An Extended UTAUT Model to Explore the Influential Factors towards M-Banking Apps' Use

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Abstract

Mobile banking apps (mBA) are considered vital tools for banks' digital transformation as they offer self-service options for most of their provided services to their customers via mobile devices. However, only a small proportion of retail customers utilize them. The limited relevant literature focuses only on individuals' behavioral intention to adopt or use mBA. The scope of this paper is to help in the examination of such a contemporary and vital topic through the investigation of the key factors that influence individuals towards mBA utilization via their smartphones. The study suggests and tests a conceptual framework that extends the Unified Theory of Acceptance and Use of Technology (UTAUT) with trust, innovativeness, compatibility, and convenience determinants. A sample of 411 adopters and non-adopters of mBA was analyzed through factor analysis and discriminant analysis. Findings reveal that almost all examined determinants do impact individuals' m-banking app use.

Keywords: m-banking apps, m-banking apps' use, UTAUT, innovativeness, trust, compatibility

1. Introduction

Since 2007, when Apple first introduced the iPhone, the concept of using applications (apps) in our mobile phones has greatly changed the way of searching on the Internet and taking advantage of its great capabilities. Nowadays, a countless number of apps exist, and even more are coming to light every day with the aim to inform, assist, educate and entertain individuals to the greatest possible extent (Alavi & Ahuja, 2016). Banking is regarded as one of the industries where mobile apps have been greatly applied.

Particularly banks have been continuously trying to be virtualized to a great degree taking into consideration that they are considered as information-intensive companies (Bons et al., 2021). According to Singh & Srivastava (2018), their services are the most value-adding and significant apps in the mobile context. Thus, banks have tried really hard to offer as much as possible enhanced customer experience to their clients as they noticed too soon the move of individuals to smartphones and apps provided (Laukkanen, 2016; Martins et al., 2014; Shankar et al., 2020a,b). Furthermore, the continuous demands for improved mobile services lead to endless investments to offer more advanced m-services to their customer base and a serious reason to attract others as well (Baabdullah et al., 2018; Giovanis et al., 2019a; Komulainen & Saraniemi, 2019; Luarn & Lin, 2005; Shaikh & Karjaluoto, 2015). Additionally, their effort to cut operational costs is greatly based on transferring the vast majority of their customers from brick-and-mortar bank branches to online value-added self-service solutions; and mobility through apps is one of the most prominent ones. All the aforementioned facts do reveal the importance of mobile apps to the banking industry.

Furthermore, apps are the latest of the three ways for m-banking along with SMS banking and m-Internet

(Shankar et al., 2020a,b); and the one in which banks actually have invested the most (Baabdullah et al., 2018; Giovanis et al., 2019a; Luarn & Lin, 2005). Nowadays they are the leading method for contemporary m-banking (Farah et al., 2018) and offer various benefits to both involved entities. To be more specific, individuals can access their banking services anytime anywhere, thus, they save significant time than visiting a traditional bank branch (Hogan et al., 2004; Goyette et al., 2010; Kim & Prabhakar, 2004; Yousafzai, 2012; Zhou, 2011). There are also a wide range of other benefits to individuals, such as convenience, customization, control of the processes and financial savings (Baabdullah et al., 2018; Fenu & Pau, 2015; Karjaluoto et al., 2019; Laukkanen, 2016; Shankar & Jebarajakirthy, 2019). On the other hand, banks are greatly benefited as well. For instance, they can among others decrease operating costs, lower workforce, improve productivity and efficiency, have access to customers wherever they live; and finally increase their profits (Baabdullah et al., 2018; Ha et al., 2012; Ho et al., 2020; Kwateng et al., 2019; Malaquias & Hwang, 2016; Shankar & Jebarajakirthy, 2019; Shankar & Rishi, 2020; Yousafzai, 2012). To sum up, retail services through mobile apps is one of the top strategic priorities of the banking industry towards its continuous digital transformation (Baabdullah et al., 2018; Giovanis et al., 2019a; Luarn & Lin, 2005).

Even though m-banking apps (mBA) do provide a lot of benefits, however, up to now only a small proportion of retail customers use them (Shaikh & Karjaluoto,2015; Thusi & Maduku,2020). In specific their usage rate is low (Majumdar & Pujari, 2021) compared to their adoption rate (Pages, 2021). Thus, the aim of this research paper is to reveal the factors that influence users to utilize mBA. Particularly, this study intends to prove which determinants force individuals to use them compared to retail banking customers who do not utilize them. As far as it is concerned, even though there is a numerous number of empirical studies that focuses on m-banking services in general (e.g., Alalwan et al., 2016; Baabdullah et al., 2018; Bhatiasevi, 2016; Farah et al., 2018; Farzin et al., 2021; Geebren et al., 2021; Ha et al., 2012; Ho et al., 2020), the research that focuses exclusively on mBA is somehow limited (Malaquias & Hwang, 2016). Thus, the paper adapts the main factors of a well-known behavioral theory; that is the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatech et al., 2003), and incorporates several other factors which are considered as important in the context of the mobile environment. Through this amalgamation, the paper suggests and then examines a conceptual framework with the aim to reveal which factors do impact individuals to utilize mBA. The study anticipates helping the banking industry in their effort to attract even more customers to its mBA services. Moreover, this study is expected to focus on a slightly examined topic and reveal vital insights not only to the banking industry, but also to the academia and other involved enterprises and organizations.

The rest of the paper includes another five sections. In specific, the existing literature review that focuses on empirical research in the context of m-banking apps' adoption is presented in section 2; followed by section 3 where the suggested research framework along with its hypotheses are analyzed. In the next sections (section 4 and 5), the applied methodology is presented followed by the analysis of the results. Finally, in section 6 a discussion on the study's findings is presented.

2. Literature Review

There have been only a few empirical researches which have focused only on users' behavioral intention to adopt or use mBA. To our knowledge, eleven academic papers have already examined only this specific scientific field without simultaneously investigating other m-banking methods or m-banking services in general. Hence, throughout the following paragraphs of this section, a presentation of their main scope and outcome are presented.

Muñoz-Leiva et al. (2017) investigated Spanish non-adopters and confirmed the effect of perceived usefulness, social image, perceived trust, and perceived ease of use towards their intention to adopt mBA. Veríssimo (2016) examined the enablers and hinders of mBA. Specifically, he proved that high perceived usefulness, high compatibility, low perceived risk, and high perceived ease of use impact individuals to adopt such apps. In contrast, individuals are reluctant to use them if these factors do not exist to the aforementioned levels. In Malaysia, Hew et al. (2015) utilized the UTAUT2 model and proved that with the exception of social influence and price value, all the other determinants do have a statistically significant impact on individuals' adoption of mBA. Moreover, Sampaio et al. (2017) conducted a multiethnic investigation and proved that perceived benefits are greatly connected with users' satisfaction. To add to this, they confirmed that satisfaction can reinforce loyalty, trust, and positive word-of-mouth towards such apps.

Furthermore, Poromatikul et al. (2019) focused on Thai adopters and investigated factors of continuance intention to use mBA. They revealed that trust, satisfaction, and expectancy confirmation are the most important factors; followed by image, risk and quality of m-services. On the other hand, Alavi & Ahuja (2016) classified

retail bank customers to three groups, (a) cognizant indubitables, (b) conservative apprehensives and (c) internet-savvy inquisitives; taking into consideration their adoption and use of twelve difference mBA. Moreover, they confirmed the statistically significant impact of perceived usefulness, perceived ease of use, perceived risk and cost as well as the information necessity from the m-services provided to the adoption and further utilization of these apps. In Cameroon, Kamdjoug et al. (2021) examined a series of influential factors towards an m-banking app adopt intention by merging determinants from various behavioral theories and models, such as the TAM, the UTAUT2, the Protection Motivation Theory (PMT) and the Information System Success Model (ISSM). In specific, they proved the impact of utilitarian expectation, hedonic motivation, habit, status gain, and perceived privacy towards this app. Lately, Saprikis et al. (2022) compared users and non-users of mBA by extending the UTAUT. In specific, they confirmed that even though there are common factors that impact both groups of respondents, such as performance expectancy, social influence and reward, there are also a number of factors that react differently to these groups, such as facilitating conditions, risk, anxiety and security.

Thusi & Maduku (2020) focused on active South African users of mBA. Particularly, they extended the UTAUT2 and confirmed that performance expectancy, habit, facilitating conditions, perceived risk and institution-based trust do impact on their behavioral intention. In the United Arab Emirates, Majumdara & Pujari (2021) explored adopters and non-adopters' perceptions towards mBA. The results of their investigation revealed that information availability and perceived usefulness are vital factors, not only for apps' adoption but also for the level of their use. Finally, Hanif & Lallie (2021) investigated the impact of cyber security determinants in the UK by extending the UTAUT and confirmed the statistically significant effect of privacy, performance expectancy and risk.

The existing literature review reveals that this topic needs additional investigation with the aim to provide to academia, the banking industry and other involved entities further vital findings about m-banking apps' adoption and use. As noted above in the Introduction section, the study adapts the UTAUT model with trust, innovativeness, compatibility, and convenience factors. It should be emphasized, though, that as far as it is concerned, this paper is the first where innovativeness and convenience factors are examined in the exclusive context of mBA.

3. Suggested Conceptual Framework and Research Hypotheses

The aforementioned merge intends to reveal possible useful information regarding the main factors that impact individuals towards m-banking apps' use. As it has already stated in section 2, there are five researches that focus on the topic of mBA examination where the UTAUT and its newest version (i.e., UTAUT2) have been applied by former academicians (Hanif & Lallie, 2021; Hew et al., 2015; Kamdjoug et al., 2021; Saprikis et al., 2022; Thusi & Maduku, 2020). Thus, the selection to adapt and extend the behavioral model of the UTAUT was considered as ideal for the objectives of this study. In the following paragraphs the analysis of the research hypotheses is presented along with the presentation of the suggested conceptual framework (Figure 1).

3.1 Performance Expectancy

Performance expectancy is considered as a key factor of the UTAUT. According to its creators, it is defined as "the degree to which using a technology will provide benefits to consumers in performing certain activities" (Venkatesh et al., 2003, p. 159). In the context of mBA, four studies confirmed its positive effect on behavioral intention (Hanif & Lallie, 2021; Hew et al., 2015; Saprikis et al. 2022; Thusi & Maduku, 2020). Moreover, according to Venkatesh et al. (2003), it is considered as the strongest predictor of the UTAUT. Thus, it is assumed that:

Hypothesis 1: Performance expectancy exerts a positive impact on m-banking apps' use

3.2 Effort Expectancy

Effort expectancy is the other, main, factor of the UTAUT and is defined as "the degree of ease related with the use of the technology" (Venkatesh et al., 2003, p. 159). From the previous studies where UTAUT was applied, in three out of the four studies (Hanif & Lallie, 2021; Hew et al., 2015; Thusi & Maduku, 2020) the researchers confirmed its positive impact on m-banking adoption intention. Hence, based on the existing literature review, the paper adopts the subsequent hypothesis:

Hypothesis 2: Effort expectancy exerts a positive impact on m-banking apps' use

3.3 Social Influence

According to (Venkatesh et al., 2003, p. 451), social influence is defined as "the degree to which an individual perceives that significant others, such as family and friends, believe that he/ she should use a particular

technology". In the context of m-banking apps' investigation, even though previous research has examined it in three studies, only Saprikis et al. (2022) confirmed its statistically significant effect. Based on it, this study intends to examine social influence once again aiming at confirming or not its impact on m-banking apps' use. Hence, it is hypothesized that:

Hypothesis 3: Social influence exerts a positive impact on m-banking apps' use

3.4 Facilitating Conditions

Facilitating conditions is the fourth factor of the UTAUT. According to (Venkatesh et al., 2003, p. 453), it is defined as "the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the technology". In the context of mBA investigation, Saprikis et al. (2022) and Hew et al. (2015) have already confirmed its positive impact on behavioral intention to adopt such apps. Therefore, on this study, it is assumed hat:

Hypothesis 4: Facilitating conditions exerts a positive impact on m-banking apps' use

3.5 Trust

Trust is a vital determinant and has been widely examined in numerous scientific fields, such as behavior, management, psychology, and technology (Kim et al., 2008). According to various researchers (e.g., Akman & Mishra, 2017; Meharia, 2012; Ming-Hsien et al., 2009), trust is critical in defining not only the user's adoption intention but also his/her actual behavior. (Shin, 2009, p. 1346) defined trust as "the belief that vendors will perform some activity in accordance with customers' expectations". Moreover, it should be emphasized that trust is considered extremely important in the mobile environment where insecurity issues are higher compared to e-commerce (Wei et al., 2009). In the context of m-banking apps' examination, four previous studies (i.e, Muñoz-Leiva et al., 2017; Poromatikul et al., 2019; Sampaio et al., 2017; Thusi & Maduku, 2020) confirmed its positive impact on individuals' behavioral intention to adopt and use. Hence, it is assumed that:

Hypothesis 5: Trust exerts a positive impact on m-banking apps' use

3.6 Innovativeness

Innovativeness is regarded as a vital factor in adopting and further utilizing ICT in general (e.g., Herrero & Del Bosque, 2008; San Martín & Herrero, 2012). As a result, it has been greatly examined in the broad context of m-commerce as well (e.g., Saprikis et al., 2021; Williams, 2021). Based on Agarwal and Prasad (1998), innovativeness is defined as "the willingness of an individual to try out any new IT". Regarding m-banking apps' investigation, however, there is no study that has proved its impact. Therefore, since innovative people seem to be more dynamic, curious, venturesome, stimulation-seeking and communicative (Bhatti, 2007), it is assumed that highly innovative mobile users are more likely to utilize mBA.

Hypothesis 6: Innovativeness exerts a positive impact on m-banking apps' use

3.7 Compatibility

According to (Moore, 1991, p. 195), compatibility is defined as "the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters". There are various empirical studies in the context of m-commerce (i.e., Oliveira et al., 2016; Saprikis & Avlogiaris, 2021a) where the statistically significant effect of compatibility on behavioral adoption intention has been proved. Regarding m-banking apps' investigation, only Veríssimo (2016) confirmed its positive impact. Therefore, in this paper, it is aimed to predict if compatibility influences m-banking apps' use from individuals. Thus, it is hypothesized that:

Hypothesis 7: Innovativeness exerts a positive impact on m-banking apps' use

3.8 Convenience

Convenience is considered as one of the main benefits in the broad context of m-banking (Chang et al., 2016; Jucukcay & Benyoucef, 2014; Lee et al., 2008; Saprikis et al., 2022). Particularly, De Kerviler et al. (2016) emphasized the utilitarian value of convenience, while Kim et al. (2010) mentioned that it provides time as well as space efficacies. There have been various studies so far that proved its positive effect on m-commerce adoption intention and use (e.g., Saprikis & Avlogiaris, 2021b; Shankar & Rishi, 2020; Williams, 2021; Xu et al., 2019). However, no one has ever examined convenience focusing on the specific context of mBA. Hence, in this paper, it is alleged that the higher the levels of perceived convenience of mBA utilization, the greater the level of their usage from individuals. Hence, it is hypothesized that:

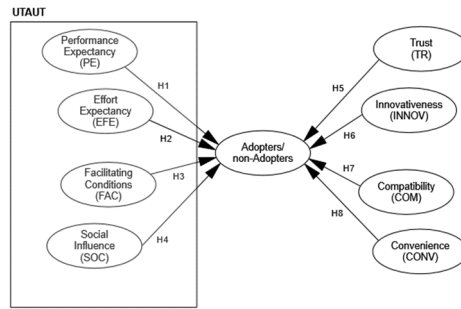Hypothesis 8: Convenience exerts a positive impact on m-banking apps' use

Figure 1. Suggested conceptual framework

4. Research Methodology

This section describes the research methodology of the empirical investigation. Thus, the procedure for developing the measurement instrument is presented. This is followed by the data collection procedure and the demographics of the research sample. The section ends with the reliability and validity analyses of the measurement instrument.

4.1. Measurement Instrument

The questionnaire was selected as the most appropriate method for gathering the data required. Thus, a questionnaire was developed based on the existing literature review with the aim to avoid validity and reliability issues. In specific, the questionnaire items that correspond with the UTAUT factors of the suggested conceptual framework were adapted from the creator of the behavioral model (Venkatesh et al., 2003). Concerning the other determinants, as it was depicted in Table 1, their items are based on previous high quality research studies. It should be mentioned that a 5-point Likert scale was applied to all questions. Regarding the dependent variable, a dichotomous variable is applied named "Adopters-Non Adopters", which classifies respondents based on their utilization or not (adopters versus non-adopters) of mBA. Finally, five questionnaire items were added to the measurement instrument with the aim to depict the demographic profile of the sample.

The questionnaire was first drafted in the English language. Then, to guarantee its consistency, it was translated to the Greek language by a professional English tutor. Lastly, it was pre-tested from twenty individuals as well as two researchers for eliminating potential clarity and accuracy issues, as well as guaranteeing that its items were reliable and valid.

Table 1. Measurement items of the suggested conceptual framework.

Research Variables	Measurement Items	Sources
Performance Expectancy (PE)	PE1: I think that using an mBA would help me accomplish my transactions more quickly	Venkatesh et al., 2003
	PE2: I think that using an mBA would increase my chances of completing transactions that are important to me	
	PE3: I suppose that using an mBA would be useful	
Effort Expectancy (EFE)	EFE1: I think it would be easy for me to learn how to use an mBA	
	EFE2: I think that it would be easy for me to use an mBA	
	EFE3: I think that my interactions via an mBA would be clear and understandable	
	EFE4: I think that I would find mBA easy to use	
Facilitating Conditions (FAC)	FAC1: I think that I have the proper smartphone to use an mBA	
	FAC2: I think that I could use an mBA with my current smartphone	
Social Influence (SOC)	SOC1: People who influence my behavior think that I should use an mBA	
	SOC2: People who are important to me think that I should use an mBA	
	SOC3: People whose opinion count think that I should use an mBA	
Trust (TR)	TR1: I think that mBA are reliable	
	TR2: I think that I would trust to use an mBA	Ashforth, 2001
	TR3: I think that mBA strictly follow the terms of use	
	TR4: In general, I trust an mBA	
Innovativeness	INNOV1: I like using new technologies	

(INNOV)	INNOV2: I like learning about new technologies	Baptista &
	INNOV3: When I am informed about a new technological product, I try to find the opportunity to experiment on it	Oliveira, 2017; He et al., 2018
	INNOV4: Compared to my friends and family, I am usually among the first to try new technologies	
Compatibility (COM)	COM1: I think that an mBA would be compatible with all aspects of my lifestyle	Moore &
	COM2: I think that using an mBA would fit well with the way I like to conduct my banking transactions	Benbasat, 1991
	COM3: I think that using an mBA would fit into my lifestyle	
Convenience (CONV)	CONV1: Using an mBA would be convenient as I usually carry my smartphone	Kim et al.,
	CONV2: Using an mBA through my smartphone would be convenient as I can use it anytime	2010
	CONV3: Using an mBA through my smartphone would be convenient as I can utilize it in any situation	

4.2. Data Collection and Sample Characteristics

The questionnaire was developed online and distributed via email and social media for the first two months of the Spring 2021 (March-April) aiming at gathering all responses required to test our suggested conceptual framework. Taking into consideration that the total population of the research was not known, convenience sampling was applied. At this point it should be emphasized that pilot-test responses were excluded to avoid skewing the results.

The study took place in Greece, a country with a very low Digital Economy and Society Index (DESI) 2021 in the European Union (DESI, 2021). Particularly, Greece is in the 25th position in a total of 27 countries, with a 37.3 score (DESI, 2021). At the end of April 2021, a total of 411 individuals responded. From the total research sample, 199 users do not utilize mBA, whereas 212 do use the provided services offered via this type of apps. Table 2 depicts the respondents' demographic characteristics.

Table 2. Samples' demographics

Demographic Information	Respondents	Percent (%)
Sex:		
Male	215	52.3
Female	196	47.7
Age:		
18-24	60	14.6
25-34	151	36.8
35-44	106	25,8
45-54	91	22.1
>54	3	0.7
Occupation:		
Public servant	85	20.7
Private employee	147	35.8
Freelancer	87	21.1
Unemployed	49	11.9
Other	43	10.5
Education:		
Elementary School	2	0.5
High school	93	22.6
University/College	209	50.9
Master/Phd	107	26.0
Monthly salary:		
<600€	76	18.5
601-900€	83	20.2

901-1200€	81	19.7	
1201-1500€	47	11.4	
1501-1800€	24	5.8	
1801-2500€	12	2.9	
>2500€	19	4.7	
Not answer	69	16.8	

To investigate the suggested conceptual framework (Figure 1), a data analysis was carried out in two stages. First, exploratory factor analysis was applied utilizing Principal Component Analysis (PCA) and orthogonal rotation (VARIMAX) as well as confirmatory factor analysis testing the data validity and reliability and developing the latent factors. Second, discriminant analysis was employed to test these determinants which were linked to the eight research hypotheses. This approach has previously been used in analogous empirical studies (e.g., Joo & Kim, 2004; Molla & Licker, 2005; Saprikis, 2013; Saprikis and Vlachopolou, 2012).

4.3 Reliability and validity Analyses

The data from the measurement items gathered were analyzed for reliability issues. Moreover, the convergent and the discriminant validity between the latent constructs were investigated as well. In particular, factor analysis which utilizes PCA and VARIMAX was utilized to investigate the validity of the variables, group measurement items into latent factors and calculate factor loadings. To examine the suitability of the data for factor analysis, however, various measures were also applied. Specifically, Bartlett's tests of sphericity (*Chi-square*=11780.291, $p < 0.001$) verified that the correlation matrices had significant correlations among the variables. The result of Kaiser-Meyer-Olkin (KMO) -0.948- and the measurement of sampling adequacy (MSA) ranged from 0.791 to 0.981, indicating that both values were acceptable. These MSA values were all higher than 0.50 (Hair et al., 2014). The results showed the suitability of factor analysis. Convergent validity is achieved if the items load strongly (higher than 0.50) on their associated factors, whereas discriminant validity is achieved if each item loads stronger on its associated factor than on any other factor (Hair et al., 2014). The values of all factors loading indicators ranged from 0.542 to 0.923 (Table 3), exceeding 0.5 threshold (Fornell & Larcker, 1981; Hair et al., 2014). In addition, they load stronger on their related factors than on other factors. Consequently, convergent and discriminant validity were satisfied. The eight (8) latent factors can interpret 86.817% of variance of the measurement items (Table 3). Finally, to examine the reliability of the items of the questionnaire, Cronbach's alpha test was utilized. The results surpassed the 0.7 threshold (Hair et al., 2014), ranging from 0.859 to 0.956 (Table 3), whereas Composite Reliability (CR) also surpassed 0.6 (Bagozzi & Yi, 1988) (0.697-0.928).

Table 3. Factor loadings, convergent validity and reliability

Construct	Item	Loading	Mean	SD	CR	Cronbach's α
F1: Performance Expectancy	$F1_1$	.709	4.059	.917	.701	.923
	$F1_2$	.730				
	$F1_3$	.542				
F2: Effort Expectancy	$F2_1$	.661	3.745	1.066	.795	.956
	$F2_2$	.706				
	$F2_3$	.731				
	$F2_4$	.709				
F3: Facilitating Conditions	$F3_1$	.815	4.355	.853	.783	.938
	$F3_2$	.789				
F4: Social Influence	$F4_1$	.647	4.115	.931	.697	.948
	$F4_2$	.679				
	$F4_3$	.649				
F5: Trust	$F5_1$	.799	3.074	.958	.837	.933
	$F5_2$	.754				
	$F5_3$	.677				
	$F5_4$	.768				

F6: Innovativeness	$F6_1$	.764	4.215	.797	.876	.938
	$F6_2$	.782				
	$F6_3$	.830				
	$F6_4$	.819				
F7: Compatibility	$F7_1$	.747	3.524	.931	.852	.859
	$F7_2$	.854				
	$F7_3$	.828				
F8: Convenience	$F8_1$	.885	2.879	1.001	.928	.913
	$F8_2$	.923				
	$F8_3$	.894				
Total Variance Explained=86.817						

Furthermore, a Confirmatory Factor Analysis (CFA) was applied. The model's overall goodness-of-fit evaluated several measures; all of them were satisfactory as it is depicted on Table 4. In specific the chi-square/df ratio should be less than 5, the goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), normed fit index (NFI), incremental fit index (IFI), and Tucker-Lewis index (TLI) values should be greater than 0.90, and the root mean square error of approximation (RMSEA) should be less than 0.05. The only exception was AGFI which was 0.888, but very close to the recommended value, thus, accepted. As a result, it was deducted that all indicators of the suggested framework's measurement model (Figure 1) were satisfactory based on the values recommended from the literature review (Bentler, 1990; Hu & Bentler, 1999; Muthén & Muthén, n.d.).

Table 4. Evaluation of model goodness-of-fit

Measures	Recommended value	Measurement model
χ^2/df	≤ 5.00	1.923
Goodness of fit index (GFI)	≥ 0.90	0.916
Adjusted goodness of fit index (AGFI)	≥ 0.90	0.888
Comparative fit index (CFI)	≥ 0.90	0.979
Normed fit index (NFI)	≥ 0.90	0.958
Incremental fit index (IFI)	≥ 0.90	0.980
Tucker-Lewis index (TLI)	≥ 0.90	0.974
Root mean square Error of Approximation (RMSEA) [90%CI]	≤ 0.05	0.047 [0.041-0.054]

5. Results

Discriminant analysis was utilized to analyze the hypotheses of the suggested conceptual framework (Figure 1). Specifically, the simultaneous estimation method was chosen and utilized instead of the stepwise estimation approach, "as it is more preferable when, for theoretical issues, the researcher wants to include all the independent variables in the analysis" (Hair et al., 2014). Prior to the analysis of the data gathered, however, several main assumptions were investigated aiming at confirming the appropriateness of discriminant analysis. First, the normality of the distribution was investigated. The findings indicated that overall, the normality assumption can be accepted. Second, the correlation matrix of all the independent variables was tested so that possible multicollinearity problems can be checked. Regardless of the strong correlations between some of the variables, none of them was significantly close to 0.90 (Hair et al., 2014). Therefore, no multicollinearity issues were noticed. Lastly, Box's M test was used to validate the similarity of the dispersion matrices of the independent variables among the groups (Hair et al., 2014). The results from the discriminant analysis are presented in Table 6. The discriminant function had statistically significant elements regarding the relationship between the eight (8) independent variables and the dependent variable (Table 5). Moreover, it explained the 85.7% (root of canonical correlation) of the total variance. Thus, the investigation produced a model that is satisfactorily significant in discriminating the two levels of individuals. Specifically, the standardized discriminant coefficients and discriminant loadings for the independent variables are depicted in Table 6. Seven out of the eight variables exceeded the cut-off value of 0.4 which denotes a significant contribution to the

function, thus, acceptable (Hair et al., 2014). These variables are the following, in a descending order: 1. effort expectancy, 2. facilitating conditions, 3. performance expectancy, 4. trust, 5. Innovativeness, 6. social influence, and 7. compatibility.

Table 5. Wilks' Lambda

Function	Eigenvalue	Canonical correlation	Wilks' Lambda	Chi-square	df	Sig.
1	1.169	0.734	,461	313,499	8	.000

To add to this, these variables also had high discriminant coefficients indicating that they are important discriminators. Thus, hypotheses H1-H7 were confirmed, whereas H8 was rejected. Mean and standard deviation from the two participation levels were also depicted in Table 6 aiming at offering a better presentation of the results.

Finally, the examination of the discriminant function's ability to categorize the two groups of respondents correctly was tested. The total percentage of correct classifications is 88.3% which is considered as high (Hair et al., 2014). Table 7 depicts the detailed classification results.

Table 6. Discriminant analysis results

Measures	Discriminant coefficient	Discriminant loading	Level 1(No) Mean (SD)	Level 2(Yes) Mean (SD)
PE	.075	.736	3.471(.87)	4.612(.54)
EFE	.415	.890	2.984(.93)	4.456(.58)
SOC	.024	.556	3.902(.92)	4.781(.49)
FAC	.459	.888	3.451(.83)	4.739(.48)
TR	.130	.711	3.102(.87)	4.269(.64)
INNOV	.026	.582	3.778(.82)	4.625(.49)
COM	.070	.496	3.070(.85)	3.950(.79)
CONV	.045	.272	2.588(.91)	3.153(1.01)

Table 7. Classification accuracy of discriminant analysis

	Level 1(No)	Level 2(Yes)	Total
Level 1 (No)	159(79.9%)	40(20.1)	199(100%)
Level 2 (Yes)	8(3.80%)	204(96.2%)	212(100%)

6. Discussion and Conclusion

This empirical paper aims to present and examine the factors that impact individuals to adopt and use mBA. Through the proposed framework, the merge of the basic determinants of the UTAUT model along with trust, innovativeness, compatibility, and convenience reveals important findings about the factors that influence individuals to adopt and use mBA. These findings are in harmony with previous empirical studies in the context of mBA (Hanif and Lallie, 2021; Hew et al., 2015; Saprikis et al., 2022; Thusi and Maduku, 2020). It should be emphasized, though, that as far as it is concerned, this paper is the first where innovativeness and convenience factors are examined in the exclusive context of mBA. To add to this, the results revealed that innovativeness does exert a positive impact on m-banking apps' utilization. Therefore, it can be deduced that the more innovative an individual is, the higher the chances are to adopt and use mBA.

Concerning the other confirmed factors, commonly to Hanif & Lallie (2021), Hew et al. (2015) and Thusi & Maduku (2020), this study revealed the importance of effort expectancy to mBA use. This determinant was also measured as the most powerful one, thus, the ease to learn and utilize mBA was regarded as a top priority for current users. Hence, banks should emphasize the high usability features of their apps to non-adopters with the aim to convince them moving from traditional and other e-/ m-banking methods to mBA. To add to this, the ease to use mBA might lead current adopters to utilize even more the provided services. Facilitating conditions also scored high, explaining the importance of the possession of a proper smartphone that supports the basic

requirements for an mBA installation and further use. These findings are in accordance with Hew et al. (2015) and Saprikis et al. (2022) previous studies.

Regarding performance expectancy, the results did confirm its significant importance. The advantage of accomplishing financial transactions quickly through mBA was also considered as highly important to individuals. Therefore, banks should also promote this ability to non-adopters with the aim to persuade them about the great capabilities of their provided mBA services. Previously, four academic empirical papers also confirmed the statistically significant impact of mBA to their adoption and use (Hanif & Lallie, 2021; Hew et al., 2015; Saprikis et al. 2022; Thusi & Maduku, 2020). Apart from quick procedures, trusted transactions are highly important as well. In specific, the findings of this study confirmed Muñoz-Leiva et al. (2017), Poromatikul et al. (2019), Sampaio et al. (2017) and Thusi & Maduku (2020) results. Trust is a vital factor especially when the transactions deal with financial issues and are conducted in the mobile environment (Wei et al., 2009). Hence, banks should pay attention to satisfy customers' perceived expectations. A reliable and trusted mBA is significant. Concerning the responses of the sample, individual mentioned that mBA apart from reliability, they also strictly follow the terms of use. These findings reveal the great, continuous, effort of banks to provide trusted mBA to their customer base. Finally, commonly to Veríssimo (2016), the study proved that social influence does impact to mBA use. Thus, banks should focus on current adopters of their mBA and try through them convince their close friends, colleagues, and relatives. As a result, marketing campaigns should offer incentives to all current users who persuade non-adopters utilize their mBA.

6.1 Theoretical and Practical Implications

The results of this empirical study are anticipated to help in various ways the academic community and the banking industry. First, regarding the academia, the paper contributes to the existing literature of the mBA examination, as it suggests and tests a novel conceptual framework. Specifically, on this framework, various previous determinants were confirmed. Moreover, as far as it is concerned, innovativeness factor has been confirmed for the first time. Hence, the findings provide new insights in a non-extensively examined, but highly important and contemporary research topic.

Second, the data collection took place during the third wave of COVID-19 pandemic in a country with low m-banking penetration rate (<10%) (Giovanis et al., 2019b). Therefore, the results are expected to help academic community to acquire vital information for the first time from a country with promising prospects, not only because of the intense digital transformation of its banking industry, but also of the fact that individuals are expected to be even more receptive to mBA with their aim to avoid face-to-face banking exchanges for health worries. This outcome is considered as vital for the banking industry, for practical implications, as well. Moreover, the findings of this paper along with the suggested conceptual framework could also be used from the academia to be applied in other countries with analogous socio-demographic and adoption rate characteristics.

Third, the framework could be extended from researchers with other determinants which might impact individuals' towards mBA utilization. On the other hand, the banking industry is expected to be benefited from this paper as well. In specific, the validation of almost all examined factors could surely support banks to tailor their strategic actions with the aim to a) convince even more of their customers to adopt and use mBA and b) boost mBA utilization of their current adopters. Thus, as aforementioned on this section, the results of this study could assist the banking industry to its marketing campaigns that focus on mBA adoption and use.

To sum up, the findings of this paper could be regarded as extremely important in a period of great changes towards the complete digital transformation of the banking industry, where a continuous transfer of various customers to mBA has been noticed. Even though in some countries, such as Greece people do not currently utilize mBA to a significant level, it is certain that the near future is about to bring great chances for a considerable percentage of bank customers.

6.2. Limitations and Further Research

Even though the study does provide useful insights, there is room for further improvements. To be more specific, taking into consideration that convenience sampling was applied, it is impossible to generalize on the results. Moreover, since the data was cross-sectional, the findings cannot ascertain causality, such as this or that factor leads to the adoption of mobile phone Apps. Thus, further examination -data gathering- should take place and focus on applying an analogous sampling technique with the aim to gather a more representative sample of the total population of the country. Through this study, the rejection or not of the convenience factor, which was not confirmed on this study, could also be examined. To add to this, a cross-cultural study of the suggested conceptual framework is believed to reveal even more significant insights about mBA utilization. Such a procedure can improve the quality of the research work. Finally, it might be interesting to further improve and

test the suggested conceptual framework with the addition of other determinants from the broad context of m-banking and m-commerce. This action might provide an even more complete research approach of the mBA utilization.

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