

Determinants of Customer Behavioral Intention Towards the Usage of Fin-tech Banking Services: Evidence from Egypt

Dr. Ahmed Mostafa Hamdy Rady

Assistant Professor - Faculty of International Business and Humanities- FIBH, Egypt-Japan University of Science and Technology; Borg El-Arab Alexandria-Egypt

Ahmed.rady@ejust.edu.eg

Abstract

With the new trend towards financial technology (Fin-Tech) to improve financial services and develop the financial industry, the trend is growing towards making mobile banking services more convenient for financial users to conduct their financial services. Mobile banking is an emerging Fin-Tech service in the banking industry. To the extent that new technology services are growing in the banking industry, it is necessary for researchers to identify the factors that influence the customer's behavioral intention to use mobile banking as a new financial service. The research framework model is based on the Technology Acceptance Model (TAM1) and (TAM2). Five independent variables were studied in the research (perceived benefit, perceived ease of use, perceived risk, perceived trust, and subjective criteria) for the purpose of testing their impact on the behavioral intention of customers towards using mobile banking services. The study used a “convenient sampling method technique”, where data was conveniently collected from 330 banking customer in Egypt. Partial least squares structural equation modeling (PLS-SEM) was used for measurement model evaluation and hypothesis testing purposes. The result shows a significant positive effect on perceived trust and perceived ease of use on customers' behavioral intention towards using mobile banking services. While it indicated an insignificant effect on Perceived usefulness, perceived risk, and Subjective Norms, on the behavioral intention of customers towards using mobile banking services.

Keywords: Fin-tech; Technology Acceptance Model; Behavioral Intention.

المخلص

مع تنامي التوجه نحو التكنولوجيا المالية (Fin-Tech) لتحسين الخدمات المالية وتطوير الصناعة المالية، يتنامى التوجه نحو جعل الخدمات المصرفية عبر الهاتف المحمول أكثر ملاءمة للمستخدمين الماليين لإجراء خدماتهم المالية. الخدمات المصرفية عبر الهاتف المحمول هي إحدى خدمات Fin-Tech الناشئة في الصناعة المصرفية. وبقدر نمو خدمات التكنولوجيا الجديدة في الصناعة المصرفية، من الضروري للباحثين التعرف على العوامل التي تؤثر على نية العميل السلوكية تجاه استخدام الخدمات المصرفية عبر الهاتف المحمول باعتبارها من الخدمات المالية الجديدة. يعتمد نموذج إطار البحث على نموذج قبول التكنولوجيا (TAM1) و (TAM2). تم دراسة خمس متغيرات مستقلة في البحث (الفائدة المدركة، سهولة الاستخدام المدركة، المخاطر المدركة، الثقة المدركة، والمعايير الذاتية) لغرض اختبار تأثيرها على النية السلوكية للعملاء تجاه استخدام الخدمات المصرفية عبر الهاتف المحمول. استخدمت الدراسة أسلوب "convenient sampling method technique"، حيث تم جمع البيانات بشكل ملائم من ٣٣٠ عميل مصرفي في مصر. تم استخدام نمذجة المعادلات الهيكلية للمربعات الصغرى الجزئية (PLS-SEM) لتقييم نموذج القياس وأغراض اختبار الفرضيات. وظهرت النتائج وجود تأثير إيجابي كبير لثقة العملاء المدركة، وسهولة الاستخدام المدركة على النية السلوكية للعملاء تجاه استخدام الخدمات المصرفية عبر الهاتف المحمول. بينما دلت على ان هناك تأثير غير معنوي للفائدة المدركة، والمخاطر المدركة، والمعايير الذاتية على النية السلوكية للعملاء تجاه استخدام الخدمات المصرفية عبر الهاتف المحمول.

الكلمات الرئيسية: التكنولوجيا المالية؛ نموذج قبول التكنولوجيا؛ النية السلوكية.

1- Introduction

Due to the financial digitalization, the financial industry has been undergoing continual changes in service delivery, at the client interface, as well as in the back-office procedures; this evolution is marked by increased connectivity and faster information processing. The focus of digitalization has recently shifted away from improving the delivery of old activities, toward creating fundamentally new business prospects and models for financial sector organizations (Gomber et al.,2017). Nowadays, the increasing of the internet-based economy such as digital money, digital devices, and digital investment, resulted in the flexibility of the customers for choosing among the financial services provided, and have prompted the customers to use an increasing number of portable devices to complete their daily tasks such as making payments and paying bills. (Ibrahim et al., 2019). Financial technology (Fin-tech) refers to new technologies that are being created to improve and automate financial services and the development of the financial industry (Thakor, 2020; Chandler and Krajcsk, 2021). In recent years, the FinTech industry has expanded, allowing for convenient, secure, and high-quality online banking services (Kang, 2018). Financial technology has disrupted the financial services industry in Egypt and in the world, with global revenue expected to reach \$265 billion by 2025(MCIT, 2021, p. 25). Financial technology is an effective method at responding consumer needs through clear, user-friendly platforms and interfaces, since it is digitally native and is subject to less regulatory restrictions than conventional banks, which are subject to stricter regulations. However, with over 70% of Egypt's population remaining unbanked, there is substantial room for increased collaboration between banks and fin-tech companies to grow the entire customer base. Several Egyptian banks have engaged in fin-tech services to support the emerging industry as well as to improve and expand their own digital products (MCIT, 2021, p. 25).

Banks are considered one of the high extremely dynamic business entities that, when linked together in a global network, provide better terms to customers who use these banking services (Muñoz-Leiva, Sánchez-Fernández, & Luque-Martínez, 2010).

The banking industry, like many others, uses the Internet and mobile applications to provide their customers with banking products and services. As a result, we are seeing a more competitive banking market with more demanding clients (Shaikh& Karjaluo, 2015). Since the introduction of electronic banking, the software applications have had a rapid popularity due to the benefits they provide to the banking services in terms of comfort and ease when conducting client transactions, as well as increased market coverage and service quality. Mobile banking, in contrast to traditional banking, offers more features and functionality at a lesser cost (Laukkanen, 2007). Banks have been at the forefront of digitalization in the private sector, launching online platforms to supplement traditional in-person services. By the beginning of 2020, 32 banks in Egypt had implemented online banking and 28 had received mobile banking licenses (MCIT, 2021, p. 25).

Mobile banking has become a prominent system with the advancement of mobile technology. Mobile users can now conduct financial services from anywhere and at any time, as well as connect banking services to mobile devices simply and rapidly. In mobile banking, banking services are delivered quickly and interactively (Turban, King, Viehland, & Lee, 2006). Banks allow consumers to access account balances, pay bills, and transfer payments through cell phone or another mobile device rather than visiting a bank. The mobile banking development implies a potential benefit to the banking industry. Banks can keep current banking customers by integrating a new system (mobile banking) into their existing systems, as well as convert cell phone users to banking customers. (Devaraj, & Kohli, 2002; Gefen, Karahanna, & Straub, 2003a)

On the other hand, face-to-face interactions continue to be critical in establishing trust between clients and financial service providers. And here comes the important of the study, as to identify the factors that affect the Customer Behavioral Intention in Egypt, towards the usage of the mobile banking services. It is crucial to determine the key factors affecting the customers' acceptance towards the adaptation of new technology, of the following generation of the Egyptian banking customers, while

considering the rapid advancements in technology. Accordingly, the following study attempts to bridge the research gap by highlighting the Technology Acceptance Models (TAM1) and (TAM2), to determine the factors affecting the Egyptian customers intention to use the Fin-Tech banking services (mobile banking). Hence, the study will clarify the following main objective; to identify the main determinants of the customer behavior intention to use the mobile banking services in Egypt. Therefore, to achieve the aforementioned objective, this study attempts to answer the following questions: 1) Does Perceived Usefulness (PU) directly affect the customer intention to use mobile banking services in Egypt. 2) Does Perceived Ease of Use (PEOU) directly affect the customers intention to use mobile banking services in Egypt. 3) Does Perceived Risk (PR) directly affect the customers intention to use mobile banking services in Egypt. 4) Does Perceived Trust directly affect the customer intention to use mobile banking services in Egypt. 5) Does Subjective Norms (SN) directly affect the customers intention to use mobile banking services in Egypt.

2- Literature Review & Hypothesis Development

2-1 Technology Acceptance Model (TAM)

The following study underlies a set of different theories that supports and determines the factors affecting the customers' acceptance towards the adaptation of new technology. A Technology Acceptance Model (TAM) developed by Davis (1989), is a theoretical model that explains the customers' acceptance of the adaptation of new information technology. It is also considered as one of the most used methods for determining the factors affecting customer behavior intention towards Fin-Tech sector in general (Ajibade, 2019; Zhang et al., 2018). Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) were proposed as the two main variables in the TAM model which is investigated in the following research to test its direct effect on the customer behavioral intention (BI). Also, due to the ignorance of the subjective norms (SN) in the TAM 1, the study will take into consideration the extension of TAM 1, (TAM2), developed by Venkatesh and Davis (2000) which includes the SN as a direct

factor influencing the customer behavior intention. (Rondan-Cataluoa et al., 2015; Varannai et al., 2017).

Moreover, past research indicate that Technology Acceptance Model theory is insufficient in explaining the user's decision to embrace information technology software (Glavee et al.2017; Shanmugam et al.2014; Phan et al.2011). Accordingly, the study will undertake Perceived Risk (PR) and Perceived Trust (PT) as additional variables of the study model to determine the factors influencing customer's behavior intention of the new technology adaptation (Gefen et al., 2003a; Shanmugam et al, 2014). Bauer (1960), was the first to claim that customer behavior in purchasing decisions is influenced by perceived risks (PR). Several academics have suggested that perceived risks have a substantial influence on a user's intention to utilize the new technology (Hu et al., 2019). Other researches like Abraho et al.,(2016); El Haddad et al.,(2018); Liébana-Cabanillas et al., (2020); Sinha et al., (2019), Have indicated that "privacy and security" are the main risk concerns, that drive customers' confidence to utilize technology services. Therefore, we conclude that, the following study will make a theoretical contribution to the extended TAM model by adding perceived trust (PT) and perceived risks (PR), to the variables of TAM2 (SN, PEOU and PU) to investigate whether these variables influence BI to use mobile banking service in Egypt.

2-2 Perceived Usefulness (PU) and Behavior intention (BI):

Perceived Usefulness (PU) is outlined by Davis (1989), as the degree to which a person believes that adapting a new technological system would help him execute his job more successfully and in a more efficient way. Generally, the individuals show interest in adapting new technologies when they feel that they are more useful and suitable for their daily life (Davis, 1989; Alalwan et al. 2017). Customers are more likely to consider or employ digital services that provide them with extra value, such as efficiency, reduced effort, and time savings. Customers, for example, have found online shopping to be beneficial because it allows them to access relevant information while also providing a rapid purchasing experience (Liébana-Cabanillas et al., 2020; Vijayasarathy, 2004). Al-Marroof and Al-

Emran, (2018) and Park et al., (2014) have argued that the intention of consumers to adapt a new technology is directly predicted by Perceived Usefulness. Previous research has indicated that PU indicators have a positive impact on customer's behavioral intention to adapt the mobile payments e.g. (de Luna et al., 2019; Lara-Rubio et al., 2020; Liébana-Cabanillas et al., 2020; Singh et al., 2020). As a result, we believe that the desire of customers to use mobile banking is influenced by Perceived Usefulness (PU). Therefore, we propose the following hypothesis. **Hypothesis 1 (H1)** PU has a Positive significant effect with BI to use mobile banking service.

2-3 Perceived Ease of Use (PEOU) and Behavior intention (BI):

PEOU can be defined as the degree of simplicity the system can be to the end user, it represents the degree to which a person believes that learning to use a certain technology will take no effort (Davis, 1989). Davis, (1989), have argued that people may think an application is useful, but they may also think it is complicated to know how to use it. The more simple a technology is to use, the more helpful it may be, leading to increased acceptance and utilization (Ali et al, 2016). Because the features of mobile banking services need a certain level of knowledge and abilities, perceived ease of use is critical in influencing people's willingness to embrace such a system (Makanyeza, C. 2017). PEOU has been demonstrated in several empirical studies to investigate its vital role in forecasting customers' intentions to use mobile banking, showing its significance on cultural attitudes (Davis, 1989; Low et al, 2017; Silva Bidarra, et al, 2013;). Other studies have investigated the positive significance effect between PEOU and the usage of the new technology, including financial digitalization service and mobile payments. (Abraho et al., 2016; Kim et al., 2010; Nguyen et al., 2016; Shankar and Datta, 2018). On the other hand, studies like Oliveira et al. (2016) failed to prove the significance relationship between PEOU and BI in the usage of the mobile payments. Davis, (1993) has investigated that this positive correlation between PEOU and BI is due to the beneficial and the ease of use of the system. Based on the literature, we hypothesize

that the PEOU of mobile banking will positively influence the Egyptian customer's behavioral intentions to use mobile banking in the Egyptian banking sector. Therefore, we propose the following hypothesis.

Hypothesis 2 (H2) PEOU has a Positive significant effect with BI to use mobile banking services.

2-4 Perceived Risk (PR) and Behavior intention (BI):

Perceived risk is the uncertainty about the results of the usage of the new technology and its level of security (Gerrard, P., & Cunningham, J. B. 2003). It is also has been identified as a dynamic component in determining a person's attitude toward the usage of mobile banking. (Wessels, et, al (2010); Purwanegara,et, al. (2014); Van Deventer,.et, al.(2017)). Bauer (1960) was the first to claim that customer behavior in purchasing decisions is influenced by perceived risks (PR). Several academics have suggested that perceived risk has a substantial influence on the user's intention to utilize the new technology (Hu et al., 2019). Other research like Abrao et al., (2016); El Haddad et al., (2018); Liébana-Cabanillas et al., (2020); and Sinha et al., (2019), have indicated that "privacy and security" are the main dimensions concern, that drive customers' confidence to utilize E-payments. Moreover, scholars have investigated that perceived risk has multi- diminutions that vary according to the type of the product or service provided (Kassim & Ramayah, 2015). Other research concerning the online transactions, highlighted that PR has several risk dimensions such as performance risks, financial risks, time/convenience risks, and psychological risks (Forsythe & Shi, 2003). Based on the literature, we hypothesize that the PR will positively influence the Egyptian customer's behavioral intentions to use mobile banking services in the Egyptian market. Therefore, we propose the following hypothesis.

Hypothesis 3 (H3) PR has a Positive significant effect with BI to use mobile banking services.

2-5 Perceived Trust (PT) and Behavior Intention (BI)

Trust is the “expectation that other individuals or companies with whom one interacts will not take undue advantage of a dependence upon them” (Gefen, Karahanna, and Straub 2003b) (p.308) in other words, trust is the assumption that the service provider are willing to act in accordance with a customer's expectations (Grazioli & Jarvenpaa, 2000; Luhmann, 1979). Trust helps to prevent fraud and risk of opportunistic behavior, while also providing users with the ultimate benefits of more reliable financial services from trustworthy banks (Pavlou, 2003; Gefen et al., 2003a). Once the customers perceive trust of the service provider (banks), they will accept the digital services and will be willing to a adapt it. Users will have faith in the digital banks services if they believe the banks have nothing to gain by breaking their confidence and are not deceiving them (Gefen et al., 2003a). Trust has been demonstrated in several empirical studies to investigate its vital role in forecasting customers' intentions to use mobile banking. scholar such as, Malaquias, R. F., & Hwang, Y. (2016), have investigated a positive effect in their Empirical study on trust in mobile company in the developing country. Other study has found that technology trust has positive relationship with mobile banking satisfaction. (Masrek, M. N., et al. 2014). Accordingly, we hypothesize that the PT will positively influence the Egyptian customer's behavioral intentions to use mobile banking services in the Egyptian market. Therefore, we propose the following hypothesis.

Hypothesis 4 (H4) Perceived Trust has a Positive significant effect with BI to use mobile banking services.

2-6 Subjective Norms (SN) and Behavior Intention:

Subjective norms are defined as the level to which people are persuaded by their surrounding social environment (family, friends, experts, celebrities) in the adaptations of the new technology systems (Flavian et al., 2020). The original TAM developed by Davis (1989), didn't recognize SN as one of its factors. However, the Venkatesh and Davis (2000) argued the importance of including subjective norms/social factors in TAM and developed TAM2 which includes SN one of its factors. Xie et al. (2011) in his research has investigated the influence of the social environment, in the individual behavior during the pandemics such as SARS, news, safety precautions, and concerns from COVID-19 are frequently shared through traditional media, social media, and other ways, resulting in significant changes in how people in Egypt and throughout the world go about their daily lives. According to the Koch et al. (2020) research he found that during COVID-19 pandemic, experts' opinions and media reports highlighted the importance influence of media sources, social media, on the customers' behavior intentions for online purchasing. Moreover, Revathy and Balaji (2020) in his research during the COVID-19 outbreak have discovered that social influence prompted Indian customers to utilize e-wallets. It also highlighted the need of family, friends, and peers in promoting awareness about the dangers of physical transactions and the importance of avoiding them during and after the pandemic. Accordingly, we hypothesize in this study that SN influence individuals' decisions in their normal business and financial transactions, leading them to use more digital secured payment method instead of using paper banknote and cash money. Therefore, we propose the following hypothesis.

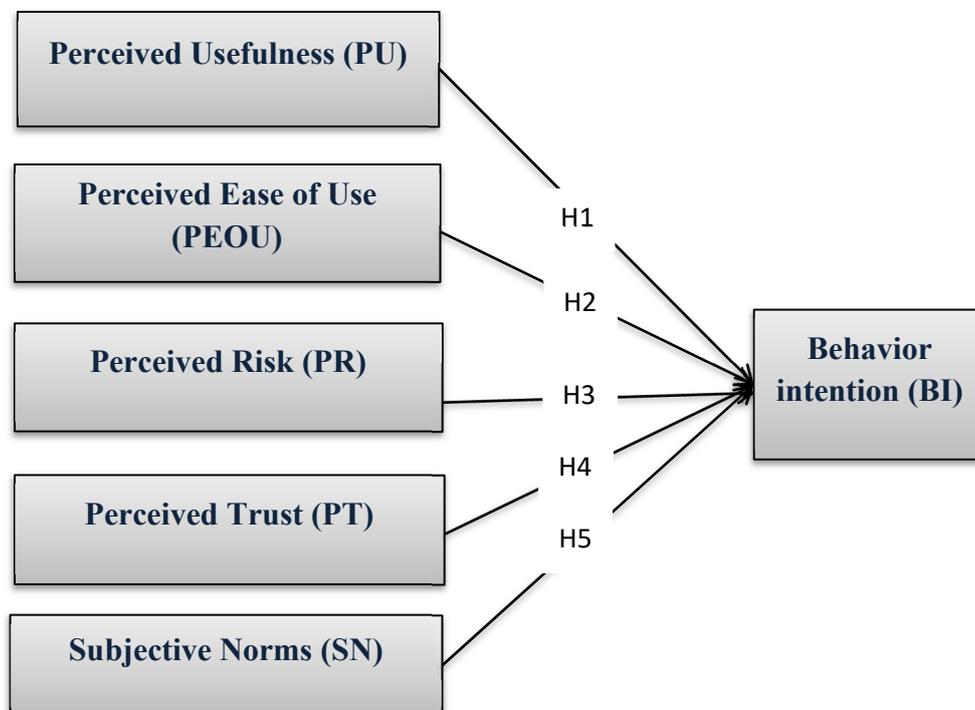
Hypothesis 5 (H5) SU has a Positive significant effect with BI to use mobile banking services.

3-Research Methodology

3-1 The Conceptual Framework of the Study

The conceptual model of the research is integrated based on the Technology Acceptance Model (TAM) developed by Davis (1989), as it is considered as one of the most used methods for determining the factors affecting customer behavior intention towards Fin-Tech sector in general. Also, the study will take into consideration the extension of TAM (TAM2), developed by Venkatesh and Davis (2000) which includes the SN as a direct factor influencing the customer behavior intention. Moreover, the following study will make a theoretical contribution to the extended TAM model by adding Perceived trust (PT) and perceived risks (PR), to the variables of TAM2 (SN, PEOU and PU) and to investigate whether these variables influence BI to use mobile banking services in the Egyptian banking sector.

The conceptual model is shown in **Fig. 1**.



3-2 Research Design

This research design is focused on a quantitative and descriptive research, for the purpose of testing the hypotheses and to determine and establish the relationship between the different variables in the study model. The research has relied on a single cross sectional data collection according to the homogeneity of the phenomena among the sample unit. Accordingly, a structured questionnaire was designed to determine the determinants of customer behavioral intention towards the usage of mobile banking services in the Egyptian banking industry.

Partial least squares structural equation modeling (PLS-SEM) version 3.2.9 was used to assess the measurement model and test research hypotheses. (Ringle *et al.*, 2015)

The research started the first step by examining convergent validity. According to Hair *et al.* (2014), this sort of validity measures how closely items of a particular construct converge or have a high proportion of variation in common. It may be measured using the outer loading size (λ), indicator reliability (λ^2), and average variance extracted (*AVE*).

internal consistency reliability is the second criterion to be assessed. To assess the consistency of findings across items on the same test, one uses this type of dependability. It establishes whether the scores of the items used to measure a construct are similar (i.e., all the indicators have equal loadings on the construct). The traditional criterion for internal consistency is Cronbach's alpha, which estimates the reliability based on the inter-correlations of the observed variables.

According to Cronbach's alpha, all indicators are equally reliable (i.e., all the indicators have equal loadings on the construct). Additionally, Cronbach's alpha often underestimates the internal consistency reliability and is sensitive to the number of items in the scale. The researcher has used composite reliability as a substitute for another internal consistency reliability test because of Cronbach alpha limitations (CR).

Moreover, the research used an alternative and more conservative method of evaluating discriminant validity which is the Fornell-Larcker criterion. It contrasts the correlations between the latent variable and the square root of the AVE values. In particular, the

square root of each construct's AVE should be higher than the construct's highest correlation. A concept is thought to share more variance with its associated indicators than any other construct, according to the theory behind this methodology (Fornell and Larcker, 1981).

3-3 Questionnaire Design & Measurement Scales Used.

The questionnaires were designed using questions adapted from previous authors and modified to suit the purpose of this study. Also, it was developed in English and Arabic languages based on the information required above that were developed to test the hypotheses. The questionnaire contains five independent variable constructs: Perceived Usefulness (PU) (four items) adapted by Davis (1989), Perceived Ease of Use (PEOU) (three items) adapted by Kim et al. (2010), Perceived Risk (PR) (four items), adapted by Luarn and Lin (2005) Perceived trust (PT) (four items), adapted by Munozv et al. (2017) Subjective Norms (SN) (five items) adapted by Daragmeh et al. (2021) and one dependent variable, behavior intention (six items), adapted by Rehman et al. (2020) In total, there were 25 question statements. The question statements are measured by a five-point Likert scale from strongly disagree (1) to strongly agree (5). Table (1) show the measurements of the variables investigated in the research.

3-4 Population and Sample Size

The target population for the following study is the customers that have bank accounts which can have the privilege to use the mobile banking provided from their banks, and different fintech parties. Therefore, the population is expected to be greater than one million, so taking adequacy of analysis and homogeneity of population. a sample of 384 units (Sekaran & Bougie, 2016) was selected from banks' customers using the non-probability convenient sampling technique.

3-5 Data Collection

The data collection instrument in this research is a structured questionnaire that provide a quantitative data to test the specific hypotheses and examine the relationship among the variables. Data were collected through a survey-based structured questionnaire distributed and completed by either personal interview or digital means.

Table (1): Measures of study variables

Measurement	Items	Question statements
Perceived Usefulness (PU)	PU1	Using Mobile banking would enable me to pay more quickly.
	PU2	Using Mobile banking makes it easier for me to conduct payments.
	PU3	Using Mobile banking would be advantageous rather than traditional payment methods (cash/contact payments).
	PU4	I would find Mobile banking a useful possibility for paying.
Perceived Ease of Use (PEOU)	PEOU1	Learning to use the Mobile banking is easy for me.
	PEOU2	My interaction with Mobile banking procedure would be clear and understandable.
	PEOU3	It would be easy for me to become skillful at using the Mobile banking services.
Perceived Trust (PT)	PT 1	I think that Egyptian banks will maintain the terms and commitments made in relation to the mobile banking services
	PT 2	I think that mobile banking services is reliable
	PT 3	In general, I trust mobile banking services
Perceived Trust (PR)	PR1	I believe mobile banking providers are trustworthy
	PR2	I believe that my transactions with mobile banking providers are likely to be safe
	PR3	Using mobile banking would not divulge my personal information
	PR4	I would find mobile banking secure in conducting my banking transactions
Subjective Norm (SN)	SN1	People who are important to me (e.g., family, friends, celebrities, and experts) think I should use mobile banking.
	SN2	People whose opinions I value prefer to me to use mobile banking.
	SN3	People, who are important to me, support me to use mobile banking.
	SN4	People who are important to me would recommend me to use mobile banking.
	SN5	People who are important to me influence my decision to use mobile banking.
Behavioral Intention (BI)	BI1	I prefer mobile banking to other service channels such as (Branch)
	BI2	I am very likely to adopt mobile banking in the future.
	BI3	I plan to adopt mobile banking in the future
	BI4	I believe it is worthwhile for me to adopt mobile banking.
	BI5	I have great intentions to introduce mobile banking to others.
	BI6	I will keep using E-payment services in the future.

4- Discussion of Results

A total of 350 Egyptian banking customers using mobile banking services participated in the study. The dataset has no missing values, and data cleaning of suspicious response patterns (i.e., straight-lining) reduced the sample size to 330 observations (Hair *et al.*, 2014). Thus, the researcher has run the statistical analysis using the 330 valid observations as a sample size. The demographic characteristics of the participant showed more female respondent with (62%) of the sample size and (91%) of the participant are below 45 years old.

The demographic characteristics of participants can be described as shown in Table (2):

Table (2): Participants' demographic profile

Demographic Variable	Total sample $n = 330$	
	Frequency	Percent
<i>Gender</i>		
Male	144	43.6
Female	186	56.4
<i>Age</i>		
> 25 years	132	40.0
25 to < 45	171	51.8
≥ 45	27	8.2
<i>Household status</i>		
Single	213	64.5
Married	117	35.5
<i>Income level</i>		
Not working yet (student/dependent)	96	29.1
< 2000 L.E.	12	3.6
2000 to < 4000	45	13.6
4000 to < 8000	96	29.1
8000 to < 15000	54	16.4
≥ 15000	27	8.2
<i>Number of years using mobile banking</i>		
> 3 years	222	67.3
3 to < 5	45	13.6
5 to < 7	24	7.3
7 to < 10	15	4.5
≥ 10	24	7.3
<i>Education Level</i>		
High School	15	4.5
Bachelor's	198	60.0
Master's Degree	75	22.7
Degree Ph.D. or higher	42	12.7
<i>Occupation</i>		
Student	117	35.5
Employee	156	47.3
Private business	27	8.2
Housewife	30	9.1
<i>Bank</i>		
National Bank of Egypt	207	62.7%
Commercial International Bank (CIB)	90	27.3%
Société Arabe Internationale de Banque (saib)	87	26.4%
Banque Misr	84	25.5%
QNB Alahli	30	9.1%
Credit Agricole	18	5.5%
Egyptian Gulf Bank (EGBANK)	18	5.5%
Arab African International Bank	18	5.5%
Banque du Caire	15	4.5%
Bank Audi	12	3.6%
Bank of Alexandria	9	2.7%
Arab Investment Bank (aiBANK)	3	0.9%
Others	51	15.5%

Source: By the researcher based on the results of IBM SPSS Statistics software, version 26

4-1 Assessment of Measurement Model

Using the statistical software program Smart PLS version 3.2.9, partial least squares structural equation modelling (PLS-SEM) has been utilized to estimate the measurement model to evaluate the validity and reliability of research constructs (Ringle et al., 2005).

Table (3) & Figure (1): presents the PLS statistical finding related to constructs' measurements model; Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Perceived Risk (PR), Subjective Norm (SN) Perceived Trust (PT) and Behavioral Intention (BI). The finding confirms the internal consistency reliability of all measurements as the composite reliability (CR) and Cronbach's alpha are more than 0.70 for all constructs (Nunnally & Bernstein, 1994).

The finding also shows that all outer loading (λ) are above the threshold value of 0.708. All indicators reliability (λ^2) are above the required minimum level of 0.50 (Hair et al., 2014). The indicator BI1 (outer loading: 0.741) has the smallest indicator reliability with a value of 0.549, while the indicator BI4 (outer loading: 0.940) has the highest indicator reliability with a value of 0.884.

The average variance extracted (AVE) for all constructs are greater than the generally accepted value of 0.50. These results provide clear evidence of convergent validity of the constructs included in the model (Hair et al., 2014). Moreover, one item, SN5, has been dropped from the social norms scale and two items, PR2 and PR3, have been dropped from perceived risk scale due to having outer loadings below the accepted value of 0.708, and deletion of these items increased the composite reliability and the average variance extracted of its respective constructs (Hair et al., 2011).

The cross loadings of the indicators have been examined to assess the discriminant validity as a final stage. Due to the absence of cross loadings that are greater than the outer loadings of the indicators on the corresponding constructs, PLS results support the discriminant validity of all the constructs included in the model (Hair et al., 2011).

Table (3): PLS results for the measurement model

Constructs and indicators	Convergent validity			Internal consistency reliability	
	λ	λ^2	AVE	CR	Cronbach's alpha
Perceived Usefulness			0.793	0.939	0.913
PU1	0.893	0.798			
PU2	0.910	0.827			
PU3	0.859	0.738			
PU4	0.899	0.809			
Perceived Ease of Use			0.786	0.917	0.863
PEOU1	0.887	0.787			
PEOU2	0.932	0.869			
PEOU3	0.838	0.702			
Perceived Risk			0.875	0.934	0.858
PR1	0.932	0.869			
PR2	0.939	0.881			
Subjective Norm			0.786	0.936	0.909
SN1	0.861	0.741			
SN2	0.903	0.815			
SN3	0.881	0.777			
SN4	0.900	0.810			
Perceived Trust			0.769	0.908	0.849
PT1	0.791	0.625			
PT2	0.911	0.830			
PT3	0.923	0.851			
Behavioural Intention			0.759	0.950	0.935
BI1	0.741	0.549			
BI2	0.889	0.791			
BI3	0.910	0.828			
BI4	0.940	0.884			
BI5	0.833	0.694			
BI6	0.900	0.810			

Note: λ stands for outer loadings; λ^2 stands for indicator reliability; AVE stands for average variance extracted; and CR stands for composite reliability

Figure (2): presents the PLS statistical finding related to constructs' measurements model; Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Perceived Risk (PR), Subjective Norm (SN) Perceived Trust (PT) and Behavioural Intention (BI). The finding confirms the internal consistency reliability of all measurements as the composite reliability (CR) and Cronbach's alpha are more than 0.70 for all constructs (Nunally & Bernstein,1994).

Fig. (2): Structural and measurement models estimate.



Table (4) reveal the research sample attitudes toward the study variables. The participants have positive attitudes toward the four dimensions of mobile banking usage, with mean values of 4.350, 4.242, 3.600 and 3.752 respectively. And one negative attitude with mean values of 2.625 Also, the results show a positive attitude toward the customer intention in the research sample with mean values of 4.058.

Table (4): Research sample attitudes toward variables under consideration

Research variables	One-Sample Statistics		One-Sample Test (Test value = 3)			
	Mean	Std. Deviation	Mean Difference	Std. Error	t-value	p-value
Perceived Usefulness	4.350	0.820	1.350***	0.078	17.269	< 0.001
Perceived Ease of Use	4.242	0.791	1.242***	0.075	16.473	< 0.001
Perceived Risk	2.625	0.838	-0.375***	0.080	-4.696	< 0.001
Subjective Norm	3.600	0.925	0.600***	0.088	6.802	< 0.001
Perceived Trust	3.752	0.878	0.752***	0.084	8.973	< 0.001
Behavioural Intention	4.058	0.900	1.058***	0.086	12.320	< 0.001

*** Mean difference is significant at $p < 0.01$

Source: By the researcher, based on the results of IBM SPSS Statistics software, version 26

The Fornell-Larcker criterion compares the square root of the AVE values with the latent variable correlations. Specifically, the square root of each construct's AVE should be greater than its highest correlation with any other construct. The logic of this method is based on the idea that a construct shares more variance with its associated indicators than any other construct (Fornell and Larcker, 1981).

Table (5) shows the final results of the Fornell-Larcker criterion with the square root of the constructs' AVE on the diagonal and the correlations between the constructs in the lower left triangle. The findings indicate that the square roots of the AVEs for constructs are all higher than the correlations of these constructs with other latent variables in the path model. These results support the discriminant validity of the constructs.

Table (5): PLS results of Fornell-Larcker criterion and correlation matrix of constructs

	Perceived Usefulness	Perceived Ease of Use	Perceived Risk	Subjective Norm	Perceived customer Trust	Behavioural Intention	AVE
Perceived Usefulness	0.891						0.793
Perceived Ease of Use	0.691**	0.886					0.786
Perceived Risk	0.403**	0.478**	0.936				0.875
Subjective Norm	0.492**	0.474**	0.529**	0.886			0.786
Perceived Trust	0.461**	0.448**	0.381**	0.665**	0.877		0.769
Behavioural Intention	0.628**	0.621**	0.416**	0.625**	0.730***	0.871	0.759

Note: The square root of AVE values is shown on the diagonal; nondiagonal elements are the latent variable correlations, *** Significant at $p < 0.001$

Source: By the researcher, based on the results of Smart-PLS statistical software, version 3.2.9

Table (6) show the results of the assessment of collinearity among the predictor constructs. The results show the variance inflation value VIF, are below the threshold of 5, indicating that, no collinearity issue among the research structural model (Hair et al., 2011).

Table (6): Variance inflation factor for collinearity assessment

Constructs	VIF
Perceived Usefulness	2.078
Perceived Ease of Use	2.151
Perceived Risk	1.530
Subjective Norm	2.215
Perceived Trust	1.892

Source: By the researcher, based on the results of Smart-PLS statistical software, version 3.2.9

Table (7) show the PLS results for the structural model, the hypothesis of the model shown in table (6) indicate that there are only two hypotheses, are accepted in the proposed structural model. The result shows that H2 and H5 are significant at (*path coef cient* =0.218, *t*= 1.703, *p*=0.089) and (*path coef cient* =0.461, *t*= 4.840, *p* < 0.001) respectively. The model indicate that the perceived trust is the strongest significant positive effect on the customers behavioral intention on the usage of mobile banking services (*path coef cient* =0.461, *t*= 4.840, *p* < 0.001). and these results align with, (Malaquias, R. F., & Hwang, Y. 2016) and (Masrek, M. N., et al. 2014). moreover, perceived ease of use is the second positive significant effect on customer behavioral intention of the usage of mobile banking in Egypt. And these results align with other scholars such as. (Abraho et al., 2016; Kim et al., 2010; Nguyen et al., 2016; Shankar and Datta, 2018) who investigated appositve significant effect on the customer intention on usage of the mobile banking services. On the other hand, the results indicates an insignificant effect on Perceived Usefulness, Perceived Risk and Subjective Norm, on the customer behavioral intention.

Table (7): PLS results for structural model

Hypotheses	Path	Path coefficient	Standard Error	t value	p-value	R ²	f ²	Rank	Hypotheses testing results
H ₁	Perceived Usefulness → Behavioral Intention	0.211	0.136	1.550	0.121	0.066	---	---	Not Supported
H ₂	Perceived Ease of Use → Behavioral Intention	0.218*	0.128	1.703	0.089	0.068	2	---	Supported
H ₃	Perceived Risk → Behavioral Intention	0.012	0.064	0.180	0.857	0.000	---	---	Not Supported
H ₄	Subjective Norm → Behavioral Intention	0.117	0.103	1.133	0.257	0.019	---	---	Not Supported
H ₅	Perceived Trust → Behavioral Intention	0.461***	0.095	4.840	< 0.001	0.344	1	---	Supported
						0.673			

Notes: ***, ** and * refer to statistical significance at the 0.01, 0.05 and 0.1 levels, respectively

Source: By the researcher, based on the results of Smart-PLS statistical software, version 3.2.9

5. Conclusions and Managerial Implications

The research results show that mobile banking services is very important for the banking industry in Egypt. The research argues that fin-tech services in the banking industry give the customer the flexibility for choosing among the financial services provided and have prompted the customers to use different numbers of portable devices to complete their daily tasks such as making payments and paying bills. Which will facilitate their day-to-day financial services transaction.

The main objective of the research was to identify the significant and essential factors, of customer intention to use mobile banking services. And among the research framework model based on the Technology Acceptance Model (TAM1) and (TAM2), the results show that customer perceived trust, and perceived ease of use, have apposite significant effect on the customer behavior intention to use mobile banking services. And this result reflects the Egyptian culture, as the two main questions faces the users of mobile banking services in Egypt are, how can I use the bank application, or how to use mobile banking? And the second question arise, is my financial transaction will be safe while using the mobile banking services?

Therefore, banks must pay attention to aspects of the service's features like usability and ease of use in order to increase customers' intention to utilize fintech services. Nevertheless, banks also need to be worried about concerns like client trust and easiness of usage. So, it is important for banks policymaker to increase the awareness of the usage of mobile banking services and enhance customer trust on the day-to-day financial transaction, to increase customers' intention to utilize fin-tech services.

Moreover, the research demographic characteristics of the participant showed (91%) of the participant are below 45 years old, which is logic due to the adaptation of the new generation with new technology services. also, the results show that the National Bank of Egypt which is a government national bank represents (62.7%) of the sample size, which reflects the interest of the Egyptian government on applying new Fin-Tech services in the banking industry.

In conclusion, based on the study's findings, the authors suggest various regulatory changes to encourage the growth of fintech services in the banking industry in Egypt as follows.

- Banks need to enhance the service's usefulness to fit all consumer segments.
- Banks need to plan to improve their market standing and reputation. In order to increase customer trust, increase market share and lower transaction risks,
- Banks need to actively promote and educate the public about their new fin- tech goods and services.
- Banks need to increase the quality of high-tech application services while providing clients with better experiences.
- According to the demographic statistics, banks need to promote the 45 year old and above customers to use mobile banking as they represent a big segmentation in the banking industry.
- Banks must improve the bank's employees, by giving them training in both specific knowledge and applications based on contemporary technology in the financial services industry.

Reference

- Abraho, R. de S., Moriguchi, S.N., Andrade, D.F., 2016. Intention of adoption of mobile payment: An analysis in the light of the Unified Theory of Acceptance and Use of Technology (UTAUT). *RAI Rev. Adm. Inov.* 13, 221–230. <http://dx.doi.org/10.1016/j.rai.2016.06.003>
- Ajibade, P., 2019. Technology acceptance model limitations and criticisms: Exploring the practical applications and use in technology-related studies, mixed-method, and qualitative researches. *Libr. Philos. Pract.*.
- Ali, R. A., & Arshad, M. R. M. (2016). Perspectives of students' behavior towards mobile learning (M-learning) in Egypt: an extension of the UTAUT model. *Engineering, Technology & Applied Science Research*, 6(4), 1109-1114.
- Al-Marouf, R.A.S., Al-Emran, M., 2018. Students acceptance of google classroom: An exploratory study using PLS-SEM approach. *Int. J. Emerg. Technol. Learn.* 13, 112–123. <http://dx.doi.org/10.3991/ijet.v13i06.8275>.
- Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, 37(3), 99-110.
- Bauer, R.A., 1960. Consumer behavior as a risk taking: in R.S. Hancock (Ed.), 389. *Dynamic Marketing for a Changing World*, Chicago.
- Chandler, N., Krajcsk, Z., 2021. Intrapreneurial Fit and Misfit: Enterprising Behavior, Preferred Organizational and Open Innovation Culture. <http://dx.doi.org/10.3390/joitmc7010061>.
- Davis, F.D., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q. Manag. Inf. Syst.* 13, 319–339. <http://dx.doi.org/10.2307/249008>.
- Daragmeh, A., Lentner, C., & Sági, J. (2021). FinTech payments in the era of COVID-19: Factors influencing behavioral intentions of “Generation X” in Hungary to use mobile payment. *Journal of Behavioral and Experimental Finance*, 32, 100574.
- De Luna, I.R., Liébana-Cabanillas, F., Sánchez-Fernández, J., Muñoz Leiva, F., 2019. Mobile payment is not all the same: The adoption of mobile payment systems depending on the technology applied. *Technol. Forecast. Soc. Change* 146, 931–944. <http://dx.doi.org/10.1016/j.techfore.2018.09.018>.
- Devaraj, S., Fan, M., & Kohli, R. (2002). Antecedents of B2C channel satisfaction and preference: validating e-commerce metrics. *Information systems research*, 13(3), 316-333.
- El Haddad, G., Aimeur, E., Hage, H., 2018. Understanding trust, privacy and financial fears in online payment. In: *Proceedings - 17th IEEE International Conference on Trust, Security and Privacy in Computing and Communications and 12th IEEE International Conference on Big Data Science and Engineering, Trustcom/BigDataSE 2018*. Institute of Electrical and Electronics Engineers Inc., New York, NY, USA, pp. 28–36. <http://dx.doi.org/10.1109/TrustCom/BigDataSE.2018.00015>.

- Flavian, C., Guinaliu, M., Lu, Y., 2020. Mobile payments adoption – introducing mindfulness to better understand consumer behavior. *Int. J. Bank Mark.* 38, 1575–1599. <http://dx.doi.org/10.1108/IJBM-01-2020-0039>
- Forsythe, S. M., & Shi, B. (2003). Consumer patronage and risk perceptions in internet shopping. *Journal of Business Research*, 56(11), 867–875. [https://doi.org/10.1016/S0148-2963\(01\)00273-9](https://doi.org/10.1016/S0148-2963(01)00273-9)
- Fornell, C. and Larcker, D.F. (1981). “Evaluating Structural Equation Models with Unobservable Variables and Measurement Error”. *Journal of Marketing Research*, Vol. 18, No. 1, pp.39-50, doi.10.2307/3151312.
- Gefen, D., Karahanna, E., & Straub, D. W. (2003a). Trust and TAM in online shopping: An interacted model. *MIS Quarterly*, 27(1), 51–90
- Gerrard, P., & Barton Cunningham, J. (2003). The diffusion of internet banking among Singapore consumers. *International journal of bank marketing*, 21(1), 16-28.
- Glavee-Geo, R., Shaikh, A. A., & Karjaluoto, H. (2017). Mobile banking services adoption in Pakistan: are there gender differences?. *International Journal of Bank Marketing*.
- Gomber, P., Koch, J. A., & Siering, M. (2017). Digital Finance and FinTech: current research and future research directions. *Journal of Business Economics*, 87(5), 537-580.
- Grazioli, S., & Jarvenpaa, S. L. (2000). Perils of internet fraud: An empirical investigation of deception and trust with extesting experienced internet. *IEEE Transactions on Systems, Man, and Cybernetics Part A: Systems and Humans*, 30(4), 395–410.
- Hair, J.F.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2014). A primer on partial least squares structural equation modeling (PLS-SEM), SAGE Publications, Los Angeles.
- Hu, Z., Ding, S., Li, S., Chen, L., Yang, S., 2019. Adoption intention of fintech services for bank users: An empirical examination with an extended technology acceptance model. *Symmetry (Basel)* 11, 340. <http://dx.doi.org/10.3390/sym11030340>.
- Ibrahim, M. H., Hussin, S. R., & Hussin, S. H. (2020). Factors influencing Malaysian consumers’ intention to use quick response (QR) mobile payment. *Jurnal Pengurusan (UKM Journal of Management)*.
- Kang, J., 2018. Mobile payment in fintech environment: trends, security challenges, and services. *Hum.-Centric Comput. Inf. Sci.* 8, 32. <http://dx.doi.org/10.1186/s13673-018-0155-4>
- Kassim, N. M., & Ramayah, T. (2015). Perceived risk factors influence on intention to continue using internet banking among Malaysians. *Global Business Review*, 16(3), 393–414. <https://doi.org/10.1177/0972150915569928>

- Kim, C., Mirusmonov, M., Lee, I., 2010. An empirical examination of factors influencing the intention to use mobile payment. *Comput. Human Behav.* 26, 310–322. <http://dx.doi.org/10.1016/j.chb.2009.10.013>.
- Koch, J., Frommeyer, B., Schewe, G., 2020. Online shopping motives during the COVID-19 pandemic—lessons from the crisis. *Sustain.* 12, 1–20. <http://dx.doi.org/10.3390/su122410247>
- Lara-Rubio, J., Villarejo-Ramos, A.F., Liébana-Cabanillas, F., 2020. Explanatory and predictive model of the adoption of P2P payment systems. *Behav. Inf. Technol.* 1–14. <http://dx.doi.org/10.1080/0144929X.2019.1706637>.
- Laukkanen, T. (2007). Internet vs mobile banking: Comparing customer value perceptions. *Business Process Management Journal*,13(6), 788---797
- Liébana-Cabanillas, F., García-Maroto, I., Muñoz Leiva, F., Ramos-de Luna, I., 2020. Mobile payment adoption in the age of digital transformation: The case of apple pay. *Sustain.* 12, 1–15. <http://dx.doi.org/10.3390/su12135443>.
- Low, Y. M., Goh, C. F., Tan, O. K., & Rasli, A. (2017). USERS'LOYALTY TOWARDS MOBILE BANKING IN MALAYSIA. *Journal of Internet Banking and Commerce*, 22(S7), 1.
- 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
- Luhmann, N. (1979). *Trust and power*. Chichester, England: John Wiley and Sons.
- Makanyeza, C. (2017). Determinants of consumers' intention to adopt mobile banking services in Zimbabwe. *International Journal of Bank Marketing*.
- Malaquias, R. F., & Hwang, Y. (2016). An empirical study on trust in mobile banking: A developing country perspective. *Computers in human behavior*, 54, 453-461.
- 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.
- Ministry of communication and information technology report MCIT (2021). Covid-19 Recovery Roadmap, (Report NO. 2052021000), Oxford business group governmental report financial regulatory authority, https://mcit.gov.eg/Upcont/Documents/Reports%20and%20Documents_2052021000_E_Financial_Services_CRR_Booklet.pdf
- Munoz-Leiva, F., Climent-Climent, S., & Liébana-Cabanillas, F. (2017). Determinants of intention to use the mobile banking apps: An extension of the classic TAM model. *Spanish journal of marketing-ESIC*, 21(1), 25-38.
- Muñoz-Leiva, F., Hernández-Méndez, J., & Sánchez-Fernández, J.(2012). Generalising user behaviour in online travel sites through the Travel 2.0 website acceptance model. *Online Information Review*, 36(6), 879---902.
- Nguyen, T.N., Cao, T.K., Dang, P.L., Nguyen, H.A., 2016. Predicting consumer intention to use

- mobile payment services: Empirical evidence from Vietnam. *Int. J. Mark. Stud.* 8 (117), <http://dx.doi.org/10.5539/ijms.v8n1p117>.
- Oliveira, T., Thomas, M., Baptista, G., Campos, F., 2016. Mobile payment: Understanding the determinants of customer adoption and intention to recommend the technology. *Comput. Human Behav.* 61, 404–414. <http://dx.doi.org/10.1016/j.chb.2016.03.030>
- Park, N., Rhoads, M., Hou, J., Lee, K.M., 2014. Understanding the acceptance of teleconferencing systems among employees: An extension of the technology acceptance model. *Comput. Human Behav.* 39, 118–127. <http://dx.doi.org/10.1016/j.chb.2014.05.048>.
- Pavlou, P. A. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce*, 7(3), 101–134
- Phan, K., & Daim, T. U. (2011). Exploring technology acceptance for mobile services. *Journal of Industrial Engineering and Management (JIEM)*, 4(2), 339-360.
- Purwanegara, M., Apriningsih, A., & Andika, F. (2014). Snapshot on Indonesia regulation in mobile internet banking users attitudes. *Procedia-Social and Behavioral Sciences*, 115, 147-155.
- Rehman, Zahoor Ur, and Fazal Ali Shaikh., 2020. "Critical factors influencing the behavioral intention of consumers towards mobile banking in Malaysia." *Engineering, Technology & Applied Science Research* 10.1 (2020): 5265-5269.
- Revathy, C., Balaji, P., 2020. Determinants of behavioural intention on E-wallet usage: An empirical examination in amid of COVID-19 lockdown period. *Int. J. Manag.* 11, 92–104. <http://dx.doi.org/10.34218/IJM.11.6.2020.008>.
- Ringle, C. M. (2005). SmartPLS 2.0 (M3). [http://www. smartpls. de](http://www.smartpls.de).
- Rondan-Catalua, F.J., Arenas-Gaitan, J., Ramirez-Correa, P.E., 2015. A comparison of the different versions of popular technology acceptance models a nonlinear perspective. *Kybernetes* 44, 788–805. <http://dx.doi.org/10.1108/K-09-2014-0184>
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & sons.
- Shaikh, A. A., & Karjaluoto, H. (2015, February). Mobile banking adoption: A literature review. *Telematics and Informatics*, 32(1),129---142.
- Shanmugam, A., Savarimuthu, M. T., & Wen, T. C. (2014). Factors affecting Malaysian behavioral intention to use mobile banking with mediating effects of attitude. *Academic Research International*, 5(2), 236.
- Shankar, A., & Datta, B. (2018). Factors affecting mobile payment adoption intention: An Indian perspective. *Global Business Review*, 19(3_suppl), S72-S89. <https://journals.sagepub.com/doi/pdf/10.1177/0972150918757870>

- Silva Bidarra, S. H., Muñoz-Leiva, F., & Liébana-Cabanillas, F. (2013). The determinants of mobile banking acceptance: conceptual development and empirical analysis. *International Journal of Management Science & Technology Information*, (8).
- Singh, N., Sinha, N., Liébana-Cabanillas, F.J., 2020. Determining factors in the adoption and recommendation of mobile wallet services in India: Analysis of the effect of innovativeness, stress to use and social influence. *Int. J. Inf. Manage.* 50, 191–205. <http://dx.doi.org/10.1016/j.ijinfomgt.2019.05.022>.
- Sinha, M., Majra, H., Hutchins, J., Saxena, R., 2019. Mobile payments in India: the privacy factor. *Int. J. Bank Mark.* 37, <http://dx.doi.org/10.1108/IJBM-05-2017-0099>.
- Thakor, A.V., 2020. Fintech and banking: What do we know? *J. Financ. Intermed.* 41, 100833. <http://dx.doi.org/10.1016/j.jfi.2019.100833>, 46
- Turban, E. David king, Dennai Viehland, Jae Lee (2006),“Electronic Commerce A Managerial Perspective”.
- Varannai, I., Sasvari, P., Urbanovics, A., 2017. The use of gamification in higher education: An empirical study. *Int. J. Adv. Comput. Sci. Appl.* <http://dx.doi.org/10.14569/ijacsa.2017.081001>.
- Van Deventer, M., De Klerk, N., & Bevan-Dye, A. (2017). Antecedents of attitudes towards and usage behavior of mobile banking amongst Generation Y students.
- Venkatesh, V., Davis, F.D., 2000. Theoretical extension of the technology acceptance model: Four longitudinal field studies. *Manage. Sci.* 46, 186–204 <http://dx.doi.org/10.1287/mnsc.46.2.186.11926>.
- Vijayasathy, L.R., 2004. Predicting consumer intentions to use on-line shopping: The case for an augmented technology acceptance model. *Inf. Manag.* 41, 747–762. <http://dx.doi.org/10.1016/j.im.2003.08.011>.
- Wessels, L., & Drennan, J. (2010). An investigation of consumer acceptance of M-banking. *International Journal of bank marketing*.
- Xie, X.F., Stone, E., Zheng, R., Zhang, R.G., 2011. The typhoon eye effect: Determinants of distress during the SARS epidemic. *J. Risk Res.* 14, 1091–1107. <http://dx.doi.org/10.1080/13669877.2011.571790>.
- Zhang, T., Lu, C., Kizildag, M., 2018. Banking on-the-go: examining consumers’ adoption of mobile banking services. *Int. J. Qual. Serv. Sci.* 10, 279–295. <http://dx.doi.org/10.1108/IJQSS-07-2017-0067>.