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Factors affecting intention, adoption and use of mobile banking services in Morocco Based on TAM Model

Facteurs affectant l'intention, l'adoption et l'utilisation des services bancaires mobiles au Maroc Basé sur le modèle TAM

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Abstract

The objective of this research is to study the behavioral intention of Moroccan consumers towards mobile banking. Based on the technology acceptance model (TAM), we tried to explore the relevant factors that influence the intention to adopt mobile banking services in Morocco, including perceived ease of use (PEU), perceived usefulness (PU), perceived trust (PT), perceived risk (PR), and social influence (SI).

The literature review allowed us to formulate a set of hypotheses to test, a quantitative study targeting a sample of 110 Moroccan consumers was carried out. We used the PLS-SEM approach and SmartPLS 4 software. The results of our PLS regression model indicate that perceived usefulness (PU), perceived trust (PT) and social influence (SI) have a positive and significant influence on the adoption intention of Fintech services. On the other hand, perceived ease of use (PEU) and perceived risk (PR) have an insignificant effect on the adoption intention of mobile banking services.

Keywords : TAM ; mobile banking ; perceived trust ; perceived risk ; social influence.

Résumé

L'objectif de cette recherche est d'étudier l'intention comportementale des consommateurs marocains envers la banque mobile. Sur la base du modèle d'acceptation technologique (TAM), nous avons tenté d'explorer les facteurs pertinents qui influencent l'intention d'adopter des services bancaires mobiles au Maroc, notamment la facilité d'utilisation perçue (PEU), l'utilité perçue (PU), la confiance perçue (PT), le risque perçu (PR) et l'influence sociale (SI).

La revue de la littérature nous a permis de formuler un ensemble d'hypothèses à tester. Une étude quantitative ciblant un échantillon de 110 consommateurs marocains a été réalisée. Pour le traitement des données empiriques, nous avons fait appel à l'approche PLS-SEM et le logiciel SmartPLS 4. Les résultats de notre modèle de régression PLS indiquent que l'utilité perçue (PU), la confiance perçue (PT) et l'influence sociale (SI) ont une influence positive et significative sur l'intention d'adoption des services bancaires mobiles. En revanche, la facilité d'utilisation perçue (PEU) et le risque perçu (PR) ont un effet insignifiant sur l'intention d'adoption des services bancaires mobiles.

Mots clés : TAM ; services bancaires mobiles ; confiance perçue ; risque perçu ; influence sociale.

Introduction

The growth of electronic communication has significant effects on facilitating daily affairs of human. The owners of industries, service organizations and other centers become able to offer their products and services, buy and sell them to their clients quickly, with low expenses and without being limited to time and space (Hanafizadeh et al, 2014).

Electronic services are offering banking and financial services through internet and cell-phone. Financial technology, commonly known as Fintech, plays a vital role in the modernization of the financial services sector. It refers to: "*the use of technology to upgrade and automate the design and delivery of financial services*" (Ankita & Debabrata, 2020). It is a modern digital solution that helps to manage finances and make financial transactions easy and secure for individuals and organizations (Hua & Huang, 2021; Hassan et al, 2022; Alkhwaldi et al., 2022). In the Moroccan context, financial technology is starting to become popular and Moroccan financial institutions are increasingly interested in the development of this industry, especially with the various measures put in place by Morocco (adoption by Bank Al-Maghrib of the law 103-12 relating to credit institutions and similar organizations promulgated by Dahir No. 1-14-193 of 1 Rabii I 1436 (December 24, 2014) …). However, a boost for this sector remains necessary for Morocco to build a solid fintech ecosystem.

The use of mobile banking services has experienced and continues to experience excessive acceleration. Indeed, this revolution provides solutions enabling banks to serve their customers efficiently, with the highest quality and within large regions, especially where there are restrictions on the duration of Internet networks or the establishment of branches traditional (Cruz et al., 2010; Laukkanen and Cruz, 2009; Wessels and Drennan, 2010 cited by Alalwan et al, 2017).

Examining and explaining customer'intentions and adoption of mobile banking services has been the focus of researchers and practitioners around the world (Gu et al., 2009; Lin, 2011; Purwanegara et al., 2014; Püschel et al., 2010; Zhou, 2012 cited by Alalwan , Dwivedi & Rana, 2017). In fact, there is a need to understand customers acceptance of mobile banking and to identify the factors affecting their intentions to use it. Such studies provide an insight for developers in the building of mobile banking systems that consumers want to use, or in discovering the reasons that push potential users to avoid using the existing system. (Luarn & Lin, 2005)

In this respect, this study aims to empirically examine the most important factors that could shape the Moroccan customers'intention and adoption of mobile banking. Therefore, the

research question is formulated as following: which key factors significantly affect the intention of adoption of M-banking by Moroccan customers?

In order to answer this question, a conceptual framework has to be defined at first. After reviewing the main theories and factors of intent associated with the adoption and use of financial technology, the Technology Acceptance Model (TAM) (Davis, 1989) is chosen as a conceptual framework for this study, as it is considered one of the most widely used models to determine the factors affecting customers' behavioral intention towards the financial technology in general (Ajibade, 2019; Zhang et al, 2018) including mobile banking services. Then, the theoretical part of this research will be completed by a quantitative study targeting a sample of Moroccan consumers. Data processing and analysis are based on the PLS-SEM approach, carried out using SmartPLS 4 software.

1 Theoretical background:

In this section, the theoretical background of our study is developed with the literature review of mobile banking, the technology acceptance model and the main hypotheses that form our conceptual model.

1.1 Mobile banking: Emergence and definifion:

Financial technology (fintech) can be defined as technology application in the provision of various financial services (Baber , 2020 cited by Firmansyah et al, 2023).Mobile banking is a financial technology that was first launched in the late 1990s by the German company Paybox in collaboration with Deutsche Bank. At first, it was deployed and tested mainly in European countries: Germany, Spain, Sweden, Austria and the United Kingdom. In 2007, Kenya introduced an SMS-based mobile banking service, M-Pesa (Shaikh & Karjaluoto, 2015).

Various terms are used by researchers to refer to mobile banking services namely: branchless banking, mobile payments, mobile transfers, mobile finance (Donner & Tellez, 2008 cited by Sheikh & Karjaluoto, 2015), pocket banking services (Amin et al., 2006 cited by Shaikh & Karjaluoto, 2015).

Regardless of the terminology used, mobile banking is considered an approach to providing financial services via information and communication technology (ICT), which facilitates the selection of mobile services even in low-income countries (Anderson, 2010 cited by Payam et al, 2012). Mobile devices and communications networks are two preconditions for mobile banking services (Yucel & Gulbahar, 2013 cited by Low et al.,2017). With mobile banking, customers are able to have anytime and from any location access to banking services and

products via a mobile device; tablet or mobile phone (Crosman, 2011 cited by Ramdhony & Munien, 2013; Sakala & Phiri, 2019; Muzurura & Chigora, 2019).

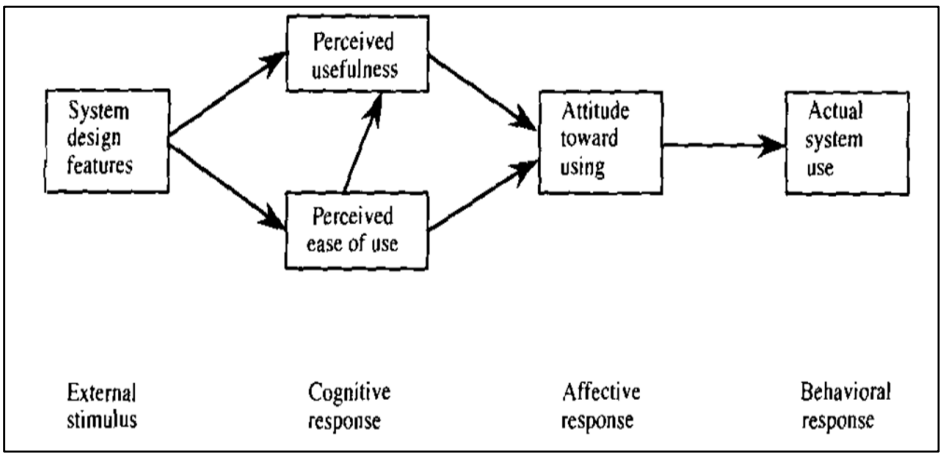
The factors driving the adoption of m-banking are mostly: the general and widespread acceptance of mobile applications, the increasing use of mobile phones and lifestyle (Ramdhony & Munien, 2013).

1.2 The technology acceptance model:

The technology acceptance model (TAM) is considered an extension of the Theory of Reasoned Action (TRA) proposed by Ajzen and Fishbein (1980) (Silva Bidarra et al, 2013; Firmansyah et al, 2023; Luarn & Lin, 2005; Ramdhony & Munien, 2013; Shankar & Datta, 2018; Ajibade, 2018; Carlos Roca et al, 2009). It was developed by Davis (1989) and explains customer acceptance of the adoption of new technologies.

According to TAM, the most salient factors in users'intention are perceived usefulness and perceived ease of use (Kim et al,2010; Ramdhony & Munien, 2013; Carlos Roca et al,2009) (see figure No. 1).

Figure N° 1:The Technology Acceptance Model



Source: Davis et al., 1989

Many studies have applied the TAM model to analyze user behavior, especially when applying different types of information systems (IS) (Agarwal & Prasad, 1999; Lederer et al., 2000; Venkatesh and Davis, 2000 cited by Hanafizadeh et al, 2014). This research is mainly based on the Technology Acceptance Model (TAM) developed by Davis (1989), since it is considered one of the most used methods to determine the factors affecting the intention of customer behavior towards the Fin-Tech sector in general. Its widespread acceptance stems from the fact that the model is simple and easy to understand (Ajibade, 2018). However, previous research

indicates that the technology acceptance model theory is insufficient to explain the user's decision to adopt information technology software (Glavee-Geo et al, 2017; Shanmugam et al, 2014; Phan & Daim, 2011; Luarn & Lin, 2005). For this reason, the study will take into consideration some additional variables of the study model in order to determine the factors influencing the behavioral intention of the Moroccan consumer regarding the adoption of mobile banking services. These variables are: social influence, perceived trust and perceived risks (see Table No. 1).

Table N°1: Definition of constructs.

Construct	Definition
Perceived usefulness	This variable measures the degree to which an individual believes that using a particular system would improve their job performance (adapted from Davis,1989).
Perceived ease of use	The degree to which an individual believes that using a particular system would be without physical and mental effort. (adapted from Davis, 1989)
Social influence	This is the degree of influence that the opinions of others can have on the adoption of a given system. (adapted from Venkatesh et al., 2003)
Perceived risk	This is the degree to which the user of mobile services believes that they may be exposed to certain types of financial, social, psychological, physical or temporal risks (adapted from Zhang, Zhu and Liu, 2012).
Perceived Trust	Trust is understood as an individual's positive expectation in which someone has belief and confidence in the words, actions, and decisions of others (McAllister, 1995)
Behavioral intention of adoption	This is the consumer's intention for effective use of a future product or service (adapted from Venkatesh et al., 2003)

Source: Adapted from Davis (1989); Venkatesh et al. (2003) and Zhang, Zhu and Liu (2012)

1.3 Conceptual model and hypotheses development:

The conceptual model of this research draws from the technology acceptance model (Davis,1989). Some additional variables are added to this model, so that we can shed a light about the main factors that influence moroccan consumer'intention to adopt mobile banking (see figure N°2).

1.3.1 Perceived usefulness (PU) and behavioral intention:

Users' intention to use an information technology relys first on their perceived usefulness and the degree of suitability of the system in their dialy life (Davis et al, 1989 cited by Kim et al,2010). Different studies have demonstrated the importance of perceived usefulness in adopting new technologies and have showen the relationship between perceived usefulness and consumers'intention (Hsu & Chiu, 2004; Kim & Shin, 2015 cited by Ramos de Luna et al, 2018; Huang et al, 2013 cited by Ramos de Luna et al, 2018; Chiu et al, 2005 cited by Silva Bidarra et al, 2013; Al-Okaily et al., 2021; Hu et al., 2019 ; Le, 2021; Zhang et al, 2023). Indeed, it was identified that there is a significant positive correlation between perceived usefulness and

the intention to adopt innovations (Mobile internet, mobile payment, online banking…) (Ramos de Luna et al, 2018; Lara-Rubio et al, 2020; Liébana-Cabanillas et al, 2020; Singh et al, 2020; Hanafizadeh et al,2014 ; Carlos Roca et al, 2009 ; Shankar & Datta, 2018). Luran and Lin (2005) argued that perceived usefulness is the ultimate reason that push users to exploit mobile banking. Actually, when a user perceives that mobile banking provides fast and convenient services, improves derived satisfaction and performance, therefore, the user adopts mobile banking services (Carlsson et al, 2006; Zhou et al, 2010 cited by Bankole et al, 2011).

In order to be in line with these researches, we think that perceived usefulness is a crucial antecedent of mobile banking adoption intention. We propose the following hypothesis:

Hypothesis 1 (H1): perceived usefulness has a positive effect on moroccon consumer's intention to use the mobile banking.

1.3.2 Perceived ease of use (PEOU) and behavioral intention:

Perceived ease of use is considered one of the most influential aspects regarding the decision to adopt new technology (Ramos de Luna et al, 2018). There has been extensive research pointing the critical effect of perceived ease of use on intention to use new technology (financial scaning services, mobile payment…)(Davis et al., 1989; Venkatesh & Davis, 1996, 2000; Agarwal & Pra- sad, 1999 cited by Kim et al.,2010; Luarn & Lin, 2005; Wang and Liao, 2007; Riquelme & Rios, 2010; Hu et al., 2019; Le, 2021; Zhang et al, 2023). Davis (1989) argued that people may think an application is useful, but they may also think it is complicated to know how to use it. The simpler a technology is to use, the more useful it can be, leading to increased acceptance and use (Adel Ali & Mohd Arshad, 2016).

Actually, mobile banking features require a certain level of knowledge and ability. In this point, perceived ease of use is key in influencing people's willingness to adopt such a system (Makanyeza, 2017; Silva Bidarra et al, 2013).

Studies reveal a positive relationship between PEOU and intention of using technology (Curran and Meuter, 2005 cited by Hanafizadeh et al, 2014; Al-Okaily et al., 2021). PEOU significantly affects attitude and adoption of mobile banking services because they use a very complex system to conduct banking transactions through a small device (Riquelme & Rios, 2010; Silva Bidarra et al, 2013). Nevertheless, some studies failed to prove the significant relationship between PEOU and intention to use new technology like the study of Oliveira et al (2016) in the field of mobile payment and the study of Pikkarainen et al (2004) in the field of online

banking. Amin et al (2008) found that ease of use is significantly related to intention to use in the context of mobile banking (Silva Bidarra et al, 2013).

Based on the literature, we hypothesize that the PEOU is a crucial antecedent of behavioral intention towards mobile banking. We therefore propose the following hypothesis:

Hypothesis 2 (H2): Perceived ease of use has a positive effect on moroccon consumer's intention to use the mobile banking.

1.3.3 Perceived trust (PT) and behavioral intention:

Trust is related to risk, and both are based on perceptions. Consequently, trust reduces the consumer's perception of the risks associated with opportunistic behavior by the seller (Silva Bidarra et al, 2013). For example, consumers may perceive a high risk of using Internet banking that may result in financial loss, but their trust towards a reputable bank may ease this concern and make them willing to adopt it nonetheless (Chan et al, 2022). Trust is considered a crucial factor in the world of electronic commerce and therefore in the acceptance of new technologies (Chircu et al. 2000 cited by Silva Bidarra et al, 2013). PT has a positive effect on user's willingness to conduct transactions with an online bank. The more a user believe that internet is trustworthy, the more positive his attitude to use it tend to be (Carlos Roca et al, 2009).

There is a significant relationship between trust and customer's perception and intention toward Mobile banking (Hanafizadeh et al, 2014; Luo et al, 2010; Zhou, 2012; Chan et al, 2022).

On the basis of the above empirical studies, we can propose the following hypothesis:

Hypothesis 3 (H3): Perceived trust has a positive effect on moroccon consumer's intention to use the mobile banking.

1.3.4 Perceived risk (PR) and behavioral intention:

Since Bauer's seminal work, the influence of perceived risk on consumer behavior has attracted the attention of researchers (Bauer, 1960 cited by Liébana-Cabanillas et al, 2020). Perceived risk is considered as a dynamic element in dertermining a user's attitude toward mobile banking (Wessels et al, 2010; Purwanegara et al,2014; Van Deventer et al,2017), because mobility increases the threat to security (Corradi et al, 2001; Coursaris et al,2003 cited by Hanafizadeh et al, 2014).Indeed, as they operate on open technological infrastructure, online and mobile banking are more risky than traditional banking channels (Yousafzai et al, 2003 cited by Ramdhony & Munien, 2013). Wu and Wang (2005) found that there is a significant relationship between perceived risk and intention to use mobile. Lovelock et al. (2001) argued that satisfaction and adoption of technology-enabled service are highest when the risk of using it is

low. PR has a significant negative effect on the attitude and using M-banking (Wessels and Drennan,2010 cited by Hanafizadeh et al, 2014).Otherwise, the higher perceived risk will lower consumers'intention toward m-banking services (Hanafizadeh et al, 2014 ; Chan et al, 2022).

Based on the literature, we hypothesize that the PR is a crucial factor of behavioral intention towards mobile banking. We therefore propose the following hypothesis:

Hypothesis 4 (H4): Perceived risk has a negative effect on moroccon consumer's intention to use the mobile banking.

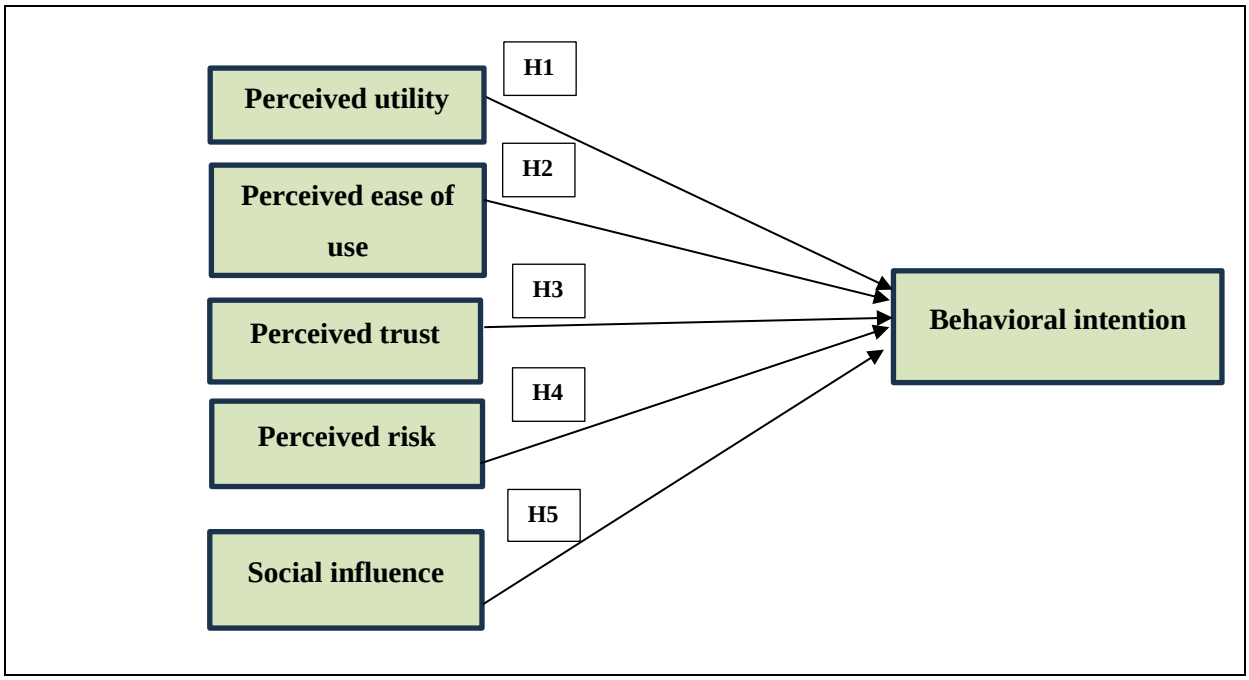
1.3.5 Social influence (SI) and behavioral intention:

Social influence reflects the influence of environmental factors (such as the opinions of user's friends, relatives, colleagues and superiors) on user's intention to adopt new technology particularly mobile banking services (Venkatesh et al, 2012; Bankole et al, 2011). Social influence can not be ignored in any adoption model because it is a crucial factor in adoption behavior (Pedersen and Ling ,2002 cited by Riquelme & Rios, 2010). Social influence has been validated in many studies such as mobile payement services (Oliveira et al, 2016), e-mail usage (Karahana and Limayem, 2000 cited by Riquelme & Rios, 2010), wireless finance adoption (Kleijnen et al., 2004 cited by Riquelme & Rios, 2010), and internet banking (Chan and Lu, 2004 cited by Riquelme & Rios, 2010). In other words, through information and encouragements, people surrounding customers could play a dynamic role in contributing to the customers' propensity to use technology (Alalwan, et al, 2016; Alalwan et al., 2015 cited by Alalwan et al,2017).

In the field of mobile banking, customers' intention to adopt such services can be influenced by the surronding social environment. We therefore propose the following hypothesis:

Hypothesis 5 (H5): Social influence has a positive effect on moroccon consumer's intention to use the mobile banking.

Figure N°2: Conceptual model



Source: Authors

2 Research Methodology :

In this section, we will present the methodological aspects (sample, data collection, data analysis…) that describe how this research was carried out and assess its reliability and validity.

2.1 Data collection and instrument development :

Our study aims to identify the factors driving the customers to adopt mobile banking services in Morocco. The study applies a quantitative methodology and a cross-sectional research design. The empirical data were collected through a closed-ended survey developed via Google Form and administered to participants online.

The questionnaire was divided into three parts. The first part gathered demographic informations about the respondents, including age, gender, education, income, and occupation. The second part of the questionnaire consists of questions about the level of respondents' awareness of mobile banking services, and the frequency of use. The last part measured customers' perceptions of perceived ease of use (PEOU), perceived usefulness (PU), perceived risk (PR), perceived trust (PT), social influence (SI), and adoption intention of mobile banking using a ''five-point Likert scale.''

The items used to measure both the independent and dependent variables in this study were drawn from previous studies (see appendix A). Hence, while adopting these items, minor modifications were implied in order to tailor them to the specific context of mobile banking.

Scale items are measured on a five-point Likert scale. In fact, participants are asked to express their level of agreement or disagreement with each statement on a scale ranging from 1, indicating "strongly disagree," to 5, indicating "strongly agree."

The target respondents of this study are more towards individuals who are mobile device users based on the rationale that they are more likely to adopt mobile banking services. Therefore, as the population of our study is large, and in order to obtain the desired sample, we first contacted our peers, friends, and colleagues. Those who responded were then asked to share the questionnaire with their friends and peers. In this study, 110 complete questionnaire responses were retained for data analysis.

Table N°2 reported the demographic data of the sampled respondents. The data include more women (64.5%) than men (35.5%), most (43.6%) are aged between the age of 18 and 40 years, and the majority had a higher level of education (65.4%). This shows that larger proportions of the respondents are highly educated and young, therefore they are more inclined towards the use of technology related services. In terms of occupation categories, employees (73.6%) accounted for the highest proportion,

Table N°2: Demographic data

Demographic Variable and Category		N	Frequency %
Gender	**Male**	39	35,5%
	Female	71	64,5%
Age (in years)	**18-28**	28	25,5%
	29-39	48	43,6%
	40-50	20	18,2%
	50 +	14	12,7%
Education	**A baccalaureate degree**	4	3,6%
	Under graduated (Bachelor's degree)	8	7,3%
	Graduated (Master, PhD…)	72	65,4%
Monthly income (dh)	**Less than 3 000**	24	21,8%
	3 000-5 000	10	9,1%
	5 000-10 000	32	29,1%
	More than 10 000	44	40,0%
Occupation	**Student**	17	15,5%
	Job-seeker	5	4,5%
	Employee	81	73,6%
	Retired	4	3,6%
	Others	3	2,7%
The use of mobile banking	**Yes**	89	81%
	No	21	19%
Frequency of use	**Almost every day**	30	27%
	Several times a week	29	26%
	Several times a month	26	24%
	Once a Week	24	22%
	Occasionally	1	1%

Source: Authors

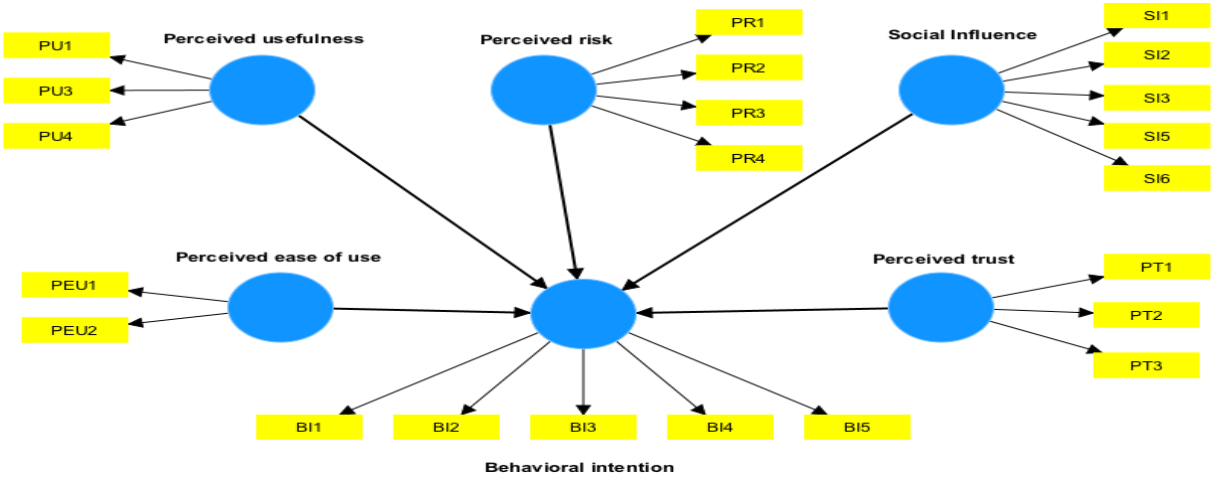
Furthermore, an analysis of the data shows that 80.9% of respondents use mobile banking mainly to check their account balances or make transfers. This indicates that majority of the sampled respondents are aware and make use of Fintech services. Among respondents using mobile banking, 27% use it every day or almost every day, 26% use it several times a week, 24% use it several times a month, 22% use it once a week and finally 1% use it occasionally.

2.2 Data analysis :

The partial least square structural equation modeling (PLS-SEM) using the SmartPLS software version 4, was used to empirically analyze the data (**see Figure 1).** In fact, this technique is the most suitable for our study because, on the one hand, the data collected is not normally distributed (according to the Shapiro-Wilk test), and on the other hand, this method is known for its ability to handle complex models with limited sample sizes (Hair et al., 2014).

The structural equation modeling is two-stage approach namely (1) the estimation of the measurement model (or the outer model) relating the observable variables which are called the manifest variables (MVs) or indicators to their own unobservable variables called latent variables (LVs) or construct, and (2) the estimation of the structural model (or the inner model) relating some endogenous LVs to other LVs.

Figure N °3- Structural equation modeling



Source : Developed using SmartPLS

2.2.1 The estimation of measurement model :

In PLS modelling, the evaluation of the measurement or outer model in a reflexive way[1] is carried out, firstly, by assessing the internal consistency, and secondly, by assessing the convergent and the discriminant validity.

In order to assess the internal consistency[2], we used the most common measurements: Cronbach alpha and composite reliability, in which the reliability is measured based on the interrelationship of the observed items variables. Table N°3 shows that all constructs have values of composite reliability/Cronbach alpha above 0.8. Our measurement model is therefore reliable.

[1] **There are three ways to relate the MVs to their LVs, respectively, called the reflective way, the formative one, and the MIMIC (multiple effect indicators for multiple causes) way. In the reflective way, it is supposed that each manifest variable (MV) reflects its Latent variable (LV).**

[2] **The internal consistency assesses the correlation between multiple items in a test that are intended to measure the same construct.**

Table N°3:Reliability and Validity of Measurement

Constructs	Items	Factor Loadings *	Alpha Cronbach	The Composite Reliability (CR)	Average Variance Extracted (AVE)
Intention behavior	B1	0.872	0.955	0.956	0.816
	B2	0.918			
	B3	0.920			
	B4	0.888			
	B5	0.895			
	B6	0.926			
Usefulness	PU1	0.924	0.945	0.948	0.859
	PU2	0.952			
	PU3	0.889			
	PU4	0.941			
Risk	PR1	0.843	0.905	0.910	0.779
	PR2	0.907			
	PR3	0.853			
	PR4	0.923			
Trust	PT1	0.883	0.904	0.917	0.839
	PT2	0.940			
	PT3	0.923			
Ease of use	PEU1	0.949	0.951	0.953	0.910
	PEU2	0.953			
	PEU3	0.959			
Social influence	SI1	0.878	0.938	0.947	0.764
	SI2	0.901			
	SI3	0.916			
	SI4	0.933			
	SI5	0.789			
	SI6	0.817			

*All contributions are significant: the bootstrap procedure on SmartPLS 4 software gives values of > 1.96 for all indicators.

Source: Authors

Next, to assess convergent validity, we examined the level and significance of the factor loadings generated by the PLS algorithm (which can be interpreted in the same way as a Principal Component Analysis). According to Chin (1998), if the values of the factor loadings are greater than 0.6, this confirms the convergent validity of the scales in the measurement model. In addition, the convergent validity is confirmed by using the Average Variance Extracted (AVE), whose values, according to Fornell and Larcker (1981), must be greater than 0.5. The results presented in Table N°4 below show that convergent validity is supported.

Furthermore, discriminant validity is used to determine the extent to which measurement scales for a given construct or variable differ from measurement scales for another variable in the model. Thus, following the guidelines of Fornell and Larcker (1981), discriminant validity is assessed by examining the correlation between the measurements of potential overlapping

constructs. In PLS regression, the variable is more likely to share the highest variance with its items than with the other variables. Thus, according to Table N°4 below, the square root of each variable's AVE (the bold and underlined values on the diagonal of the matrix) is greater than its correlation with the other variables. This indicates that the ability of each measure to generate different results from the measures of other variables or constructs is confirmed. We can therefore be sure of the discriminant validity of our constructs.

In conclusion, and based on the results discussed above, we can confirm the validity and reliability of our measurement model.

Table N°4- Correlations between constructs and the square root of AVE

	Perceived trust	Perceived ease of use	Social influence	Behavioral intention	Perceived risk	Perceived usefulness
Perceived trust	**0.916**					
Perceived ease of use	0.590	**0.954**				
Social influence	0.534	0.445	**0.874**			
Behavioral intention	0.708	0.693	0.619	**0.904**		
Perceived risk	0.798	0.634	0.602	0.697	**0.882**	
Perceived usefulness	0.577	0.812	0.554	0.797	0.650	**0.927**

Source: Authors

2.2.2 The estimation of structural model :

Once the validity (convergent and discriminant) and reliability of the overall constructs have been confirmed, the structural model must be estimated in order to generate the hypothesized relationships between the latent variables. The validation of the hypotheses depends on the importance and significance of the structural relationships obtained.

In the context of the PLS method, the quality of the overall model can be estimated by observing the collinearity (or multicollinearity) test, the coefficients of determination (R2), which report the explained variance of the dependent variables, and the corresponding t-values (Hair et al., 2016). In non-statistical terms, collinearity occurs when two or more variables measure the same thing. The existence of a collinearity (or multicollinearity) problem can be demonstrated using the "variance inflation factor" (VIF) index. VIF values must be less than 5. According to Table 5 below, the VIF values for items BI_6 (item n°6 measuring behavioral intention), PEU_3 (item n°3 measuring perceived ease of use), PU_2, PU_4 (items 2 and 4 measuring perceived

usefulness), SI_2, SI_3 and SI_4 (items 2, 3 and 4 measuring social influence) are greater than 5, confirming the presence of a multicollinearity problem which is likely to distort our results. We therefore choose to remove the indicators BI_6, PEU_3, PU_2 and SI_4 from our analysis.

Table N°5 - Multicollinearity test (VIF)

Items	VIF	Items	VIF
BI_1	3.117	**PT_1**	2.563
BI_2	4.620	**PT_2**	3.857
BI_3	4.604	**PT_3**	3.013
BI_4	3.672	**PU_1**	4.178
BI_5	3.882	**PU_2**	**6.090**
BI_6	**5.190**	**PU_3**	2.951
PEU_1	4.940	**PU_4**	5.094
PEU_2	4.804	**SI_1**	4.010
PEU_3	**5.592**	**SI_2**	**5.010**
PR_1	2.253	**SI_3**	**6.280**
PR_2	3.172	**SI_4**	**6.725**
PR_3	3.024	**SI_5**	2.396
PR_4	4.023	**SI_6**	2.392

Source: Authors

In order to gauge the quality of our model under the PLS approach, we also observe the value of the coefficient of determination (R^2) of our dependent variable. This coefficient also enables us to estimate the regression model's predictive power. The findings, obtained using the PLS algorithm, show a value R square= 71.6 %. This value confirms that our model is significant.

3 Results and discussion :

In this section, we will highlight the main results of this research followed by an interpretation of these findings.

3.1 Results :

The purpose of this paragraph is to emphasize the results of our hypothesis testing as shown in Fig.3 above and summarized in Table N°6. In the present study, the bootstrapping method was carried out with 5 000 sub-samples to assess the direct relationship between perceived usefulness, perceived ease of use, perceived risk, perceived trust, social influence and behavioral intention towards mobile banking services. Table N° 6 presents the results of our

structural model, including the relationships investigated, path coefficients (β), t-statistics and significance level. The t-statistics values must be > 2.58 for a significance level α = 1%, > 1.96 for an α = 5% or > 1.65 for an α = 10%.

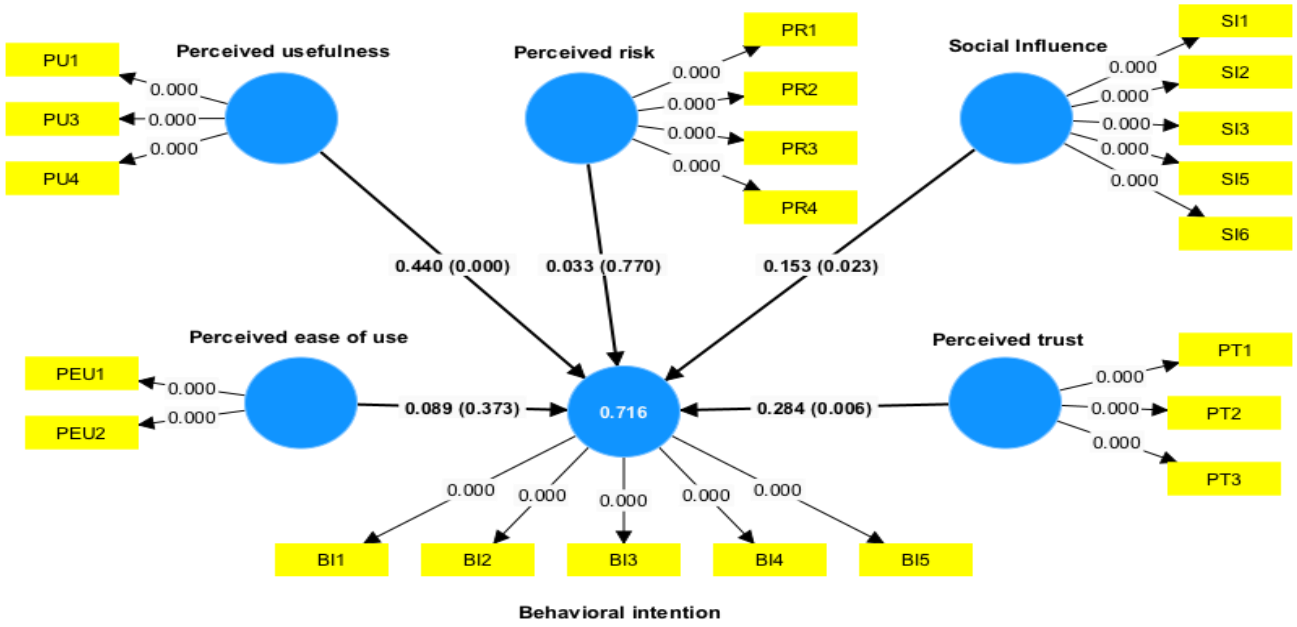
Table N°6- Results of structural model analysis

Hypotheses	Relations	Correlation coefficient (β standard)	t-statistics	p-value	Decision
H1	**Perceived usefulness -> behavioral intention**	0.440***	4.586	**0.000**	**Confirmed**
H2	**Perceived ease of use -> behavioral intention**	0.089	0.892	0.373	Rejected
H3	**Perceived Trust -> behavioral intention**	0.284***	2.729	**0.006**	**Confirmed**
H4	**Perceived risk -> behavioral intention**	0.033	0.293	0.770	Rejected
H5	**Social influence -> behavioral intention**	0.153**	2.278	**0.023**	**Confirmed**

Notes: *p < 0.05; **p < 0.01; ***p < 0.001

Hypothesis 1 (H1) was supported; perceived usefulness positively impacts the consumers' intention to use mobile payment systems (t = 6.645, p < 0.001). However, we did not find evidence to support hypothesis 2 (H2), that the consumers' perceived ease of use positively affected their intention to use mobile banking (t = 0.892, p = 0.373). Our analysis found evidence to support hypothesis 3 (H3), that consumers' perceived trust in mobile payment systems positively affects their intention to use mobile banking services (t = 2.729, p= 0.006). Conversely, hypothesis 4 was not supported, as the predicted relationship between perceived risk and consumers' intention to use mobile banking services was positive and not statistically significant (t = 0.293, p = 0.770). Finally, hypothesis 5 was supported, as social influence positively affects the consumers' intention to use mobile banking (t = 2.278, p= 0.023).

Figure N°4- Structural model



Source : Developed using SmartPLS

3.2 Discussion :

The aim of this study was to examine the key factors that influence the attitude towards using mobile banking services thus leading to the adoption of mobile banking in Morocco. The analysis of the data revealed several significant findings. Interpretations based on these findings and implications are discussed below.

First of all, and as expected, the findings of this study suggest a positive and significant relationship between perceived usefulness and the intention to adopt mobile banking. This finding corroborates the results of several previous studies such as Al-Okaily et al. (2021), Alshari and Lokhande (2022), Gu et al. (2009), Hu et al. (2019), Le (2021), and Zhang et al. (2023). Therefore, our finding implies that individuals who perceived mobile banking services as useful were more likely to form more favorable attitude toward adopting these services. Therefore, mobile banking providers should focus on designing useful services in order to provide customers with seamless experiences that meet their needs and exceed their expectations.

Another supported hypothesis we found was a significant positive relationship between perceived trust and intention to use mobile banking services. As consumer's perceived trust increased, so did their intention to use mobile banking services. This finding is also as expected since past literature has consistently showed positive influence on the adoption of new

innovations (e.g., Chin et al., 2020; Gu et al., 2009; Hassan et al., 2022; Hu et al., 2019; Sikdar and Makkad, 2015; Zhang et al., 2023). Indeed, trust is a core element needed to maintain in transactions, especially when it comes to online transaction environment compared to a face-to-face transaction environment. In this regard, Aladwani (2001) emphasized that given the fact that online banking transactions lack the in-person connection between the bank staff and consumer as well as the presence of a physical branch, trust is one of the biggest challenges facing these types of transactions in the future. Therefore, in light of our findings, mobile banking providers need to develop secure banking systems that guarantee high levels of protection. They must eliminate any threat to security and protect users from the risks of fraud or piracy in a proactive and continuous manner.

Conversely, our findings revealed that perceived ease of use (PEOU) exhibits insignificant impact on intention to use mobile banking services. This finding is consistent with Hu et al., (2019). They argue that this result could be explained by the fact that in the early stages of technology or service adoption, perceived ease of use often has no significant impact on adoption behavior because users are unfamiliar with it or have no opportunity to use it (Davis, 1989). Another possible explanation is that Moroccans, especially young generations, have better ICT knowledge and know how to use digital service channels and internet technologies in general. Therefore, PEOU is no longer imbedded as an important antecedent in mobile banking adoption decision.

Another important finding is that social influence positively influences adoption intention in the mobile banking context, as hypothesized. This finding indicates that positive recommendations and experiences shared by referents, peers and influential individuals positively affect individuals' intention to use fintech services. Although there is evidence from previous research that supports these results for some specific FinTech services (Al Nawayseh, 2020; Hassan et al., 2022; Lui et al., 2019), some studies did not show similar results (Baptista and Oliveira, 2015; Hassan et al., 2023). In emerging countries such as Morocco, it was expected that social influence will play a significant role over the intention, as people in such countries place high regard and put importance on their family, friends, and peers; hence, their opinions are essential in order to purchase a product or service.

Finally, the relationship between perceived trust and intention to use mobile banking is not significant and thus our hypothesis was not supported. This finding lends support to Chin et al. (2022) and Hu et al. (2019), who also suggested that perceived risk does not affect users' attitudes toward the adoption regarding Fintech services. This surprising result, at first glance,

can be interpreted by the Motivational Avoidance Theory (Chin et al., 2022). Indeed, the systems and technologies are so complex, and users depend on them so much, that they have essentially given up worrying about potential risks involved in their use. Another potential explanation is that consumers' intention is dominated by the benefits associated with such services, and not by the associated risks (Hu et al., 2019).

Conclusion

The objective of this research is to study and understand the behavioral intention of Moroccan consumers towards FinTech services namely mobile banking. More precisely, the present work aims to explore the relevant factors that influence the intention to adopt mobile banking services in Morocco, including perceived ease of use (PEU), perceived usefulness (PU), perceived trust (PT), perceived risk (PR), and social influence (SI).

The literature review allowed us to formulate a set of hypotheses to test, a quantitative study targeting a sample of 110 Moroccan consumers was carried out. We used the PLS-SEM approach and SmartPLS 4 software. The results of our PLS regression model indicate that perceived usefulness (PU), perceived trust (PT) and social influence (SI) have a positive and significant influence on the adoption intention of Fintech services. On the other hand, perceived ease of use (PEU) and perceived risk (PR) have an insignificant effect on the adoption intention of mobile banking services.

Limits are inherent to all scientific research work. Regardless of the limits of our work, we are aware that the results can not be definitively appropriated. Therefore, the limits of this research open the way to new research perspectives. Firstly, we conducted the present study using a "cross-sectional" approach; however, future research can adopt a "longitudinal approach" to study the evolution of consumers' behavioral intention to adopt FinTech services over time. Second, we did not test the mediating and/or moderating role of certain variables. Thus, in order to enrich the conceptual model, it would be interesting to take into account the impact of mediating variables (e.g. quality of service or culture) and/or moderating variables (sex, age, gender). Finally, our study is based on the Moroccan context; therefore, it is recommended that this study be replicated in other countries, particularly African ones, in order to make international comparisons.

APPENDICES

Appendix A: Measurement items

Constructs	Items	Item Statements
Perceived usefulness (PU)	PU1	I can/could save time by carrying out my financial transactions via my mobile phone
	PU2	I can/could do my transactions easily with mobile banking
	PU3	I find mobile banking services more advantageous than traditional transactions
	PU4	I think mobile banking is/will be useful because it's available 24/7
Perceived ease of use (PEOU)	PEOU1	I think it is/would be easy for me to learn how to use banking services through mobile phone
	PEOU2	I think my interaction with mobile banking is/will be clear and understandable
	PEOU3	I think it is / would be easy for me to become proficient in using mobile banking services
Perceived risk (PR)	PR1	I believe mobile banking providers are trustworthy
	PR2	I believe my transactions via mobile phone are likely to be secure
	PR3	I believe that my personal information would not be disclosed using mobile banking services
	PR4	I believe that using mobile banking services to carry out my banking transactions could be safe
Perceived trust (PT)	PT1	I trust network connectivity when conducting a transaction via mobile banking
	PT2	In general, I trust mobile banking services
	PT3	I think mobile banking services are reliable
Social influence (SI)	SI1	People close to me (family, friends...) think I should use mobile banking
	SI2	People whose opinions that I value prefer that I use mobile banking
	SI3	People close to me (family, friends...) helped /would help me use mobile banking
	SI4	People close to me (family, friends...) recommend /would recommend using mobile banking
	SI5	People close to me (family, friends...) influence my decision to use mobile banking
	SI6	People who use mobile banking have a positive self-image
Behavioral intention (BI)	BI1	I prefer mobile banking to other traditional banking services such as physical branches
	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 services
	BI5	I fully intend to recommend mobile banking to others
	BI6	I intend to continue using mobile banking in the future

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