

Covid-19's Impact on Attitude & Intention to Use Mobile Banking Applications



Erkek İsmail Burak, Altınbaşak-Farina İpek

Abstract: Recent research has investigated the determinant factors of customers' adoption of digital banking. But, after the spread of Corona 19 virus and world-wide pandemic, the customer behavior, traditional and digital market dynamics have changed. This study focuses on understanding the attitude and intention of customers to use mobile banking applications, digital banking marketing strategies and consumer behavior, especially during Covid-19 lock-down, in a developing country, Turkey. It is argued that service-wise attributes (e.g. usability) of mobile banking applications and personal traits (e.g. innovativeness) of bank customers have a positive impact on attitude towards and intention to use mobile banking applications. Besides, it is claimed that Covid-19 pandemic has accelerated customers' intention to use mobile technologies including mobile banking apps. The study aims to put forward the generational differences in terms of mobile banking usage, as well. The comprehensive model derived from Technology Acceptance Model (TAM) [18] with some extensions from Unified Theory of Acceptance and Use of Technology model [76], were tested using IBM SPSS and AMOS, through the survey delivered to 702 customers, which were chosen through convenience sampling. An e-mail survey has been shared with Turkish customers, after the first wave of Covid-19 pandemic, in June 2020. The results revealed that, usability, security, enjoyment and performance of mobile banking applications have positive and financial risk has a negative impact on attitude towards mobile banking and attitude has a positive impact on intention to use mobile banking applications (Five of hypothesis of the model are found to be highly significant (0,001). The CFI of the model is 0,898, where R2 is 0.490). Generation Y customers have a more positive attitude and intention to use mobile banking, compared to Generation X, as well as Baby Boomers. Besides, despite the economic recession and shrink in usage of traditional banking channels, Covid-19 pandemic has improved digital customers' intention to use mobile banking applications. The research contributed to establish an enriched TAM, covering both functional, social and risk aspects of mobile banking. For the practitioners, the research has created value-added findings and recommendations for digital marketing strategies of organizations including investment proposals on functionality and security of their mobile banking services, as well as further penetration in Generation Y customers, during the pandemic.

Keywords: Technology Adoption, Mobile Banking, Pandemic, Digitalization

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I. INTRODUCTION

A. Growth of Digital Technologies and Mobile Banking

Emerging technologies and digitalization initiatives create many profitable opportunities to companies in various markets. The widespread use of Internet and mobile forced the companies to understand the motives behind the use of digital platforms and correspondingly, changed their marketing models.

As stated in the 2020 global Digital Report of We Are Social [79], 5.19 billion out of 7.75 billion (%67 of World population) uses mobile devices, whereas 4.54 billion users (%59) are assumed to be Internet users. The total amount of value of the consumer products globally served through Internet is declared to be 5.955 billion dollar. Similarly, 58.23 million out of 83.88 million Turkish citizens (%69,4%) have mobile subscription and 62.07 million (74%) are active Internet users. (The Internet and mobile penetration and growth rates of Turkey, and the leading developed countries are given in Fig.1 [79].) The annual growth rate of Internet users in Turkey is 4% (2,4 million per year), whereas the mobile growth rate is %3.4, which are relatively higher than other developed countries.

On the other hand, as of 2019, one of two Turkish citizens (%48) is performing online shopping, which corresponds to 39.90 million users [75]. There is an (%39) increase in e-commerce market size and (%2,6) increase in users, compared to previous year, 2018. The total amount of value of the consumer products served through Internet is declared to be 15 billion USD [75].

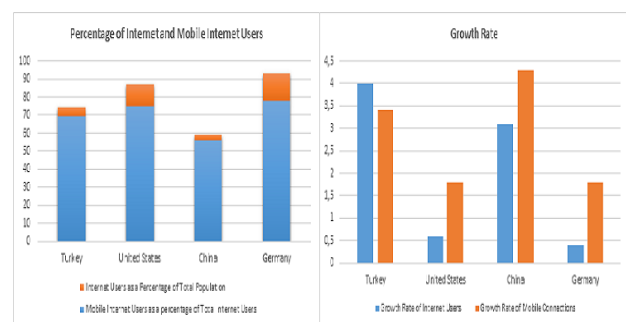


Figure-1: Internet and Mobile penetration and growth rates in countries



Besides, in Turkey the bank credit card usage in online platforms has increased by 16%, in one year [79].

In-line with global digital evolution, the worldwide banking industry, maximized its digitalization efforts in the recent years, by investing on Internet-based or mobile applications, cloud computing, data analytics, artificial intelligence and various other disruptive technologies. Video - call centers, Internet banking, mobile banking applications, virtual assistants and chat-bots using artificial intelligence technologies became the core channels within the context of multichannel services strategy and challenged the traditional branch services [14]. As a result of the increase in the usage of the digital applications many American, British and Turkish Banks decreased the number of branches, as in Fig.2, [8], [25], [27], [73], [74], [80].

At this point it is right to differentiate mobile banking from Internet banking where the former is basically the set of banking services delivered through smart devices (mobile phone, tablet) by downloading a mobile application whereas Internet Banking is set of banking services served on secure web sites via PCs (desktop, laptops). Therefore, mobile banking is described as the extension of Internet banking [45]. Many global and local banks in the US, Europe and Far East have launched their Internet banking web sites, in 90s. The first services in Turkey, İş Bank and Garanti Internet banking web sites have been introduced in 1997. The Strategy of Information Society which has been published by Turkish governmental bodies in 2006, has prioritized the digital banking applications with the context of banking services. In 2010, Banking Regulation and Supervision Agency (BRSA) in Turkey has announced "Communique on Principles" to be considered in Banks' IT Management that draws boundaries of mobile banking services and security precautions that should be taken [11].

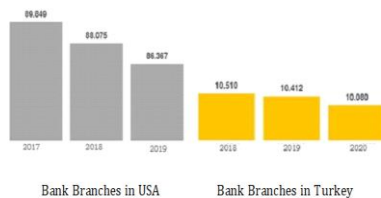


Figure-2: Trend in no of bank branches

This legislation has been revised in 2020, with a large scaled focus on mobile and Internet banking applications, and renamed as Regulation on Information Systems and E-Banking Services [12].

There is a nonlinear increase in the number of digital banking customers and decrease in the number of branches and Bank personnel; and the operational costs are lowering due to this evolution [52]. Even, in the recent years while the number of mobile banking customers are increasing dramatically, there is a slight decrease in Internet customers [72]. The mobile and internet banking statistics of period between 2010 – 2020 for Turkey, which shows the rise in mobile banking usage are given in Fig.3 [72].

The number of mobile banking customers who logged in at least once in a year is 78 million, as of December 2019. 49.2 million of those customers have logged in the last quarter of this year and 59 million in the last one year. The number of total active mobile customers increased by 3.1 million,

compared to the last quarter [72].

During the Covid-19 Pandemic period in 2020, the quarantine, social distance, curfew and home office applications, as well as economic stagnation had a serious impact on the customer behavior and in line with it, the traditional and digital market dynamics have changed. The digital penetration and digital transformation has globally accelerated. Within the period between March to July 2020, it is declared by the Turkish Ministry of Transport and Infrastructure that the broadband Internet usage has been increased by %20, whereas mobile data usage increased by %5,7 [64]. After the social isolation has been initiated, %61 of users has spent more time in Social Platforms [2]. In order to maintain the social distance, the consumers tend to usually use the e-commerce platforms instead of store shopping. Upon the related reports of "We Are Social", published by Hootsuite, the traffic of world-wide e-commerce web sites has increased by %251, between January and April, 2020. Number of mobile app downloads has duplicated in the Covid-19 Pandemic, as compared with same period of last year [82]. Regarding the banking services, digital banking applications came out on top among rising online contents in Turkey with 31,5 million logged in user and %52 growth rate, during Covid-19 pandemic period 2020), Table-I [28].

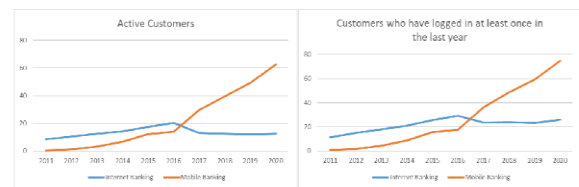


Figure-3: Trend in Mobile & Internet banking usage

Table-I: Rising and Declining online contents

Industry	Access - April 2020	Growth Rate - February vs April 2020
Rising Contents		
Banking	31,4	52,0 %
Food	15,0	43,0 %
Cinema	8,9	30,0 %
Game	10,8	26,0 %
Supermarket	13,3	23,0 %
Public	42,3	13,0 %
Astrology	2,8	12,0 %
Education	21,2	9,0 %
Declining Contents		
Maps	1,0	-56,0 %
Tourism	7,3	-47,0 %
Automotive	3,8	-43,0 %
Sports	14,3	-17,0 %
Ads	29,5	-10,0 %

Due to the mass usage of mobile and Internet banking channels, discussions and evaluations on the necessity of branches have increased and the number of branches have decreased from 10,099 to 10,015 in Turkey, during this pandemic period, between May and September, 2020. There may be a dramatic further decrease in the number of branches, as local authorities' studies on regulating open banking and digital onboarding practices continue [80].



Even, BRSA has announced the legislation on digital onboarding, which will allow Banks in Turkey to onboard customers without any requirement to accept them through branches, as of May, 2021. In addition to the digitalization efforts and mentioned regulatory progress, due to pandemic and resultant economic recession, economic activity and financial transaction volume was narrowing. In parallel to the trend in branches, the transaction volume in call center channels of Banks in Turkey has decreased from 118 million to 112 million per month, during the pandemic. In contrast to the shrink in Branches and Call Centers, there is rise in active digital banking customers during the first wave of pandemic period, as given in Fig.4 [73].

In such a dynamic environment where the habits and behavior of the consumer is also changing rapidly, technology for sure is a facilitating and fastening factor making the old business systems obsolete. That's why understanding the motives behind the attitude of the customers towards and intention to use mobile banking applications, considering impact of

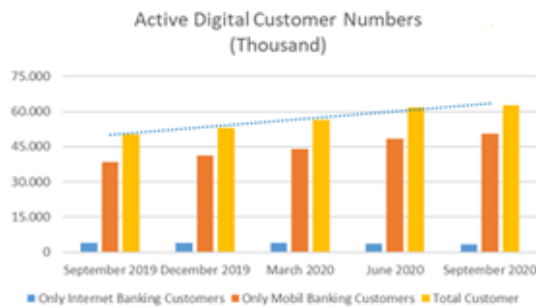


Figure-4: Trend in Digital Banking usage during Covid-19 pandemic

Covid-19 pandemic is important in order to support the Banks in their digitalization efforts so that they can satisfy their customers while decreasing their costs. With this study, it is aimed to explore how the incidence of Covid-19 has changed attitude to use mobile banking apps, consequently digital banking marketing strategies, and consumer behavior, in a developing country, Turkey.

B. Theoretical Background and Research Model

The theoretical contribution of the research is to combine Technology Acceptance Model (TAM) [18] with different models which consider all social determinants and risks and benefits, in defining customers' adoption to mobile banking. Within the context of research, TAM with some extensions from the model Unified Theory of Acceptance and Use of Technology (UTAUT) [76] are used to investigate impact of determinant factors on attitude towards and intention to use mobile banking (please, see Fig.5 for the model). Essentially, TAM and UTAUT aim to understand the factors which have an effect on the acceptance of technology and the dependencies among those variables. TAM assumes that an individual's adoption of a new technology is determined via her personal intention to use the technology. Intention is determined by an individual's attitude towards use of that technology and her understanding of its ease of use and usefulness [18], [65].

TAM, extended TAM and UTAUT were referenced in various research on adoption of digital banking platforms,

including mobile banking, internet banking. (Please see their results in Table-II.)

The literature on TAM mostly focuses on the effect of factors related to the usefulness and ease of use, including access to application independent from time and location, time efficiency [44].

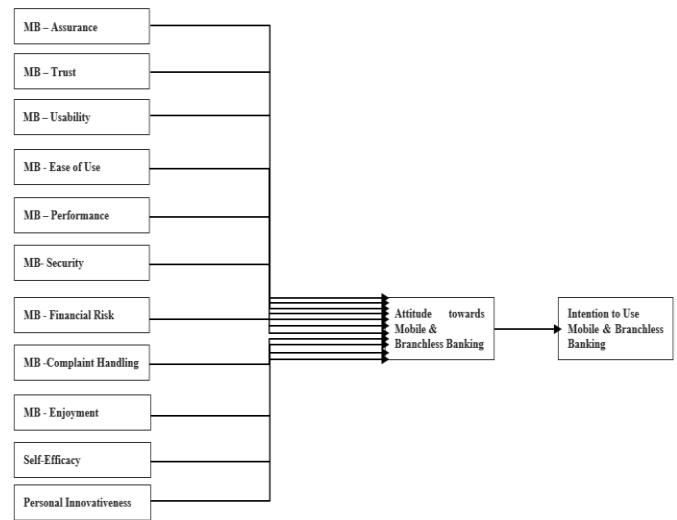


Figure-5: Research Model

Due to concerns regarding the coverage of TAM, scholars preferred to use extended TAM which include other factors [68]. Extended TAM which has been integrated with perceived credibility and self-efficacy, has been evaluated for mobile banking adoption and concluded that this model has a better prediction on mobile banking adoption and intention [49]. However, social factors that are not linked to "usefulness-related outcomes", including social influence, enjoyment, self-efficacy, personal innovativeness may be considered to be significant as well [65].

On the other hand, UTAUT is mainly focusing on additional factors including, social influence, self-efficacy, hedonic motivation (enjoyment) which determine adoption to use the mobile banking applications [76]. UTAUT has been treated as a complicated model in the literature, due to its inclusion of high number of factors and reference to many other models. Consequently, within the context of this research, TAM with some extensions from UTAUT and integrated with perceived risks are used to investigate impact of determinant factors on attitude towards and intention to use mobile banking. (Please see Table-III for the variables used and models referenced.)

The variables used in the model are defined in the following part.

Table-II: Literature on adoption of digital banking & the models used

Research	Model Used	Acceptance of the Model	Sample Size
[78]	TAM extended with self-efficacy and credibility	Findings are partially consistent with the model. (Ease of use, usefulness, and credibility positively affect adoption to internet banking.)	123
[5]	TAM extended with perceived risks and benefits	Findings are partially consistent with the model. (Usefulness, social and performance risk have an effect on attitudes towards mobile banking.)	435
[1]	Integration of TAM and Theory of Planned Behavior (TPB)	Findings are partially consistent with the model. (Usefulness affects attitude toward mobile banking.)	119
[51]	UTAUT integrated with perceived risks	Findings are partially consistent with the model. (Perceived risks affect behavioral intention to internet banking.)	249
[10]	An extended model incorporating TAM and UTAUT 2	Findings are partially consistent with the model. (Self-efficacy, security and enjoyment affects behavioral intention to use mobile banking.)	480
[6]	TAM extended with variables mobility access, self-efficacy etc.	Usefulness, ease of use and risks affects usage of mobile banking apps.	225
[63]	UTAUT	Findings are consistent with the model.	313

Table-III: Variables used in the model and models referenced

Variables in the Model	Acceptance of Technology Models Referenced
Usability	TAM
Ease of Use	TAM
Enjoyment (Hedonic Motivation)	UTAUT
Self-Efficacy	UTAUT
Personal Innovativeness	
Security	
Performance	
Financial Risk	From literature added by the authors
Trust	
Assurance	
Complaint Handling	
Attitude towards mobile banking	TAM, UTAUT
Intention to Use mobile banking	TAM, UTAUT

Corporate/ Mobile Application Based Factors Usability:

Usability is defined as “the level which an individual believes that using a technology will improve his or her performance” and is one of the two constructs in accepting a new technology as an attitude and behavior [18]. While usability in mobile banking is defined, it is mostly referred to convenience, user friendly mobile banking apps and being able to make any transaction regardless of location and time [17], [34], [55], [58], [69]). Besides, several other studies revealed that functional and interface quality and peerless service positively affects adoption to mobile banking [39], [46], [56].

Usability is assumed as a material driver and determinant of attitude towards and intention to use e-banking applications [30], [32], [59]. Various analysis has detected that usefulness has a material effect on attitude and intention to use mobile banking application [1], [5], [50], [61]. Therefore it is hypothesized that;

H1: Usefulness positively affects the attitude towards mobile banking.

Ease of Use:

Ease of use is defined as “the level which an individual believes that using a technology will be effortless” and is one of the two constructs of TAM in acceptance of a technology as an attitude and behavior [18]. The applications or technologies which are perceived as easy to use will not threaten the users as much as un-friendly ones [57].

The Internet and mobile banking apps which are frequently visited and appreciated by digital customers have to be easy to use, as those factors caused adoption towards digital banking [37]. Ease of use and aesthetics result in attitude,

intention, adoption to use mobile banking applications and digital customer satisfaction [5], [22], [30], [61]. Consequently,

H2: Ease of use positively affects attitude towards mobile banking.

Security:

There are various risks which behave as an obstacle for individuals’ adoption of digital banking applications. Leading risks are security, performance and financial risks. Security risk which is potentially the most concerning one includes account take-overs, data leakage and fraudulent transactions [5]. Formerly, security risk is described also as a threat that potentially leads to information disclosure and fraud [38]. Bank customers believe that their accounts including passwords can be taken over [60]. Even, some of them think that their mobile devices or passwords shared through mobile devices can be stolen, as well [15].

A considerable amount of customers do not adopt to mobile banking due to pay cash practices and security concerns on digital channels [3], [17], [21], [41], [47], [70]. Security risk is determined to be a factor that affects attitude towards mobile banking, negatively [4], [5], [9], [33], [50], [51], [53]). Conversely, security affects attitude towards mobile banking, positively. That’s why, is claimed that;

H3: Security has a positive impact on attitude to use mobile banking applications.

Performance:

Performance risk is described as a dysfunction or disruption of a service [5]. Disruption of bank systems may result in not being able to do transactions, even in digital channels, as well as loss of data [81].

It was revealed that performance risk has a material negative effect on attitude towards and adoption of mobile banking applications [5], [24], [50]. Conversely, performance affects attitude towards mobile banking, positively. Hence,

H4: Performance has positive impact on attitude towards mobile banking applications.

Financial Risk:

Generally, financial risk has been described as the threats that may lead to economic loss due to pricing and costs of the services and residual risks of the digital banking channels, including security [5]. Perceived financial risk has a negative effect on intention to use mobile banking applications, due to concerns on monetary loss [5], [41], [50]. Thus,

H5: Financial risk negatively affects the attitude towards mobile banking.

Complaint Handling:

The Banks receive complaints and requests from their customers on financial services and products, from various channels.



Then those complaints are assessed, processed and the results are communicated to the customers. Within the context of mobile banking, there are several automated complaint handling mechanisms, including online chat-bots, social media platforms, web sites, as well as traditional online customer representatives and call centers. In literature, it is indicated that online complaint handling has a relevant relationship with satisfaction with and attitude towards digital banking [23]. Hence,

H6: Successful complaint handling positively affects attitude to use mobile banking applications.

Enjoyment (Hedonic Motivation):

Enjoyment, or (in some studies) Hedonic Motivation is expressed as the level where usage of a technology is perceived as funny [19]. Various studies highlighted the impact of enjoyment on intention to use technology [19], [36], [71].

Besides, hedonic motivation is determined to influence positively the attitude towards online and mobile banking applications [10], [50], [77]. Additionally, enjoyment is defined to be the most material variable in adopting digital customers to mobile banking [10]. Accordingly;

H7: Enjoyment has a positive impact on attitude towards mobile banking.

Trust:

Bank users' trust to the Bank and its mobile banking applications is both a challenge and an opportunity for adoption to use those banking applications [3]. If the customer has a trust on the Bank, then there is a collaborative and loyal relationship [20]. Furthermore, if the customers perceive the mobile banking application credible, then it is assumed that traditional customers will tend to switch from branches to mobile banking channels [54]. Consequently,

H8: Trust positively affects the attitude to use mobile banking.

Assurance (Awareness):

Assurance is defined as informing the customers about the ads of mobile banking and creating awareness. In order to create awareness on mobile banking, Banks usually spend effort on advertising and promotion. Through the correct marketing strategies, customers will be aware of its features, ads and cons and adopt to use it [54].

Digital customers that are adequately aware of mobile banking, perceive those applications as more credible and less risky, compared to who are not aware of those applications [7].

As per several studies, customers' awareness of Internet and mobile banking ads, cons, opportunities, strengths and benefits result in high acceptance of those applications [35], [53], [59], [62]. Hence, it is hypothesized that;

H9: Assurance (Awareness) positively affects the attitude towards mobile banking.

Personal Factors

Self-Efficacy:

Self-Efficacy is being defined as an person's ability, competence to use a new technology, including mobile banking applications [10], [76]. The individuals who accept new technologies, tend to search, try, start to use and even promote those systems [67].

In various studies, it is argued that self-efficacy has relevant effect on mobile banking adoption and intention to use them [10], [13], [16], [49], [66]. Accordingly, it is hypothesized;

H10: Self-Efficacy positively affects attitude towards mobile banking applications.

Personal Innovativeness:

Personal Innovativeness is defined as degree of a person's willing to explore, experiment and use recent technologies [48]. A consumer's innovativeness is generally categorized into inherent innovativeness and Internet related innovativeness, while describing the effect of individual characteristics on adoption to digital banking. Internet related innovativeness is claimed to positively affect attitude to use and adopt mobile banking [43]. Thus,

H11: Personal innovativeness has positive impact on attitude towards mobile banking.

Finally, attitude to use mobile banking influences intention to use it positively, as described in Technology Acceptance Model. Thus, it can be hypothesized,

H12: Attitude towards mobile banking positively affects intention use mobile banking.

Age:

Generation and age of a customer can affect mobile banking adoption [42], [76]. Age is a determinant variable in UTAUT, as well [76].

Unlike baby boomers, generation X and Y are eager to use recent technologies as they are more technology oriented [26], [29]. Generation Y has started to use mobile devices, at their early ages and had the chance to find whatever they desire with their phones or tablets. Consequently, they are easily able to make their banking transactions through the mobile or Internet banking channels, as those apps fulfill new generation expectations [10], [29]. Besides, as Generation X has experienced mobile devices at their elder ages, they are more conservative in using the mobile banking applications, with respect to Generation Y. Hence, it is hypothesized that,

H13: Generation Y has a more positive attitude to mobile banking compared to Baby-Boomers, as well as intention to use it.

H14: Generation Y has a more positive attitude to mobile banking compared to Generation X, as well as intention to use it.

II. RESEARCH METHODOLOGY AND DATA COLLECTION

A multi-item five-point Likert scale is used to measure all factors included in the conceptual model. The scales integrated from various resources and literature are given in Table-IV

An e-mail survey has been carried out to gather data from 702 respondents, after the first Covid-19 quarantine applications and curfew, in June 2020. The sample was chosen through convenience sampling, in Turkey. The socio-demographics of the sample, including gender, occupation, age and monthly income, as well as mobile banking usage frequency are presented in Table-V.

Considering 2019 year-end figures, as %69 of all active retail digital banking customers in Turkey are male, %31 is female; the biggest portion of the group (%37) are the ones at 36-55 ages, while %29 are at ages between 26 and 35, %21,5 are at 18-25 years and %6,5 of are above 56-65, the sample is proportional with the whole population [72].

Cronbach's Alpha and T-factor tests have been carried out to verify the reliability of scales and each factor and prevent multi-collinearity. The results of Cronbach's alpha are displayed, in Table-VI. As given in Table-VI, Cronbach Alpha values of each variables' scales except 'self-efficacy' are in acceptable levels.

Table-IV: Scales integrated from various reosources

Factors in the Model	Scale Referenced
Intention to use mobile banking	[40]
Attitude towards mobile banking	[18]
Usefulness	[18]
Ease of use	[18]
Performance	[83]
Financial risk	[83]
Security	[59]
Trust	[84]
Complaint handling	[84]
Enjoyment	[10]
Self-efficacy	[10]
Personal innovatiness	[48]
Assurance	Developed by the authors

Table-V: Demographics & mobile usage of the sample

Demographics & Mobile Usage	N	%	Demographics & Mobile Usage	n	%
Gender		Education			
Female	343	48,9	High School & below	27	3,9
Male	359	51,1	Undergraduate	429	61,1
Mobile Banking Usage		Graduate			
Daily	236	33,6	PhD and higher than PhD	70	10,0
Weekly	312	44,4	Working Status/ Occupation		
Monthly	103	14,7	Government Officer	137	19,5
Quarterly	4	0,6	Private Sector Employee	368	52,4
Annually	8	1,1	Entrepreneur & Freelance	52	7,4
Less Frequent	9	1,3	Retired	63	9,0
Not Used at all	30	4,3	Student	64	9,1
Age		Housewife			
18-24	81	12	Unemployed	12	1,7
25-30	109	16	Monthly Income		
31-40	221	31	Less than 5.000 Turkish Lira (TL)	71	10,1
41-50	130	19	5.001 - 10.000 TL	244	34,8
51-59	107	15	10.001 - 25.000 TL	265	37,7
60-75	54	8	25.001 - 50.000 TL	102	14,5
			More than 50.000 TL	20	2,8

Table-VI: Cronbach's Alpha of scales

Scales	Cronbach's Alpha
Perceived Usability	0,824
Perceived Ease of use	0,904
Security	0,842
Performance	0,851
Financial Risk	0,795
Trust	0,710
Enjoyment	0,724
Complaint Handling	0,871
Assurance	0,873
Personal Innovativeness	0,860
Self-efficacy	0,620
Attitude towards Mobile Banking	0,897
Intention to use Mobile Banking	0,949

As the scale of Self-efficacy has been used as a reliable scale in [10], all the scales given in Table-IV have been used in the research.

III. ANALYSIS OF DATA

A. Model Fit

Within the first stage of data analysis, a model fit analysis has been carried out (through IBM AMOS software). The proposed model has been evaluated for the fit measures. The fit measures of the research model show us an appropriate fit of model to the data used, with a CFI value 0,898, as given in Table-VII.

B. Model Testing

Within the second data analysis stage, the survey results have been evaluated by performing descriptive statistics, frequencies, correlation and regression analysis via IBM SPSS. The results support the research model described in Figure 5. Table-VIII gives a detailed summary of first twelve hypothesis tests. Five out of twelve of hypothesis claimed are highly significant (0,001) and one of them is significant, which is six in total.

On the other hand, the remaining two hypothesis have been evaluated, by carrying out an ANOVA test on the attitude towards and intention to use mobile banking applications in various age groups, generation X, Y and baby-boomers. (20 respondents in Generation Z is ignored, as the number of this portion of sample is too limited.) In order to give an assurance on the results, a post hoc test via Games-Howell has been performed, as well. The ANOVA results are given in Table-IX and X.

As suggested in hypothesis H13 and H14, Generation Y has a more positive attitude towards mobile banking, than Generation X and Baby-Boomers. Besides, intention to use mobile is significantly stronger for generation Y, supporting the hypothesis.

Table-VII: Fit measures of the research model

Fit measures	Fit measures					Incremental fit measures		Parsimonious fit measures	
	CMIN(df)	CMIN/df	GFI	RMR	RMSEA	AGFI	NFI	CFI	RFI
Model	878	3,511	0,832	0,061	0,060	0,801	0,863	0,898	0,846



Table-VIII: Results of hypothesis tests

Hypothesis	B	Std. Error	Beta	t	Sig. (p)	Supported or Not
H1 Usability -> Attitude	0,346	0,054	0,267	6,385	0,000	Yes
H2 Ease of Use -> Attitude	0,036	0,040	0,037	0,897	0,370	No
H3 Security -> Attitude	-0,068	0,027	-0,101	-2,556	0,011	Yes
H4 Performance -> Attitude	0,196	0,043	0,208	4,613	0,000	Yes
H5 Financial Risk -> Attitude	-0,082	0,025	-0,114	-3,235	0,001	Yes
H6 Complaint Handling -> Attitude	-0,029	0,024	-0,044	-1,217	0,224	No
H7 Enjoyment -> Attitude	0,220	0,031	0,278	7,071	0,000	Yes
H8 Trust -> Attitude	0,028	0,045	0,028	0,617	0,537	No
H9 Assurance -> Attitude	0,028	0,024	0,041	1,159	0,247	No
H10 Self-Efficacy -> Attitude	-0,006	0,016	-0,010	-0,347	0,728	No
H11 Personal Innovativeness -> Attitude	0,035	0,019	0,057	1,827	0,068	No
H12 Attitude -> Intention	0,858	0,024	0,809	36,462	0,000	Yes

R²= 0,490, Adjusted R²=0,481, SE: 0,436
Predictors: (Constant), Self-Efficacy, Assurance, Financial Risk, Personal Innovation, Usability, Complaint Handling, Security, Enjoyment, Ease of Use, Trust, Performance

ANOVA (dependent variable: Attitude): df: 12, F: 55,160, Sig. (p): .000b

In line with consequences of pandemic and the social distance restrictions, the survey results reveal that customers tend to perform transactions very rarely in branches and ATMs, during the pandemic, compared to previous period. But, it is also observed that the customers' usage of call center channel which is not affected by the social distance factors, has decreased due to the economic recession and narrowing financial consumption. And, in contrast to the great shrink in Branches, Call Centers and ATMs, considering the survey results, there is an increase in terms of active mobile banking customers during the pandemic period, as given in Table-XI. Besides, it is revealed from the analysis that, 43 out of 54 customers who stopped to use Call Center channel in the pandemic and 97 out of 126 customers who is not a branch customer anymore, preferred to use only mobile banking applications during this period.

Table-IX: Anova test results for various generations

	Age	N	Mean	Std. Deviation	Std. Error
Attitude	Generation Y (20-40)	391	4,7263	0,52555	0,02658
	Generation X (41-55)	178	4,5449	0,64337	0,04822
	Baby Boomers (56-75)	113	4,4712	0,75575	0,07109
	Total	682	4,6367	0,60914	0,02333
Intention	Generation Y (20-40)	391	4,8065	0,52385	0,02649
	Generation X (41-55)	178	4,6667	0,69795	0,05231
	Baby Boomers (56-75)	113	4,4838	0,86372	0,08125
	Total	682	4,7165	0,64865	0,02484

DF= 2, Mean Square= 3,867, F= 10,720, p= 0,000 for Attitude, DF= 2, Mean Square= 4,864, F= 11,931, p= 0,000 for Intention

Table-X: Games-Howell - Post hoc test results for various generations

Games-Howell - Post hoc test	(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.
Attitude	(20-40)	(41-55)	-.18140*	0,05506	0,003
		(56-75)	-.25510*	0,07590	0,003
	(41-55)	(20-40)	.18140*	0,05506	0,003
		(56-75)	0,07370	0,08591	0,667
	(56-75)	(20-40)	-.25510*	0,07590	0,003
		(41-55)	-0,07370	0,08591	0,667
Intention	(20-40)	(41-55)	.13981*	0,05864	0,047
		(56-75)	.32270*	0,08546	0,001
	(41-55)	(20-40)	-.13981*	0,05864	0,047
		(56-75)	0,18289	0,09664	0,143
	(56-75)	(20-40)	-.32270*	0,08546	0,001
		(41-55)	-0,18289	0,09664	0,143

* The mean difference is significant at the 0.05 level.

Table-XI: Survey results - Channels used in the pandemic

Banking Channel Used	Used in 2020		Used in Pandemic		Change Ratio
	(Before Pandemic)	Ratio	#of customer	Ratio	
Branch	164	23,3%	42	5,9%	-74,4%
Private Banking	78	11,1%	42	5,9%	-46,2%
Call Center	106	15,1%	60	8,5%	-43,4%
ATM	361	51,4%	251	35,7%	-30,5%
Internet Banking	475	67,6%	452	64,3%	-4,8%
Mobile Banking	552	78,6%	603	85%	6,4%

IV. DISCUSSION & IMPLICATIONS

Although mobile banking was already an emerging area in world-wide financial services, following the Covid-19 pandemic, social distance restrictions and home working practices, digital marketing strategies and digitalization in banking services accelerated. To explore how the incidence of Covid-19 has changed the digital banking dynamics, this research is aimed to evaluate determinant variables influencing attitude towards and intention to use emerging mobile banking apps, in the pandemic environment. The research is built on an extended TAM which has been integrated with other social, risk, benefit and consumer based factors from different models, in determining adoption to mobile banking.

The study provided the understanding of the determinant variables affecting attitude and intention of home-bounded and economically worrying consumers to use mobile banking, during the pandemic. It is revealed that usability, performance, enjoyment and security of mobile banking applications has a positive and financial risk perceptions of applications have a negative impact on the attitude and intention to use mobile banking. Besides it is concluded that Generation Y customers have a more positive attitude towards mobile banking, than Generation X and Baby-Boomers.

This research contributed to build an enriched TAM, covering both functional, social and risk aspects of mobile banking. It is detected that usability, financial risk, security, performance and enjoyment has a significant impact on mobile banking adoption.

For the practitioners, the research has created value-added findings to be used in their digital marketing strategies, in Covid-19 pandemic where there is an economic recession and social distance based limitations for banking. Due the economic stagnation and worries, a narrowing in financial transactions volume of all traditional banking channels is found, except the emerging mobile banking apps. Even, consumers who stopped to do transaction onsite or call center channels preferred to enrich their transaction portfolio in mobile banking or perform mobile transactions for the first time. Those preferences were influenced by consumers usability, risk and social perceptions. Thus the financial institutions have to promote the usability, performance, enjoyment, security and precautions against financial risks.

V. SUGGESTION FOR FUTURE RESEARCH

This research is limited to the perceptions of mostly a higher-educated, banked, financially literate and digital consumers and a narrow group of non-users of mobile banking and retired people, in Turkey. To be able to generate a global picture, the research should be extended with consumers in different demographics and in other countries.

Besides, the sample data has been collected in the beginning of the pandemic, especially in the first wave (June 2020).

It is worth to check whether the same intentions are valid after the second and third waves of pandemic, even after the pandemic is over.



Finally, it may be valuable to carry out focus group interviews with the customers or banking executives, in order to understand certain approaches and trends related to mobile banking usage, in depth.

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