2	736	13.3	28%	9%
Mobile banking	300.7	13.4	291.8	15.2	382.5	17.8	31%	17%
% Share of e-banking	1.77%	5.75%	1.87%	6.78%	2.17%	7.44%	16%	10%

Table 1 Share and Growth of mobile banking

Table 1 above clearly presents the growth potential of mobile banking services in Pakistan. A special growth trend can be seen after the rise of pandemic lockdown in the country. The statistics present that the COVID-19 pandemic has increased the use of mobile baking, however, still, a huge potential is left in the consumer markets as most of the mobile banking transactions are related to the bank to bank transfers or bill payments. This paves a way to identify the factors that can help banks to increase their customer base in mobile banking, especially during the social distancing protocol of lockdown.

The Proposed Model

Several types of research have been conducted where usually one well-known model was studied in detail to identify factors influencing Mobile banking adoption (Abayomi et al., 2019; Chaouali & El Hedhli, 2019; Foroughi et al., 2019; Naeem, 2020; Rogers, 1995; Shaikh & Karjaluoto, 2015; Tam & Oliveira, 2017). The theory of planned behavior (TPB) was first introduced by Ajzen and Fishbein, (1975) and later it was decomposed (DPTB) by Taylor and Todd, (1995). Later, Venkatesh et al.(2003) proposed the unified theory of acceptance and use of technology (UTAUT) by analyzing and integrating constructs from eight renowned theories to develop an integrated model for usage of technology adoption. This enlists; the theory of reasoned action (Fishbein, 1979), the technology acceptance model (Davis et al., 1989), motivational model (MM) (Bagozzi et al., 1992), the theory of planned behavior (Ajzen & Fishbein, 1975), the personal computing utilization model (MPCU) (Thompson et al., 1991), innovation diffusion theory (IDT) (Rogers, 1995), the well-known social cognitive theory (SCT) (Bandura, 1986), and an integrated model of technology acceptance and planned behavior (TAM-TPB) (Taylor & Todd, 1995). This model proposed four variables that included the groups of all eight previous works.

All the theories are based on the findings related to the intention of adoption (Anser et al., 2020; Chang et al., 2022; Zhang, Wu, & Rasheed, 2020). TRA (Ajzen and Fishbein, 1975) was researched by several researchers for measuring the behavior of customers or employees as well. It explains four factors, i.e., belief, attitude, norms, intention, and actual use Here, attitude, and subjective norm play important roles in creating the intention to use such applications. The variable of subjective norm distinguishes it from TAM. It differs from TPB, as it does not take into account the perceived behavioral control (PBC) in its model (Shih & Fang, 2004).TRA model is based on the study of the impact of societal influences on an adoption. TRA explains that every action is based on a reason to achieve a positive outcome. First, attitude is measured through attitudinal belief, a belief that a particular action will result in a particular outcome, and subjective norm is weighed by normative belief, which explains how much an individual is concerned about the

norms set by his/her reference group. It explains that when a positive attitude is combined with the norms that comply with an individual's norms an intention to use a particular product or service is created. Albarq and Alsughayir (2013) investigated TRA to study the impact of adopting internet banking among Saudi consumers, and further by (Ali & Puah, 2017) to identify factors that influence selection of Islamic credit cards in Pakistan in finding factors of mobile learning at continuing medical education program (Gbongli et al., 2020).

Davis et al., (1989) along with other researchers explored Technology Acceptance Model (TAM) to identify elements that can influence individuals adopt any new technological innovation. Lu et al., (2003) developed a TAM to explain the factors influencing user acceptance for wireless internet through mobile devices. It was further instigated by Min et al. (2019) to find the factors of consumer adoption of the uber mobile application and by Kamutuezu (2016) to study the adoption of digital banking in Namibia. TAM explains that the adoption of new technology is a result of the relationship between "Perceived usefulness and ease of use", which builds the attitude of a consumer and determines the intention to use that technology.

Innovation Diffusion theory was first developed in sociology in 1960 to study the different innovation adoptions and in agriculture or organizations (Tornatzky & Klein, 1982). This theory was investigated by Moore and Benbasat (1991) to find factors that stimulate technology adoption and was followed by other researchers as well (Agarwal & Prasad, 1997; Al-Jabri & Sohail, 2012; Karahanna et al., 1999; Min, So, et al., 2019; Plouffe et al., 2001; Raza et al., 2018).

TPB is an improved version of TRA. TPB also considers intention because of attitude and subjective norm, however, it further includes perceived behavioral control as another construct which once included in the model emulates stimulus of intention to adopt. It explains the concept that an individual desire to adopt technology is also affected by how much he/ she perceives that it can be controlled. Madden et al., (1992) found a recognizable relationship between intention and PBC. Efficacy refers to the extent to which the use of technology can be controlled, and facilities include the time and resources available to use the technology. Overall, PBC refers to the perceived difficulty of the usage (Bandura, 1977). Liao et al., (1999) and Tan and Teo (2000) also used TPB to study internet adoption in financial services (Shih & Fang, 2004; Shaikh & Karjaluoto, 2015; Giovanis et al., 2019).

DTPB (Taylor & Todd, 1995) is an extension of TPB and TAM that predict the use intention of technology adoption. (Chien et al., 2014) found that DTPB comprises of best factors of both models and overcomes the weaknesses of the previous models. Taylor and Todd (1995) introduced DTPB to illustrate that attitude needs to be understood through its decomposition into various constructs (Shih & Fang, 2004).

Shih and Fang (2004) have proved DTPB to be the best model to study the intended behavior. DTPB is investigated by several researchers in their studies related to varying fields of finance, marketing, sociology, and education (Chien et al. 2014; Sadaf et al. 2012). Alruwais et al., (2016) discussed the Factors that impact the acceptance and usage of e-assessment by academics in Saudi universities with the help of DTPB. Based on the model of DTPB, Shih & Fang (2004) predicted the intention to adopt internet banking in Taiwan. In 2013, Kazemi et al., (2013) studied the Factors Affecting Isfahanian Mobile Banking Adoption. Sahli & Legohérel (2016) used this model to identify the intention to book tourism products online. Garay et al., (2019) related it with sustainability-oriented innovation in tourism. DTPB was mostly used to predict the behavior intention of technology adoption (Lai, 2017; Sumardi & Hanum, 2019). However, DTPB has been a major source of research in technology adoption as well (Aziz, 2017; Gangwal & Bansal, 2016;

Sumardi & Hanum, 2019), especially technology in banking (Hachimi & Salahddine, 2019; Kanimozhi & Selvarani, n.d.; Yazid & Kofarnaisa, 2019, Giovanis et al., 2019, Le et al., 2020)

Baptista and Oliveira (2016) tried to prove in their research that the UTAUT theory proposed by Venkatesh et al.(2003) is the best model to study technology adoption. However, later on, Giovanis et al. (2019) substantiated an argument among the four models, i.e. TAP, TPB, UTAUT, and DTPB based on the theory of comparison approach. The comparison was based on model fit, explanatory power, and statistical significance of path coefficient. They established that DTPB is the best model for exploring elements that stimulate intentions for using MBS, as it assimilates all four models of innovation adoption for intention for adopting MBS. Hence, based on this argument, this study is based on the constructs of DTPB model. As the study is conducted to measure the impact of corona lockdown, a construct of COVID-19 is added. Consequently, this study is based on the DTPB model with an extension of COVID-19 as presented in Figure 1.

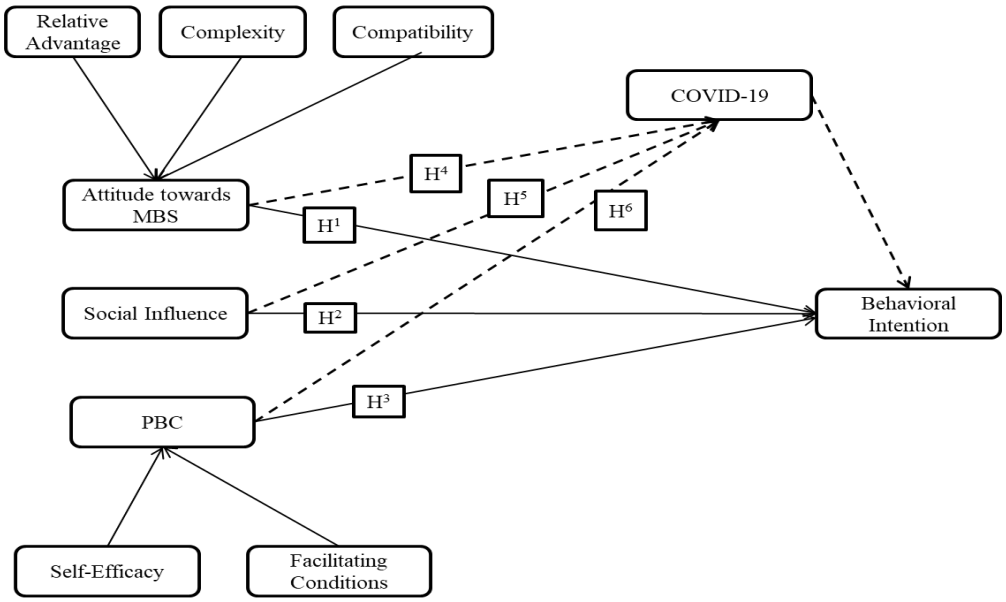

Figure 1. proposed Model

Hypothesis Development

Behavioral Intentions

It is the extent to which an individual's work performance leads to an action behavior (Ajzen & Fishbein, 1975). It is the most important construct that works as a dependent variable in this study and helps in establishing the factors that can determine the adoption of mobile banking services during COVID-19 lockdown. Previous studies establish it as the fundamental driver for the adoption of technology (Raza & Hanif, 2013; Shih & Fang, 2004; Zhou et al., 2010, Thaker et al., 2019). It is categorized into three attributes: attitudes, subjective norms, and person's perceived behavior control.

Attitudes towards MBS

Ajzen and Fishbein (1975) define attitude as *"an evaluative feeling towards the outcome of a specific action".* In this study, Attitude refers to the evaluation of consumers about the costs and benefits of using mobile banking services. It is composed of three factors:

Relative Advantage

(Moore & Benbasat, 1991) explained it as*, "the amount of excellence of an innovation that make it apart from the previous technologies".* In this study, the relative advantage of a mobile application is the degree to which it can be useful in completing the task on hand. Regarding a mobile banking app, a user will be influenced to adopt it only if he/she believes that it will improve their banking operations based on time and convenience. Especially, during the lockdown, the relative advantage would refer to how efficiently an app can cater to all the requirements of banking services without physically going there. 3

Compatibility

Moore & Benbasat, (1991) explains it as "*how much the innovation relates to present values, needs and expectations of the potential users*". The argument here is that consumers will accept and use mobile banking it matches with their usual practices and existing requirements related to banking services, where the quality of their work does not compromise even when they are operating it from their home office. For example, an app that saves time and cost during transactions will be easily accepted by business users.

Complexity

"What is the level of difficulty in understanding, learning and using the new technology?" (Rogers, 1995). Therefore, complexity conceives a negative relationship to adopt. In this study, complexity is measured as comfort of use, having a direct relationship with the attitudes. It is also expected that as users conceive mobile apps to be user-friendly, they also expect a mobile banking app to be easy to understand and use without having any complexities. Based on the above discussion, we conceive that:

H1: Positive attitude towards mobile banking leads to positive behavioral intention to adopt MBS.

Social Influence

Ajzen & Fishbein, (1975) explains that "*an individual's evaluate their behavior on the basis of whether it will be accepted by the people who are important in their lives."* Ajzen (1991) further elaborates social influence as the social pressures from significant others that compels an individual to adopt a certain attitude. This study tries to investigate that consumers can be influenced by their colleagues, family members, or supervisor, who has the power to inspire them and adopt a particular app on their recommendation and when they see them using it, especially when their belief is established that mobile apps are as effective as physical transactions and visiting a branch can be harmful. Hence, we establish that:

H2: Social influence positively impacts the behavioral intention to adopt MBS.

Perceived Behavioral Control

It refers to "*How much difficulty an individual thinks in performing the behavior*" (Ajzen, 1991). However, Taylor and Todd (1995) explains the concept from both *internal and external incapability, feared by an individual in using the new technologies".* This means that users must

have access and control over the factors that affect the use of an app. This study explains PBC through two factors:

Self- Efficacy

It can be illustrated as one's competency to use technology for completing a particular task. It is conceived here as how much an individual is comfortable with using a mobile banking service and handling it with comfort.

Facilitating Conditions

"The influence of external factors affecting the use of information and technology making a task easier to accomplish". These resources include sufficient time, money, and technology and supporting IT staff or in-app supporting facilities.

H3: Perceived behavioral control positively impacts the behavioral intention to adopt MBS.

COVID-19

It refers to the situation of lockdown that has aroused to prevent and fight the pandemic of Coronavirus. The health practitioners and Government is continuously advising citizens to practice social distance to prevent this virus. The limited space and many customers in banks make it difficult to practice social distancing, hence adopting mobile banking services by downloading applications of the concerned bank can help practice this. Consequently, the pandemic has made it inevitable use new innovations. This study tries to investigate whether COVID-19 mediates the role of all three factors of attitude, social influence, and PBC in the DTPB model. The hypothesis is established as:

H4: COVID-19 mediate impact of attitude towards MBS on behavioral intention.
H5: COVID-19 mediates impact of social influence on the behavioral intention.
H6: COVID-19 mediates impact of PBC on behavioral intention.

Research Methodology

Current research is based on empirical method where procedures and methods are adopted as the quantitative approach of research with a focus on the deduction of the theory (Rasheed, Okumus, Weng, Hameed, & Nawaz, 2020; Rasheed, Weng, Umrani, & Moin, 2021; Saleem, Rasheed, Malik, & Okumus, 2021). This study tries to discover the motivational factors that encouraged banking customers adopt MBS during the pandemic. In this study, a correlational approach was considered out of four quantitative approaches which are descriptive, correlational., casual, and experimental (Sukamolson, 2017). Creswell (2009) defined that correlational research explains the relationship of two variables by measuring their score to identify the cause and reach an outcome Masood, Feng, Rasheed, Ali, & Gong, 2021; Naeem, Weng, Hameed, & Rasheed, 2020; Pitafi, Rasheed, Kanwal, & Ren, 2020; Sattar, Rasheed, Khan, Tariq, & Iqbal, 2017; Sukamolson, 2017). To examine the hypothesis established, deductive approach is promulgated to study theory of self-identification.

The objective of this paper is to find the determining elements that motivates individuals start using MBS. Hence, all users of mobile banking application services are targeted population. The limited time of research has allowed to apply the quota convenience sampling technique. This means that no probability is connected to the entire population so anyone from the population can be selected as a sample (Bougie & Sekaran, 2019). However, a filter was applied in the questionnaire where the respondents who are users of MBS only, were allowed to continue with

their responses. Hair et al., (2013) also states that "*sample size must be equal to the total number of structural paths between variables multiplied 10 times*". The number of paths is 5, hence the criterion of a minimum of 50 is met. After deleting unilateral and multilateral outliers, the data was reduced to respondents.

The data is gathered with the help of questionnaire adapted from researchers conducted based on DTPB following previous research in related areas (Gulzar, Ahmad, Hassan, & Rasheed, 2022; Hameed et al., 2019; Naeem, Weng, Hameed, & Rasheed, 2020; Rasheed, Okumus, Weng, Hameed, & Nawaz, 2020). The structured instrument based on a Likert scale from 1 to 7 (where 1 represented 'strongly disagree' and 7 represented 'strongly agree') was used to collect data. Most of the questions were adopted from prior work with a modification of mobile banking services. Most of the items were adopted from studies that worked on DTPB (Baptista & Oliveira, 2015; Giovanis et al., 2019; Shih & Fang, 2004; Venkatesh et al., 2003, 2012). The items of COVID-19 were adopted from (Manu & Girish, 2020).

Analysis and Results

A total number of 187 responses were collected. Out of which 150 respondents were users of MBS. The data shows that most of the users of Mobile banking services are between 20 to 40 years of age (60 individuals, 40%). Most of the individuals having master's education (86 individuals, 57.3%) use this service. Most of the existing users are using it for more than 1 year (73 individuals, 48.7%). Only 37 individuals (24.7%) have started using it since last month. The cross-tabulation reveals that most of the respondents with a master's degree are either using MBS for more than one year or less than one month.

	Frequency	Percentage
Usage		
Yes	150	80.2
No	37	19.8
Age of Respondent		
Below 20 years	0	0.0
20-30 years	60	40.0
31-40 years	57	38.0
41-50	27	18.0
Above 50 years	6	4.0
Education		
Bachelors	41	27.3
Masters	86	57.3
PhD	15	10.0
Other	8	5.3
Usage Duration		
Less than 1 month	37	24.7
1-3 months	13	8.7
3-6 months	13	8.7

6months-1year	14	9.3
More than 1 year	73	48.7

Table 2. Demographics of Respondents

Collected data was tested for normality primitively following previous research (Iqbal et al., 2021; Kanwal, Pitafi, Rasheed, Pitafi, & Iqbal, 2022; Luqman, Masood, Shahzad, Imran Rasheed, & Weng, 2020; Masood, Feng, Rasheed, Ali, & Gong, 2021). The means of observed variables under each latent variable were tested through ANOVA. Once identified, a parametric tool of regression was used to see the relationship of constructs. The mediating effect of COVID-19 was tested with the help of Jamovi software. The model in this study is assessed based on a statistical technique that is least square structural equation modeling. Vinzi et al., (2010) explain that PLS is a second-generation technique that facilitates in assessing highest reliability of all constructs. In addition, it measures structural path coefficients with minimum error terms. PLS helps in identifying and predicting the effect of the relationship among the variables, it analyzes the complex relationships and constructs validity with the help of minimum requirements and it considers all phases of regression, factor analysis, and path analysis during the test of validity (Hair et al. 2013; Henseler et al. 2009). This empirical research is based on data collected test the hypothesis and the relationship of direct and indirect variables through factor analysis. These relationships were further evaluated by developing path analysis using SPSS, Smart PLS, and Jamovi.

Reliability Results

Reliability of the questionnaire was investigated on the criteria presented by (Hair, Jr. et al., 2016) and validated in several recent studies (Moin, Omar, Wei, Rasheed, & Hameed, 2021; Nisar, Rasheed, & Qiang, 2018; Pitafi, Rasheed, Kanwal, & Ren, 2020). They presented that the instrument can be considered reliable when Cronbach's alpha is greater than 0.7. The results are presented in Table 3 below. The entire instrument proves to be reliable as the results exhibit that Cronbach's alpha of all variables was more than 0.7 ($\alpha = 0.961$). These results allowed us to continue our research and data analysis. According to (Fornell & Larcker, 1981), items are considered reliable if their factor loadings are above 0.7. A confirmatory Factor Analysis test was run on Jamovi. The results in table 3 in the appendices indicate that factor loadings of all items are above 0.70 ($p<0.001$). The model represents reflective measurement as construct defines the indicators and there is an interchangeable correlation in the indicators as presented in the table (Hulland, 1999).

Variable	Cronbach Alpha	Variable	Cronbach Alpha
Relative Advantage	0.958	Facilitating Condition	0.957
Compatibility	0.957	COVID	0.960
Complexity	0.957	Attitude	0.957
Social Influence	0.965	PBC	0.958
Self-Efficacy	0.956	Behavioral Intention	0.956

Table 3. Reliability Test

Discriminant validity assesses how much each variable and its items are distinct from other variables as presented in the theory and is established through assessments of factor correlation tests and HTMT (Hair et al., 2011). The details are presented in table 4 in appendix. Factor covariances table calculated in Jamovi software through confirmatory analysis presents that each variable distinguishes from other variables, confirming validity of the scale for all variables. The summary is presented below.

	RA	CT	CM	SI	SE	FC	CV	AT	PB	BI
RA	1.000	0.911	0.765	0.632	0.720	0.678	0.620	0.659	0.652	0.881
CT		1.000	0.756	0.698	0.686	0.705	0.644	0.654	0.677	0.778
CM			1.000	0.628	0.853	0.660	0.751	0.757	0.622	0.701
SI				1.000	0.687	0.704	0.521	0.486	0.721	0.629
SE					1.000	0.855	0.763	0.678	0.860	0.797
FC						1.000	0.662	0.603	0.834	0.745
CV							1.000	0.714	0.629	0.703
AT								1.000	0.687	0.764
PB									1.000	0.731
BI										1.000

Table 4. Factor Covariance

Another criterion for discriminant validity is Heterotrait-Monotrait Ratio (HTMT) is that the values must be below the 0.90 criterion (Clark & Watson, 2016; Henseler et al., 2009). Table 6 presents the result of HTMT calculation conducted through Pearson correlation in SPSS and Excel. Study results indicated discriminant validity of most of study constructs. However, the relationship among Attitude, Social Influence, and PBC combined and Behavioral Intention (0.905) show weak validity.

	AT	SI	PBC	CV	BI
AT		0.738	0.843		
SI				0.822	0.9
PBC					
CV					0.774

Table 5. HTMT

Results from factor analysis exhibited that the model is fit for regression. Criteria applied is having RMSEA of between 0.08 to 0.10 provided a mediocre fit and below 0.08 shows a good fit (MacCallum et al., 1996). It is presented below in table 6.

			RMSEA value 90% CI	
CFI	TLI	RMSEA	Lower	Upper
0.707	0.713	0.14	0.14	0.15

Table 6.

Linear Regression Analysis

R^2 values predicts the level of variation effect size in dependent variable due to the change in independent variable. The result of linear regression of each variable run on SPSS in Table 8 predicts that Attitude significantly explains 71.3% variance (f (1, 148) = 366.92, p< 0.05) in behavioral intention. The findings also indicate significant 57% influence of PBC (f (1, 148) = 195.86, p< 0.05) on behavioral intention. The latent variable of COVID also has a significant influence of 41.9% (f (1, 148) = 106.72, p< 0.05) on behavioral intention. Social Influence has the least significant impact of 20% (f (1, 148) = 37.52, p< 0.05) on behavioral intention (Chin, 1998).

	R Square	Adjusted R Square
AT	0.713	0.711
SI	0.202	0.197
PBC	0.570	0.567
CV	0.419	0.415

Table 7. R-Square through linear regression

Path Analysis and Hypothesis Testing - Direct effects

Table 9 explains the path analysis of direct relationships. The direct effect of Path analysis was conducted on SPSS and Jamovi software to develop least-square modeling, where both models gave the same answers. The results provide a fit model with R-square of 0.732 (f (3, 146) = 133.03, p< 0.05). The estimates of the direct path model are presented in table 9 below. According to findings, H1 is gets accepted, which means that the relationship of Attitude (p <0.05, β=0.728) with behavioral intention is significantly positive. However, Social influence does not show any significant direct relationship (p >0.05, β= -0.020) with behavioral intention, hence rejecting H2. The results show a significant positive effect of the direct impact of individuals perceived behavior control over behavior intention (p<0.05, β=0.251) as well, which supports H3. The variable representing Covid - 19 also shows a direct significant effect on behavioral (p<0.05, β=0.646).

Hypotheses	Direct Path	Coefficients	P-Value	Results
H_1	ATT → BI	0.7282	0.000	Supported
H_2	SI → BI	-0.0196	0.675	Not Supported
H_3	PBC → BI	0.2509	0.002	Supported
H_4	CV → BI	0.6460	0.000	Supported

Table 8. Direct Path Effects

Path Analysis and Hypothesis Testing - Mediation of COVID-19

Our model suggests that covid 19 lockdown plays mediating part between Attitude (H4), social influence (H5), and perceived behavioral control (H6). These hypotheses were tested as separate models of mediation least square method with the help of Jamovi software (Hair, Jr. et al., 2016).

Attitude – COVID – Behavioral Intention

The first model was tested to see the mediating effect of covid between attitude and intention to adopt MBS (H4). The results presented in table 8 ($p > 0.001$, $t= 1.570$) clearly rejects our hypothesis (H4). The mediation percentage also supports this result with only an 8.19% mediation effect.

Effect(term)	Label	Estimates	SE	Z	p	% Mediation
Indirect	a × b	0.0753	0.0481	1.57	0.117	8.19
Direct	C	0.8441	0.0672	12.56	< .001	91.81
Total	(c + a × b)	0.9194	0.0477	19.26	< .001	100.00

Table 9. Mediation Estimates (AT-CV-BI)

Social Influence – COVID – Behavioral Intention

The second model was tested to see the mediating effect of covid between SI and intention to adopt MBS (H5). Table 11 presents supporting evidence to accept the hypothesis (H5). The indirect effect shows a significant result ($p < 0.001$, $t=4.630$) of the mediation of Covid. The 51% mediation level and the reduction in direct impact confirm a partial mediation.

Effect	Label	Estimate	SE	Z	p	% Mediation
Indirect	a × b	0.208	0.0448	4.63	< .001	51.0
Direct	C	0.199	0.0597	3.34	< .001	49.0
Total	c + a × b	0.407	0.0660	6.16	< .001	100.0

Table 10. Mediation Estimates (SI-CV-BI)

PBC – COVID – Behavioral Intention

Table 11 below presents the significant mediating effect of covid between perceived behavioral control and intention to adopt MBS (H6). The results reveal a significant mediation of Covid ($p < 0.001$, $t=4.020$). The change indirect effect and the percentage (23.8%) of the mediation confirm this as a partial mediation effect.

Z	p	% Mediation
4.02	< .001	23.8
8.84	< .001	76.2
14.07	< .001	100.0

Table 11. Mediation Estimates (PB-CV-BI)

Conclusion

This research is conducted to see how social distancing and lockdown impacted the adoption of Mobile Banking Services. For this purpose, the DTPB was deduced to investigate the impact of Covid pandemic over the intention to adopt MBS. Covid 19 was studied as a mediator between attitude, SI, PBC, and the behavioral intention towards MBS. The study concludes based on its findings of an analysis of the model that Covid 19 lockdown does have an impact on the intention to adopt MBS. It shows that when consumers of the banking sector perceive that a technological service can improve their work capacity and perceive that technology easy to use. They tend to adopt the technology. Secondly, this adoption is affected by the influence and opinion of significant others around them. Finally, as suggested by Taylor and Todd (1995), when the user perceives that they can use the technology with complete efficacy and has the time and resources to use it efficiently, their intention to adopt it becomes significant.

Theoretical Implications

This study presents an extension of DTPB by reviewing whether the intention to adopt a technology is affected by attitudes, SI, and PBC and not influenced by changes in macro and microenvironment. The results prove through different analyses that a major environmental factor like corona lockdown did not change the attitude of users to adopt MBS. However, SI and PBC were significantly mediated by this environmental factor.

Practical Implications

A study in social science carries several important practical implications (Sattar, Rasheed, Khan, Tariq, & Iqbal, 2017; Yousaf, Rasheed, Hameed, & Luqman, 2019; Zhang, Wu, & Rasheed, 2020). The results of the study can be helpful for the practitioners of mobile banking service applications to understand the factors behind the actions taken by their consumers. Although in Pakistan, usage of Internet Banking, Mobile Cash, and MBS are increasing rapidly, the proper promotion and positioning of MBS applications can improve its number of agents and users. Especially in the rural areas of Pakistan lacks physical facilities of banking is not available, extending the customer base towards the rural areas can prove to be beneficial for the banking sector. Along with this, as proved in this study, banks can also target the educated class of society who has the skill and capabilities to use the technology for their benefit and are technology savvy. The study is an extension of the DPTB model and can be applied to measure the mediating impact of other environmental factors which can impact the technology adoption process as presented in the model.

Limitations and Future Research Directions

This study generated important research findings, yet its findings should be seen in the light of its limitations (Yousaf, Rasheed, Kaur, Islam, & Dhir, 2022; Zhang, Rasheed, & Luqman, 2019).The number of mobile banking users is still limited. Finding a large sample from this limited population is a critical task. This is research is focused on the scenario of Karachi only and can be further investigated for other areas of Pakistan especially the rural areas. Due to the concentration of time, convenience sampling is applied, stratified random sampling is used, where strata are made based on users and non-users. This study is conducted as a term paper for a spring semester. Due to lack of time and resources, no pilot test was conducted which resulted in low reliability and validity of the instrument. The time constraint also influenced the researcher to adopt convenience sampling. It is recommended to use strata random sampling to reach the appropriate target population of Mobile Banking Service application users. For the time being, the researcher was able to gather only 150 responses. Another limitation of sampling was the lockdown situation in the city due to which the respondents were contacted only through Whatsapp. Future researchers can be met in person and that might yield interesting results.

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