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A STUDY ON ADOPTION OF ARTIFICIAL INTELLIGENCE USE IN MOBILE BANKING

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Abstract: *The aim of this study is to investigate the factors affecting the attitudes and intentions of individual users for the use of artificial intelligence in mobile banking. The data were obtained by survey method from university students using mobile banking applications. 397 forms were accepted as valid out of a total of 418 questionnaire forms, and these data were analyzed with the structural equation modeling. It is revealed that the perceived usefulness positively affects the perceived ease of use and the attitude and intention to use artificial intelligence in mobile banking. At the same time, it was determined that the perceived ease of use and perceived security affected the attitude positively but the intention negatively. The attitude of using artificial intelligence in mobile banking affects the intention positively. It will be beneficial for banks if customers trust the use of artificial intelligence in mobile applications and engage in activities that will facilitate the use of these technologies. In this study, the effects of perceived usefulness, perceived ease of use and perceived security factors on the intention to use artificial intelligence in mobile banking were investigated and it was aimed to fill the gap in the literature.*

Keywords: *Mobile banking, artificial intelligence, technology acceptance model*

JET classification: *G20, M00, M31*

INTRODUCTION

As in every sector, companies in the service sector want to keep their existing customer portfolio, and they try to expand this portfolio as well. From this point of view, especially banking sector applications in the service sector are in the first place in the evaluation of technology-based alternatives. To make this goal sustainable, a need for strategic knowledge has arisen for banks that are uneasy about investing in technology-based alternatives. To enable their customers to quickly integrate into technological developments regarding their decision-making models, the issue of eliminating this lack of knowledge (Dabholkar, 1996) has long attracted the attention of marketing

practitioners and academics (So et al., 2016) and various studies have been carried out on this subject (Barczak et al., 1997; Ricard et al., 2001).

When these studies are examined, it can be said that the effect of technological innovations on applications in the banking sector is mostly in the direction of self-serving (Jung & Allaway, 2002). In this context, applications such as ATM, internet banking, telephone banking, television banking, credit cards, point of sale (POS) terminals can be listed (Ricard et al., 2001). Eventually, with the acquisition of this feature by smart phones, which have adopted technology-based service innovation in the banking sector and which people carry along with them in the last ten years, the m-banking application has developed further and achieved the success of being the best application in which these technologies are used (Silva et al., 2013). The concept of m-banking, which will be explained in detail in the literature section, can be expressed as a wireless service distribution channel that provides increasing value to its customers in banking transactions (Pousttchi & Schuring, 2004).

As mentioned above, these technologies, which can be described as self-service, are the most effective way to gain competitive advantage in banking sector by making banking transactions more valuable, increasing customer value and reducing costs (Bhatt & Bhatt, 2016; Shaikh & Karjaluoto, 2015). This technology, which allows customers to carry out these transactions on their own everywhere at any time without having to talk to a bank employee, is an indicator of a radical change in the banking sector (Shaikh & Karjaluoto, 2015). Apparently, this has changed people's interaction with banks (Choudrie et al., 2018).

It is noteworthy that the studies conducted so far on customers' adoption of m-banking technology mainly focus on factors such as attitudes and intentions (Bhatt & Bhatt, 2016). These factors are PEU, PU, PS and lack of technological skills (Shankar & Kumari, 2016). However, in the studies in which these factors are revealed, it can be said that the issues related to the real adopted decisions are somewhat weaker (Harrison, 2017). Therefore, it is important to focus on studies dealing with the relationship between customer perception and actual use to fill this gap.

Another prominent point in the researches on the use of m-banking is the diversity in customer perception (Nijssen et al., 2016). Some customers may be prejudiced against using this technology on their own and prefer traditional methods. However, the customers who avoid interacting with bank personnel prefer m-banking more (Lee, 2017). Therefore, the decrease in human interaction is a sign that m-banking applications will develop further. Actually, the integration of AI and algorithm-based service interactions into m-banking applications is the most obvious example of this sign (Iberahim et al., 2016).

McCarthy, the inventor of AI, defines AI as the science of making intelligent machines that can think like humans (McCarthy, 2004). Nilsson, (1990), on the other hand, describes it as a theory that aims to imitate natural intelligence. In the simplest terms, they are operating systems that exhibit cognitive functions such as perception, analysis, problem solving, thinking, and decision making. These explanations highlight the existence of some issues that need to be emphasized in AI, which are human responses and intelligent programming. The two main components of AI are data and cloud technologies (Isbank, 2022). Many applications can be mentioned when approaching AI, which is a comprehensive subject, from the m-banking framework.

AI chatbots make a significant contribution to the completion of routine banking transactions by simulating conversation with developed programs and interacting with customers. Applications such as bill payment, portfolio management, cost savings, real-time fraud detection are among AI m-banking services (Bahrammirzaee, 2010).

When talking about models for m-banking use, although the industry focuses on the use of AI, customers who do not want to interact with this technology should not be ignored. Therefore, besides AI supported models, it is necessary to include not only technology-based models but also non-technology-based models. In this context, increasing the number of studies comparing the general understanding in m-banking with AI m-banking will contribute to the literature more (Yalif, 2018). In that case, it can be predicted that a more personalized strategy with relational marketing and customer orientation will be implemented in the AI interactive m-banking application of the future (Ngo & Nguyen, 2016).

To fill the gaps in the literature, this research aims to examine the factors affecting the intention of individual users to use AI in m-banking within the framework of the expanded TAM. Mainly, the factors affecting the decision processes in the use of AI m-banking by potential customers were discussed. Various studies have been conducted on the Y generation on this subject so far (Choudrie et al., 2018) and the presence of the generation Z, in other words the millennial generation, has started to increase in banking services, and therefore we focused on the generation Z. Considering that 30% of the world's population is the generation Z (Mccrindle, 2022), it can be said that the representatives of this generation constitute an important mass for banks. This will also contribute to the creation of banking solutions that meet the demands of Generation Z (Kim & DeVaney, 2016). Likewise, most of the generation Z bank customers are constantly active on social media and they always look for alternative payment tools (Toplin, 2019). According to a study conducted by Raddon Research Insights in 2017 and whose participants are generation Z, 30% of the participants think that there will be no need for traditional banking in the future (Financial Brand, 2019). This makes models such as technology-based and AI in m-banking even more attractive. In short, Generation Z is the new playground of the banking industry (Aldred, 2019).

This study contributes to the literature in various ways. In the first place, it deals with the use of m-banking both from the perspective of technology-based applications and with a focus on people. On the other hand, perception towards AI interactive applications has been measured experimentally. The main difference of the study is to measure the level of generation Z customers' adoption of AI interactive applications in m-banking. Various models such as TAM and service/human interaction were used to reveal this difference. Offering strategic suggestions for those who carry out these practices is one of the contributions of the study.

The rest of the study is structured as follows: An intensive literature review was made regarding m-banking, AI, TAM. Secondly, the research model was developed and related hypotheses were given controversially. In the third part, the methodology was presented to test the hypotheses and the results were discussed. Finally, strategic recommendations were presented for further research and managerial implications.

LITERATURE BACKGROUND

Mobile Banking (MB)

Mobile banking or m-banking can be explained as the act of carrying out financial transactions online with the help of mobile devices such as mobile phones or tablets (Shaikh & Karjaluoto, 2015). What makes m-banking effective is that it offers the opportunity to manage financial transactions without the need for face-to-face interaction with bank employees. Besides financial transactions, non-financial transactions are also carried out in m-banking. Balance inquiry, money order, account management, bill payment and PIN change are among the transactions that can be done easily in m-banking (Luarn & Lin, 2005).

As we enter the third millennium, the emergence and spread of mobile communication technologies has enabled mobile commerce to be built on solid basis (Schierholz et al., 2007). m-Banking offers various benefits to both potential bank customers and retail banking users, which are the two main elements of banking.

On the one hand, it provides a popular environment such as ubiquitous banking, flexibility and interaction for customers to perform their banking transactions (Cunningham et al., 2009), on the other hand, it forms a strong bond between retail banking users and their customers. In this respect, m-banking is a powerful marketing tool for retail banking users (Cheah et al., 2011). In addition, increasing operational efficiency and reducing costs are among the advantages of m-banking for banks (Curran et al., 2003).

Researches on m-banking reveal that some customers approach m-banking with prejudice due to technological abstinence. This type of customer is also far from edopting m-banking. Because they do not perceive m-banking as an ease of use (Laukkanen, 2007). However, despite this type of customer, the volume of m-banking has increased especially in the last ten years, with the widespread use of smart phone technology. For example, a study conducted in 2018 found out that nearly half of US adults used a mobile phone to access a bank account in 2017. The same research sees the anxiety about accessing banking services and account management tools as the first step of customers towards understanding how to tap into the potential of mobile financial services (Merry, 2018).

A review of the m-banking literature reveals that various factors are influential in the adoption of m-banking. First of all, technology has an effect on customer attitude and intention to adopt m-banking technology (Shaikh & Karjaluoto, 2015). The effect of non-technological factors is also mentioned. PS, PEU, and PU are among these factors (Shankar & Kumari, 2016; Bhatt & Bhatt, 2016). Risk and security are also included in the literature as an effective factor in the adoption of m-banking (Shankar & Kumari, 2016; Bhatt & Bhatt, 2016).

Artificial Intelligence (AI)

In the literature, there are various approaches and explanations about AI. Based on the assumption that it can describe any aspect of learning or any feature of intelligence, McCarthy stated that it is possible to build a machine that can simulate it (McCarthy et al., 1955). Haugeland (1985) sees it as an exciting new effort to make computers think and describes this technology as machines with real minds. Charniak & McDermott, (1985) defined it as the examination of mental abilities using numerical

models. Rich & Knight (2009) defined AI as the study of how the things that humans are good at now will be done by computers in the future. Nilsson (1998) defines AI as human-made intelligent responses. Russell & Norvig (2010) consider AI in four approaches: think like a human, act like a human, think logically and act logically. In the light of these explanations, it can be said that McCarthy is the one who contributed the most about AI. In fact, it can be stated that AI is its own invention, owing to a two-month workshop (Russell & Norvig, 1995). Alan Turing's "litmus test" also made significant contributions to AI. According to Turing, (1950) (Turing test), the important thing is not whether a computer will think, but whether it will imitate humans.

All sectors need AI in global competition. One of these sectors is banking. Analysts predict that the banking industry will be able to generate more than $1 trillion worth of additional benefits by 2030, thanks to AI technology. Many technological opportunities offered by AI, such as natural language processing (NLP) and machine learning, bring along various advantages in achieving this goal (Isbank, 2022). In this respect, there are many applications developed by banks with AI technologies. Fraud method, focused marketing campaigns, sentiment analytics, optimization, real-time translation, voice recognition, digital assistants and branchless banking are among these applications (Digalaki, 2021). Examples of personal assistants, which are applications developed by banks with AI technology, can be listed as follows:

Table 1. Examples of personal banking assistants developed with AI technology

Bank Name	Personal Assistant (AI)	Bank Name	Personal Assistant (AI)
Absa Bank	ChatBanking	HDFC Bank	EVA
American Express	Chatbot	HSBC	VCA
Bank of America	Erica	İşbank	Maxi
Capital One	Eno	JPMorgan Chase	COIN
CaxiaBank	Gina & Neo	Nordea	Nova
Citibank	Citibot	Santander	Chatbot
Commonwealth Bank Australia	Ceba	SEB	Aida
DBS	POSB Chat Banking	Swedbank	Nina
Finansbank	Q	Wells Fargo	Chatbot
Garanti BBVA	Ugi	Yapı Kredi	Chatbot

Source: Authors

The AI literature focuses on the four approaches mentioned by Russell & Norvig, (2010) in different disciplines such as sciences, health sciences, and information sciences. In marketing, which has an important place in social sciences, researchers are interested in how people perceive interaction with AI (Huang & Rust, 2018). Likewise, acting pragmatically has a special importance for customer service in marketing. In financial transactions where customers are more meticulous, what is expected from AI is the final result, such as doing the right thing (Zhou, 2012). When the rational aspect

of AI is evaluated, customers' perceptions and ATAI can be more understandable at this point (Payne et al., 2018).

Technology Acceptance Model (TAM)

This model, which is put forward theoretically, clarifies the reasons for technological use (Davis, 1989). It is a very effective theory in explaining user acceptance of technologies such as m-banking (Silva et al., 2013). There are two motivational factors that explain why people use technology, namely usefulness and ease of use (Davis, 1989). However, security and risk have limited the effectiveness of this theory in behavioral adaptation prediction (Shen et al., 2010). Therefore, since the theorem focuses on beliefs, it claims that the two main motivational factors, usefulness and ease of use, are related to beliefs, not technology (Venkatesh & Morris, 2000). In the literature, there are other studies (Taherdoost, 2018; Legris et al., 2003) describing the effects of these two variables on the intention to use technology.

TAM is a general model that explains information technology-related behaviors with the fewest variables. That is, according to TAM, the probability of using technology depends on its PU and ease of use. Therefore, these two motivational factors have an impact on the acceptance of new technology (Davis, 1989). It is also very common to investigate the effect of other factors such as security and risk on using m-banking (Shankar & Kumari, 2016).

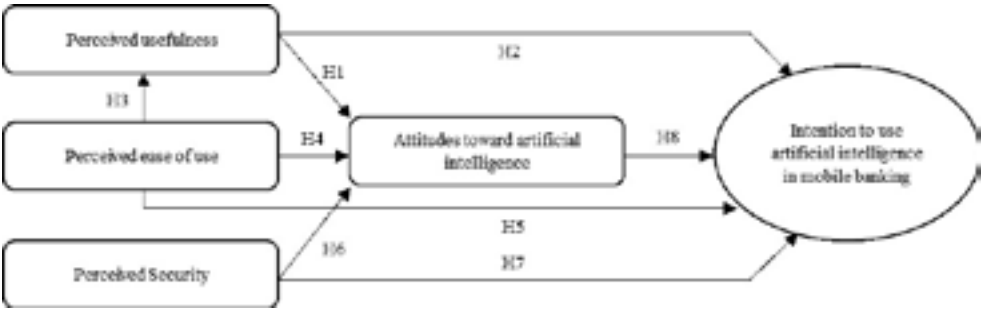
METHODOLOGY

Research Model and Hypotheses

For decades, banks have continuously developed products with which their customers can interact with them with the help of new technologies. They introduced ATMs in the 1960s and electronic, card-based payments in the 70s. 24/7 online banking was adopted in the 2000s, and then mobile-based banking became widespread in the 2010s (Biswas, Carson, Chung, Singh, & Thomas, 2020). M-banking services have eliminated the problems of users arising from time and place restrictions, enabled them to perform their transactions at the desired place and time, and provided the opportunity to receive fast, easy and low-cost service (Gu et al., 2009; Zhou, 2012; Akturan & Tezcan, 2012). In addition, banks that want to increase their service quality to a higher level have integrated the use of AI into their mobile applications. In this way, they can gain benefits such as improving business processes, optimizing service efficiency, improving customer experiences, establishing effective customer relations, increasing competitive power and responding quickly to internal and external changes (Ghandour, 2021).

In this study, using the extended TAM (Figure 1), the factors affecting the IUAI in m-banking are investigated.

Figure 1. Research Model



Source: Authors

Perceived Usefulness (PU): PU can be defined as the degree to which people believe that using an application will increase their performance at work. At this point, people tend to use or not to use their preferred application to the extent that they believe it will contribute more to their work (Davis, 1989). When the studies are examined, it is understood that the perceived usefulnes has a positive effect on the intention to use m-banking (Cheong & Park, 2005; Wessels & Drennan, 2010; Lin, 2011; Giovanis et al., 2019; Purohit & Arora, 2021). The use of AI in m-banking, on the other hand, provides banks with an increase in speed, accuracy and efficiency (Kaya, 2019), improves the experience of users, offers personalized services and increases the efficiency of the services they receive (Vijai, 2019). It is thought that these benefits can positively affect people's ATAI and their IUAI in m-banking. Accordingly, the following hypotheses were developed:

H1. Perceived usefulness has a positive effect on attitudes towards artificial intelligence in mobile banking.

H2. Perceived usefulness has a positive effect on the intention to use artificial intelligence services in mobile banking.

Perceived Ease of Use (PEU): PEU is defined as the degree of belief that using a system is effortlessly easy. When the previous studies are examined, it is seen that the PEU has a positive effect on the intention to use m-banking (Lin, 2011; Safeena et al., 2012; Akturan & Tezcan, 2012). Malaquias & Silva (2020) and Köksal (2016) state that PEU plays an important role in adopting m-banking technologies. However, there is a positive relationship between PEU and PU (Gu et al., 2009; Malaquias & Silva, 2020). Based on this information, the following hypotheses were developed:

H3. Perceived ease of use has a positive effect on perceived usefulness in mobile banking.

H4. Perceived ease of use has a positive effect on attitudes towards artificial intelligence in mobile banking.

H5. Perceived ease of use has a positive effect on the intention to use artificial intelligence services in mobile banking.

Perceived Security (PS): PS risk refers to the perception of possible loss of control over the transactions performed or the financial information owned (Akturan & Tezcan, 2012). At this point, if m-banking users do not feel any concern about security, they will find bank applications useful and will be more willing to use them (Gu et al., 2009). When the studies are examined, the decrease in security in m-banking causes a

decrease in the trust of the users and thus creates a negative effect on their intention to use (Shankar & Kumari, 2016; Tertia & Nurbasari, 2022; Wessels & Drennan, 2010). At the same time, Featherman & Haili (2016) state that when users evaluate a technology-based service, they develop a set of risk beliefs about this service. Perceptions of high risk may negatively affect their attitudes and intentions towards the use of services containing new technology. Accordingly, the following hypotheses were developed:

H6. Perceived security has a positive effect on attitudes towards artificial intelligence in mobile banking.

H7. Perceived security has a positive effect on the intention to use artificial intelligence services in mobile banking.

Attitudes Towards Artificial Intelligence (ATAI): When users' attitudes towards a service are positive, their intention to use that service is equally strong (Ajzen, 1991). This is also the case for a technology-based application. An easy-to-use and useful application provides a positive attitude and therefore affects the intention to use it positively (Rampersad et al., 2012). Based on this information, the following hypotheses were developed:

H8. Attitudes towards artificial intelligence have a positive effect on the intention to use artificial intelligence services in mobile banking.

Method and Sample Size

In this study, a survey was conducted within the framework of the scale created by expanding the TAM to determine the attitudes of m-banking application users towards AI in m-banking and the factors affecting their IUAI. The data were obtained from the students studying at the Faculty of Business Administration of Selcuk University through a questionnaire sent to their e-mails. 21 of these forms, which contain missing information and were decided not to be used, were not included in the analysis and 397 forms were used. Basic information about the participants is shown in Table 2.

Table 2. Demographic characteristics of the participants

Variable	N	(%)	Variable	N	(%)
Gender			*Bank Preference*		
Female	187	47.1%	Yapı Kredi	58	8.5%
Male	210	52.9%	Akbank	23	3.4%
Age (years)			Garanti BBVA	52	7.6%
18	21	5.3%	TEB	9	1.3%
19	85	21.4%	İşbank	49	7.2%
20	108	27.2%	Finansbank	30	4.4%
21	81	20.4%	Kuveyt Türk	27	4.0%
22	38	9.6%	ING Bank	5	0.7%
23	18	4.5%	Denizbank	14	2.0%
24	10	2.5%	Türkiye Finans	4	0.6%
25 and above	36	9.1%	Ziraat Bank	315	46.1%
Monthly Income			Vakıfbank	57	8.3%

Under 1.000 TL	245	61.7%	Halkbank	23	3.4%
1.000-1.999 TL	55	13.9%	Others	17	2.5%
2.000-2.999 TL	43	10.8%			
3.000-3.999 TL	14	3.5%			
4.000-4.999 TL	7	1.8%			
5.000 TL and above	33	8.3%			
n = 397					

Source: Authors

Scales and Analysis Method

All of the scales used in this study were obtained from previous studies. The use of the scales in other studies and their high reliability were important criteria to be prefered. However, the cronbach alpha values of all scales are above the generally accepted value of 0.70. A 5-point Likert type scale was used for a total of 29 items in the questionnaire. The items in the scales and their sources are shown in Table 3.

Table 3. Scales and sources

Constructs	Items	Measures	Resources
Perceived Usefulness	PU1	M-banking enables me to accomplish banking activities more quickly	Pikkarainen et al. (2004) Al-Jabri & Sohail (2012) Lin (2011) Yiu et al. (2007) Al-Somali et al. (2009) Igbaria et al. (1995) Cheng et al. (2006)
	PU2	M-banking enables me to accomplish banking activities more easy	
	PU3	M-banking gives me greater control over financial banking activities	
	PU4	M-banking allows me to manage my finance effectively	
	PU5	M-banking enables me to accomplish more banking activities	
	PU6	I think m-banking is useful	
Perceived Ease of Use	PEU1	I find m-banking easy to use	Pikkarainen et al. (2004) Pala & Kartal (2010) Al-Somali et al. (2009) Igbaria et al. (1995) Cheng et al. (2006)
	PEU2	Learning to use m-banking is easy for me	
	PEU3	Learning to use m-banking does not require a lot of mental effort	
	PEU4	I find interaction with the m-banking services clear and understandable	
Perceived Security	PS1	I trust the technologies used in m-banking	Pikkarainen et al. (2004) Payne et al. (2018) Cheng et al. (2006)
	PS2	I trust in the ability of a m-banking to protect my privacy	
	PS3	I trust in m-banking as a bank	
	PS4	Using a m-banking is financially secure	
	PS5	I am not worried about the security of a m-banking	
	PS6	Information about my transactions may not be tampered by others	

Attitudes Toward AI	ATAI1	I would enjoy using AI	Payne et al. (2018)
	ATAI2	I want to use AI	
	ATAI3	I think that AI is essential	
	ATAI4	I am confident that i can use	
	ATAI5	AI is not intimidating	
	ATAI6	AI is exciting	
	ATAI7	Overall, i would be comfortable interacting with AI	
Intention to Use AI in Mobil Banking	IUAI1	Comfort using AI for paying bills	Payne et al. (2018)
	IUAI2	Comfort using AI for having a conversation with AI concerning your accounts	
	IUAI3	Comfort using AI for managing my accounts	
	IUAI4	Comfort using for getting personalized investment advice	
	IUAI5	Comfort using for getting personalized spending advice	
	IUAI6	Overall comfort banking with AI	

Source: Authors

SPSS 21 and AMOS 21 programs were used to analyze the data obtained in this study. First, the reliability of the scales was tested, and then exploratory factor analysis was performed to determine the factor structures. Then, it was determined whether the measurement model was sufficient with confirmatory factor analysis. Finally, the hypotheses in the study were tested with structural equation modeling.

RESULTS

Reliability and Exploratory Factor Analysis

Cronbach's alpha value was calculated to test the reliability of the scales. These values calculated for all scales are between 0.812 and 0.910 and are above the commonly accepted value of 0.70 (Cheng et al., 2006). Exploratory factor analysis was performed to determine the factor structures of the items forming the scale. Principal component analysis and direct oblimin rotation method were used in the analysis. In addition, eigenvalues for each factor were required to be greater than 1 and factor loadings were required to be greater than 0.60 (Nunnally, 1978). As a result of the analysis, it was determined that the factor loads of the scales varied between 0.660 and 0.855 and ensured the validity. The cronbach alpha values of the scales and the exploratory factor analysis results are shown in Table 4.

Table 4. Factor analysis

Constructs	Items	Loadings	Constructs	Items	Loadings
Perceived Usefulness (α = 0.884) (variance explained = 7.723%)	PU1	0.833	Attitudes Toward AI (α = 0.901) (variance explained = 38.153%)	ATAI1	0.748
	PU2	0.741		ATAI2	0.775
	PU3	0.692		ATAI3	0.784
	PU4	0.782		ATAI4	0.705
	PU5	0.701		ATAI5	0.764
	PU6	0.696		ATAI6	0.766
				ATAI7	0.762
Perceived Ease of Use (α = 0.812) (variance explained = 4.250%)	PEU1	0.668			
	PEU2	0.817	Intention to Use AI in Mobil Banking (α = 0.908) (variance explained = 6.076%)	IUAI1	0.800
	PEU3	0.789		IUAI2	0.820
	PEU4	0.706		IUAI3	0.752
				IUAI4	0.784
Perceived Security (α = 0.910) (variance explained = 10.374%)	PS1	0.761		IUAI5	0.855
	PS2	0.846		IUAI6	0.660
	PS3	0.832			
	PS4	0.804			
	PS5	0.833			
	PS6	0.754			
Total variance explained = 66.576%					

Source: Authors

Confirmatory Factor Analysis

Confirmatory factor analysis was performed to confirm the structure determined by exploratory factor analysis. When the results of the analysis were examined, it was understood that some of the fit index values were below the acceptable level and the PEU3 item was removed from the scale. In addition, covariances were established between PS1 and PS2, ATAI1 and ATAI 2, ATAI 4 and ATAI 5, and IUAI4 and IUAI5. When the results obtained by repeating the analysis were examined, it was determined that the fit indices were above the values accepted in the literature (Hu & Bentler, 1999; Schermelleh-Engel et al., 2003; Hair et al., 2014). The fit indices of the scale are shown in Table 5.

Table 5. Fit indices

Fit indices	Suggested	Obtained
Chi-square		610.569
df		336
Chi-square significance	≤ 0.05	0.000
Chi-square/df	0<x2/df ≤3	1.817
GFI	≥0,90	0.902
NFI	≥0,90	0.914
CFI	≥0,95	0.959
RFI	≥0,90	0.903

TLI	≥0,95	0.954
IFI	≥0,90	0.959
RMSEA	≤0,05	0.045

Source: Authors

Path Analysis

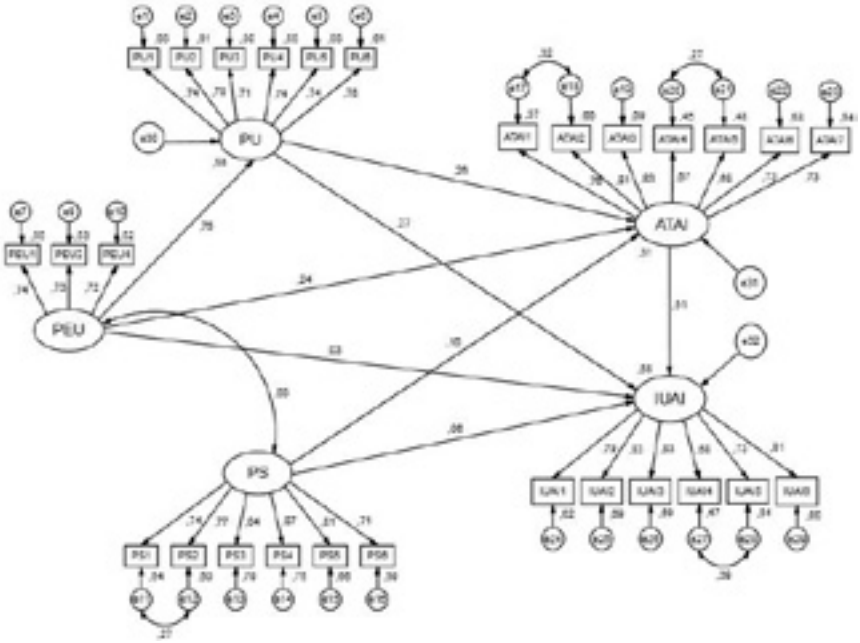
Path analysis, the last step of the structural equation model, was performed to test the hypotheses. At this point, firstly, the fit indices of the model were examined. When the fit indices are examined, it was seen that they were above the recommended values (Table 6).

Table 6. Fit indices of the model

Fit indices	Suggested	Obtained
Chi-square		621.846
df		337
Chi-square significance	≤ 0.05	0.000
Chi-square/df	0<x2/df ≤3	1.845
GFI	≥0,90	0.900
NFI	≥0,90	0.913
CFI	≥0,95	0.958
RFI	≥0,90	0.902
TLI	≥0,95	0.953
IFI	≥0,90	0.958
RMSEA	≤0,05	0.046

Source: Authors

Figure 2. Structural equation model results



The path diagram formed as a result of the analysis is shown in Figure 2, and the results of the hypothesis test are shown in Table 7.

Table 7. Hypothesis test results

No.	Hypothesis path	Estimate	S.E.	C.R.	Standardized estimate (β)	p	Hypothesis result
H1	ATAI ← PU	0.315	0.108	2.906	0.265	0.004**	Supported
H2	IUAI ← PU	0.298	0.086	3.450	0.271	0.000*	Supported
H3	PU ← PEU	0.772	0.070	11.027	0.750	0.000*	Supported
H4	ATAI ← PEU	0.293	0.131	2.235	0.240	0.025***	Supported
H5	IUAI ← PEU	0.032	0.103	0.305	0.028	0.761	Not Supported
H6	ATAI ← PS	0.174	0.074	2.345	0.146	0.019***	Supported
H7	IUAI ← PS	0.068	0.058	1.162	0.061	0.245	Not Supported
H8	IUAI ← ATAI	0.474	0.056	8.539	0.512	0.000*	Supported

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

Source: Authors

As seen in Figure 2 and Table 7 where the results of the structural equation model are presented, PU has a positive effect on ATAI ($\beta = 0.265$, $p < 0.01$) and IUAI in m-banking ($\beta = 0.271$, $p < 0.001$). While PEU has a positive effect on PU ($\beta = 0.750$, $p < 0.001$) and ATAI ($\beta = 0.240$, $p < 0.05$), it has a negative effect on the IUAI in m-banking ($\beta = 0.028$, $p = 0.761$). While PS has a positive effect on ATAI ($\beta = 0.146$, $p < 0.05$), it has a negative effect on IUAI in m-banking ($\beta = 0.061$, $p = 0.245$). ATAI have a positive effect on the IUAI in m-banking ($\beta = 0.512$, $p < 0.001$). According to these results, while H1, H2, H3, H4, H6, H8 were accepted, H5 and H7 were rejected.

DISCUSSION

For decades, the TAM has been used to determine people's attitudes and behaviors. This model has been expanded over time and has been the subject of research within the framework of m-banking and some technologies used in m-banking. In this study, the TAM was expanded and the effects of PU, PEU and PS on ATAI and IUAI were investigated. PU can be expressed as the belief that customers, by using a product, will gain advantage, their job will be easier, and thus they will gain more benefits. At this point, customers will have a positive ATAI and using AI in m-banking if they perceive that they can perform their transactions easily and faster, and generally provide advantages with the use of AI in m-banking. Research results show that PU has a positive effect on ATAI and IUAI in m-banking. Thus, the H1 and H2 hypotheses were accepted.

PEU means that customers' intention to use a product may change depending on whether the product is easy or difficult to use. Therefore, facilitating the use of m-banking applications based on AI will positively affect customers' intention to use them. According to our research, it is concluded that PEU has a positive effect on PU and ATAI, and a negative effect on the IUAI in m-banking. This negative effect reveals the necessity of developing AI applications in mobile applications in a user-friendly way in line with customer expectations. At this point, hypotheses H3 and H4 were accepted, but hypothesis H5 was rejected.

Customers' doubts about security emerge as one of the important factors that affect the adoption of the use of a product, system or technological innovation. According to the information obtained from the study, it was concluded that PS had a positive effect on ATAI and a negative effect on the IUAI in m-banking. This result shows that although consumers' ATAI are positive in terms of security, their IUAI in mobile applications is negative. At this point, eliminating security concerns in mobile applications will enable more people to use banking services. Thus, the H6 hypotheses were accepted, and the H7 hypothesis was rejected.

Positive attitudes of customers towards a product also positively affect their intention to use that product. According to the results of the study, it was determined that ATAI positively affect the IUAI in mobile applications. Accordingly, the H8 hypothesis was accepted.

CONCLUSION

In this study, which was carried out based on the TAM, the factors affecting the IUAI in m-banking were investigated. The results obtained from this study, which is thought to contribute to the relevant literature, make it possible to make both theoretical and administrative implications.

The theoretical contribution of this research is the development of a model to determine customers' IUAI in m-banking in the context of generation Z. In addition, it reveals how developing technology has an impact on customers' attitudes and intentions. This research, which emerged by expanding the TAM, can also contribute to the deficiency in the literature.

From an administrative point of view, it was determined that usefulness, ease of use, security and attitude have important effects on the formation of IUAI in m-banking, as it is stated in the literature. It was determined that PU has a positive effect on attitudes and IUAI. While PEU has a positive effect on ATAI, it seems to have a negative effect on intention. This negative effect should not be in a structure that causes difficulties for customers and, as a result, reduces the use of AI applications used by banks in m-banking. In addition, PS has a positive effect on attitude and a negative effect on intention. At this point, it would be appropriate to take the necessary measures to minimize the perceived risks in the mobile applications of banks.

AI, which has more and more areas of use every day, will enable the development of products and services offered in m-banking and facilitate banking transactions for customers. At this point, it will show that these technologies have a facilitating effect, and it will be for the benefits of banks to engage in activities that will eliminate the customers' concerns about AI.

This study has some limitations that should be evaluated in future studies. This model, which was first created by expanding the TAM, includes certain factors. The research can be carried out more comprehensively by adding other factors that may affect the attitude and IUAI. Secondly, the sample used in the research includes university students. Increasing the sample size in future studies will improve the limitation in the generalization of the results. Third, the study is for a specific age group. Studies on different age groups may yield different results.

Results and discussion represent part of the paper in which results of the research conducted are explained and compared to similar research, the limits of the interpreted results are analysed, as are their significance and potential implications.

LITERATURE

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(20), 179-211.

Akturan, U., & Tezcan, N. (2012). Mobile banking adoption of the youth market: Perceptions and intentions. *Marketing Intelligence and Planning, 30*(4), 444-459.

Aldred, M. (2019). *How do Banks Appeal to Generation Z?* Retrieved from https://www.globalbankingandfinance.com/how-do-banks-appeal-to-generation-z/. [12.05.2022].

Al-Jabri, I., & Sohail, M. (2012). Mobile banking adoption: Application of diffusion of innovation theory. *Journal of Electronic Commerce Research, 13*(4), 379-391.

Al-Somali, S., Gholami, R., & Clegg, B. (2009). An investigation into the acceptance of online banking in Saudi Arabia. *Technovation, 29*(2), 130-141.

Bahrammirzaee, A. (2010). A comparative survey of artificial intelligence applications in finance: artificial neural networks, expert system and hybrid intelligent systems. *Neural Comput and Applic, 19*, 1165-1195.

Barczak, G., Ellen, P., & Pilling, B. (1997). Developing typologies of consumer motives for use of technologically based banking services. *Journal of Business Research, 38*(2), 131-139.

Bhatt, A., & Bhatt, S. (2016). Factors affecting customers adoption of mobile banking services. *Journal of Internet Banking and Commerce, 21*(1), 1-22.

Biswas, S., Carson, B., Chung, V., Singh, S., & Thomas, R. (2020). *AI-bank of the future: Can banks meet the AI challenge* . Retrieved from New York: McKinsey and Company, 1-14: https://www.mckinsey.com. [22.05.2022].

Charniak, E., & McDermott, D. (1985). *Introduction to Artificial Intelligence.* Reading, MA.: Addison-Wesley.

Cheah, C., Teo, A., Sim, J., Oon, K., & Tan, B. (2011). Factors affecting Malaysian mobile banking adoption: an empirical analysis . *International Journal of Network and Mobile Technologies, 2*(3), 149-160.

Cheng, T., Lam, D., & Yeung, A. (2006). Adoption of internet banking: an empirical study in Hong Kong. *Decision support systems, 42*(3), 1558-1572.

Cheong, J., & Park, M. (2005). Mobile İnternet acceptance in Korea. *Internet Research, 15*(2), 125-140.

Choudrie, J., Junior, J., McKenna, B., & Richter, S. (2018). Understanding and conceptualising the adoption, use and diffusion of mobile banking in older adults: A research agenda and conceptual framework. *Journal of Business Research, 88*, 449-465.

Cunningham, L., Young, C., & Gerlach, J. (2009). A comparison of consumer views of traditional services and self-service technologies. *Journal of Services Marketing, 23*(1), 11-23.

Curran, J., Meuter, M., & Surprenant, C. (2003). Intentions to use self-service technologies: A confluence of multiple attitudes. *Journal of Service Research, 5*(3), 209-224.

Dabholkar, P. (1996). Consumer evaluations of new technologybased self-service options: An investigation of alternative models of service quality . *Internal Journal of Research in Marketing, 13*(1), 29-51.

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly, 13*(3), 319-340.

Digalaki, E. (2021). *The impact of artificial intelligence in the banking sector and how AI is being used in 2021*. Retrieved from https://www.businessinsider.com/ai-in-banking-report. [24.05.2022].

Featherman, M., & Haili, N. (2016). Self-service technologies and e-services risks in social commerce era. *Journal of Business Ethics, 139*(2), 251-269.

Financial Brand. (2019). *Generation Z: The Future of Banking*. Retrieved from https:// thefinancialbrand.com/70024/generation-z-bankingmarketing-strategy/. [25.05.2022].

Ghandour, A. (2021). Opportunities and challenges of artificial ıntelligence in banking: Systematic literature review. *TEM Journal, 10*(4), 1581-1587.

Giovanis, A., Athanasopoulou, P., Assimakopoulos, C., & Sarmaniotis, C. (2019). Adoption of mobile banking services: A comparative analysis of four competing theoretical models. *International Journal of Bank Marketing, 37*(5), 1165-1189.

Gu, J., Lee, S., & Suh, Y. (2009). Determinants of behavioral intention to mobile banking. *Expert Systems with Applications, 36*(9), 11605-11616.

Hair, J., Black, W., Babin, B., & Anderson, R. (2014). *Multivariate Data Analysis* (7th ed.). New Jersey: Pearson Education.

Harrison, T. (2017). Editorial. *Journal of Financial Services Marketing, 22*(4), 139-140.

Haugeland, J. (1985). *Artificial Intelligence: The very idea.* Cambridge, MA.: MIT Press.

Hu, L., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1-55.

Huang, M., & Rust, R. (2018). Artificial intelligence in service. *Journal of Service Research, 21*(2), 155-172.

Iberahim, H., Mohd Taufik, N., Mohd Adzmir, A., & Saharuddin, H. (2016). Customer satisfaction on reliability and responsiveness of self service technology for retail banking services. *Procedia Economics and Finance, 37*, 13-20.

Igbaria, M., Livari, J., & Maragahh, H. (1995). Why do individuals use computer technology? A finnish case study. *Information and management, 29*(5), 227-238.

Isbank. (2022). Retrieved from https://www.isbank.com.tr/blog/artificial-intelligence [10.04.2022].

Jung, L., & Allaway, A. (2002). Effects of personal control on adoption of self-service technology innovations. *Journal of Services Marketing, 16*(6), 553-572.

Kaya, O. (2019). *Artificial intelligence in banking* . Retrieved from https:// www. dbresearch. com/PROD/RPS_ENPROD/PROD0000000000495172/Artificial_intelligence_in_ banking%3A_A_lever_ for_pr.pdf. [22.05.2022].

Kim, H., & DeVaney, S. (2016). Banking Behavior Among the Millennials. *Consumer Interests Annual, 62*, 1.

Köksal, M. (2016). The intentions of Lebanese consumers to adopt mobile banking. *International Journal of Bank Marketing, 34*(3), 327-346.

Laukkanen, T. (2007). Internet vs mobile banking: Comparing customer value perceptions . *Business Process Management Journal, 13*(6), 788-797.

Lee, H. (2017). Personality determinants of need for interaction with a retail employee and its impact on self-Service Technology (SST) usage intentions. *Journal of Research in Interactive Marketing, 11*(3), 214-231.

Legris, P., Ingham, I., & Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information Management, 40*(3), 191-204.

Lin, H. (2011). An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge-based trust. *International journal of information management, , 31*(3), 252-260.

Luarn, P., & Lin, H. (2005). Toward an understanding of the behavioural intention to use mobile banking. *Computers in Human Behavior, 21*(6), 873-891.

Malaquias, R., & Silva, A. (2020). Understanding the use of mobile banking in rural areas of Brazil. *Technology in Society, 62*, 1-9.

McCarthy, J. (2004). *What is artificial intelligence?* Retrieved from http://wwwformal.stanford.edu/jmc/whatisai/. [15.04.2022].

McCarthy, J., Minsky, M., Rochester, N., & Shannon, C. (1955). *A proposal for the Dartmouth summer research project on artificial intelligence*. Retrieved from http://www-formal.stanford.edu/jmc/history/dartmouth/dartmouth.html. [15.04.2022].

Mccrindle. (2022). Retrieved from https://mccrindle.com.au/insights/blogarchive/gen-z-and-gen-alpha-infographic-update/#:~: text=Generation%20Z%20are%20the%20largest,almost%202%20billion%20of%20them. [10.04.2022].

Merry, E. (2018). *Mobile Banking: A closer look at survey measures. FEDS Notes. Washington: Board of Governors of the Federal Reserve System*. Retrieved from https://doi.org/10.17016/2380-7172.2163. [17.04.2022].

Ngo, V., & Nguyen, H. (2016). The relationship between service quality, customer satisfaction and customer loyalty: An investigation in vietnamese retail banking sector. *Journal of Competitiveness, 8*(2), 103-116.

Nijssen, E., Schepers, J., & Belanche, D. (2016). Why did they do it? how customers' self-Service Technology introduction attributions affect the customer-provider relationship. *Journal of Service Management, 27*(3), 276-298.

Nilsson, N. (1990). *The Mathematical Foundations of Learning Machines.* San Francisco, CA.: San Mateo: Morgan Kaufmann.

Nilsson, N. (1998). *Artificial Intelligence: A New Synthesis.* San Francisco, CA.: Morgan Kaufmann.

Nunnally, J. (1978). *Psychometric Theory.* NewYork, NY.: McGraw Hill.

Pala, E., & Kartal, B. (2010). An empirical study of the attitudes of Turkish bank customers Regarding internet banking. *Journal of Management and Economics, 17*(2), 43-61.

Payne, E., Peltier, J., & Barger, V. (2018). Mobile banking and AI-enabled mobile banking. *Journal of Research in Interactive Marketing, 12*(3), 328-346.

Pikkarainen, T., Pikkarainen, K., Karjaluoto, H., & Pahnila, S. (2004). Consumer acceptance of online banking: an extension of the technology acceptance model. *Internet Research, 14*(3), 224-235.

Pousttchi, K., & Schuring, M. (2004). Assessment of today's mobile banking applications from the view of customer requirements. *Proceedings of the 37th Hawaii International Conference on System Sciences.* Big Island, Hawaii. Retrieved from http://doi.ieeecomputersociety.org/10.1109/HICSS.2004.1265440. [21.04.2022].

Purohit, S., & Arora, R. (2021). Adoption of mobile banking at the bottom of the pyramid: An emerging market perspective. *International Journal of Emerging Markets, Vol ahead-of-print No. ahead-of-print*.

Rampersad, G., Plewa, C., & Troshani, I. (2012). Investigating the use of information technology in managing innovation: A case study from a university technology transfer Office. *Journal of Engineering and Technology Management, 29*(1), 3-21.

Ricard, L., Prefontaine, L., & Sioufi, M. (2001). New Technologies and their impact on French Consumer Behaviour: An investigation in the banking sector. *International Journal of Bank Marketing, 19*(7), 299-311.

Rich, E., & Knight, K. (2009). *Artificial Intelligence* (2nd. ed.). New York, NY.: McGraw-Hill.

Russell, S., & Norvig, P. (1995). *Artificial Intelligence: A Modern Approach.* Upper Saddle River, NJ.: Prentice Hall.

Russell, S., & Norvig, P. (2010). *Artificial Intelligence: A Modern Approach* (3rd. ed.). Upper Saddle River, NJ. : Prentice Hall.

Safeena, R., Date, H., Kammani, A., & Hundawale, N. (2012). Technology adoption and Indian consumers: Study on mobile banking. *International Journal of Computer Theory and Engineering, 4*(6), 1020-1024.

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating The Fit of Structural Equation Models: Tests of Significance and Descriptive Goodness-Of-Fit Measures. *Methods of Psychological Research Online, 8*(2), 23-74.

Schierholz, R., Sinisalo, J., Salo, J., Karjaluoto, H., & Leppaniemi, M. (2007). Mobile customer relationship management: Underlying issues and challenges. *Business Process Management Journal, 13*(6), 771-787.

Shaikh, A., & Karjaluoto, H. (2015). Mobile banking adoption: a literature review. *Telematics and Informatics, 32*(1), 129-142.

Shankar, A., & Kumari, P. (2016). Factors affecting mobile banking adoption behavior in India. *Journal of Internet Banking and Commerce, 21*(1), 1-24.

Shen, Y., Huang, C., Chu, C., & Hsu, C. (2010). A benefit-cost perspective of the consumer adoption of the mobile banking system. *Behaviour and Information Technology, 29*(5), 497-511.

Silva, B., Samuel, H., Francisco, M., & Francisco, L. (2013). The determinants of mobile banking acceptance: Conceptual development and empirical analysis. *International Journal of Management Science and Technology Information, 1*(8), 1-27.

So, K., King, C., Sparks, B., & Wang, Y. (2016). Enhancing customer relationships with retail service brands: the role of customer engagement. *Journal of Service Management, 27*(2), 170-193.

Taherdoost, H. (2018). A reviev of technology acceptance and adoption models and theories. *Procedia Manufacturing, 22*, 960-967.

Tertia, S., & Nurbasari, A. (2022). Perceived Ease of Utilization, Usefulness, Security, and Trust in Mobile Banking. *Economics and Busi-ness Quarterly Reviews, 5*(2), 76-82.

Toplin, J. (2019). *Banking and Payments for Gen Z Report: The winning strategies for attracting the next big opportunity — generation z*. Retrieved from https://www.businessinsider.com/author/jaime-toplin. [15.04.2022].

Turing, A. (1950). Computing machinery and intelligence. *Mind, 59*(236), 433-460.

Venkatesh, V., & Morris, M. (2000). Why don't men ever stop to ask for directions? gender, social influence and their role in technology ac-ceptance and usage behavior. *MIS Quarterly, 24*(1), 115-139.

Vijai, D. (2019). Artificial intelligence in Indian banking sector: Challenges and opportunities. *International Journal of Advanced Research, 7*(5), 1581-1587.

Wessels, L., & Drennan, J. (2010). An investigation of consumer acceptance of m-banking. *International Journal of Bank Marketing, 28*(7), 547-568.

Yalif, G. (2018). *How chime bank is using ai to drive growth and open more accounts*. Retrieved from https://thefinancialbrand.com/73355/predictive-analytics-digital-banking-website-accounts/. [13.04.2022].

Yiu, C., Grant, K., & Edgar, D. (2007). Factors affecting the adoption of ınternet banking in Hong Kong—implications for the banking sector. *International journal of information management, 27*(5), 336-351.

Zhou, T. (2012). Examining mobile banking user adoption from the perspectives of trust and flow experience. *Information Technology and Management, 13*(1), 27-37.

Zhou, T. (2012). Understanding users' initial trust in mobile banking: An elaboration likelihood perspective. *Computers in Human Behavior, 28*(4), 1518-1525.

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