INVESTIGATING RESISTANCE FACTORS THAT AFFECT MOBILE BANKING USAGE

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DECLARATION OF ORIGINALITY

I, Sarp M. Kohen, certify that

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Date 25.03.2019

ABSTRACT

Investigating Resistance Factors That Affect Mobile Banking Usage

An overlooked component of innovative service adoption is consumers' resistance factors. Mobile banking is no exception and the present study focuses on these barriers, especially those pertaining to usage, time and risk, privacy and trialability. Moreover, this study further investigates the extent to which financial literacy may offset these barriers as financially literate users might be persuaded to overlook resistance barriers. The findings of the survey study, based on 405 respondents, confirm this conjecture in terms of financial activeness. The more financially active a user, the increased likelihood that he or she might be able to overcome resistance barriers and decide to adopt mobile banking. This conclusion was reached after analyzing the results of original research consisted of questionnaires which determined the participants' levels of mobile banking usage as well as the level of their financial literacy. The results of this study will be of considerable interest to financial service providers and managers as it delivers vital information pertaining to potential and existing users of mobile banking.

ÖZET

Mobil Bankacılık Kullanımını Etkileyen Direnç Faktörlerinin Araştırılması

Yenilikçi hizmet adaptasyonunun göz ardı edilen bir bileşeni de tüketicilerin direnç faktörleridir. Mobil bankacılık bu konuda bir istisna olmamakla beraber mevcut çalışma bu bariyerlere; özellikle kullanım, zaman ve risk, mahremiyet ve denenebilirlik ile ilgili olanlara odaklanmaktadır. Ayrıca, bu çalışma finansal okuryazarlığın bu engelleri ne ölçüde ortadan kaldırabileceğini de araştırmaktadır. Finansal okuryazar olan kullanıcılar, direnç bariyerlerini göz ardı etmek için ikna edilebilirler. 405 katılımcı üzerinde yapılan anket çalışmasının bulguları bu etkiyi finansal aktiflik açısından doğrulamaktadır. Finansal açıdan daha aktif olan bir kullanıcının direnç bariyerlerini göz ardı etme olasılığı artar ve mobil bankacılığı benimsemeye karar verir. Bu sonuca, mobil bankacılık kullanım düzeylerini belirleyen anketlerden ve finansal okuryazarlık düzeylerinden oluşan özgün araştırmanın sonuçlarının analizinden sonra ulaşılmıştır. Bu çalışmanın sonuçları, potansiyel ve mevcut mobil bankacılık kullanıcılarına ilişkin önemli bilgiler sunması nedeniyle finansal hizmet sağlayıcıları ve yöneticileri tarafından ilgi görecektir.

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.

ABBREVIATIONS

CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis
EU	European Union
FA	Factor Analysis
KMO	Kaiser-Meyer-Olkin
OECD	Organization for Economic Co-operation and Development
OSCE	Organization for Security and Co-operation in Europe
PCA	Principal Components Analysis
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UTAUT	Unified Theory of Acceptance and Use of Technology
VIF	Variance Inflation Factor

CHAPTER 1

INTRODUCTION

Not all innovative products are adopted by consumers. While certain products and services are embraced others are rejected. However, research on resistance factors is not only scarce (Laukkanen, 2016; Kleihnen, Lee and Wetzels, 2009) but also focuses only on identifying the resistance factors while neglecting how they can be overcome. This thesis addresses both of these dimensions and brings forth the importance of financial literacy on reducing barriers to new technology adoption; mobile banking.

Zhou et al. (2010) discuss that mobile banking adoption is lower compared to other mobile innovations and Laforet and Li (2005) show that the reasons for these low adoption rates include a lack of awareness and a failure to comprehend the benefits offered by mobile banking. However, mobile banking helps banks to increase service quality and lower operating costs which can be passed on to customers (Zhou et al., 2010). Thus, mobile banking helps banks to build relationships with their customers through better service quality, customized offerings, and, as a result, banks may increase loyalty and profitability (Thakur, 2014; Onay and Oztas, 2018). Moreover, mobile banking gives access to financial services, particularly for unbanked people in developing economies (Anderson, 2010; Porteous, 2006). The physical proximity to financial infrastructure, once a bottleneck for financial inclusion (Allen et al., 2016), can be eliminated by mobile banking. Hence, mobile banking not only enables banks to tap into new customer segments, but it may also help increase financial inclusion. Nejad (2016) discusses that challenges and opportunities in the future of financial services rely on

understanding how mobile banking and other financial innovations can assist unbanked consumers or those who lack the necessary financial literacy. Accordingly, understanding and overcoming resistance factors are of particular importance to the financial services industry as well as policy makers.

On the other hand, financially literate people make more informed financial choices and demand more sophisticated services (Lusardi and Mitchell, 2011; Grohman et al., 2018). Financial literacy leads to higher wealth accumulation (Van Rooji et al., 2011). There is also a direct and positive association between financial literacy and financial inclusion. Furthermore, Grohman et al. (2018) discuss that financial literacy and financial infrastructure are complements in the sense that higher literacy leads to higher use of financial services. In this regard, mobile banking adoption is considered to be a financial service, which not only enables access to financial services anywhere and at any time, but also in a more cost-effective way with more customized offerings. Accordingly, it is expected to be found that higher literacy will reduce the barriers for the adoption of mobile banking.

This research benefits from financial literacy and financial inclusion literature to contribute to resistance literature by introducing financial literacy as a strong moderator for the reduction of barriers. The elimination of barriers requires intensive study and analysis and would be of benefit to not only stakeholders in the financial sector but also consumers and governments who seek to increase financial inclusion. Few studies that focus on online financial products actually take into consideration the financial competence of users. In doing so, this thesis will help contribute to the understanding of the reasons for resistance which will serve as a basis for banking managers to be able to modify, remedy and adapt existing and future technologies for broader appeal and to make sure that fewer customers are left behind. Accordingly,

the aim of this thesis is to first identify the resistance factors to mobile banking, and then to test the extent to which financial literacy may be a determinate variable in overcoming them, using Turkey as focus.

In this thesis, the determinants of mobile banking adoption is investigated with a stepwise logistic model using 405 observations. The determinants of mobile banking adoption are categorized into two groups: resistance factors and financial literacy.

1.1. Mobile banking in the world

Mobile banking is on the rise both worldwide and in Turkey. Banks are offering online services that can be accessed on a mobile device as well as providing dedicated mobile banking applications. The number of people with a mobile and use a mobile banking app doubled between 2010 and 2015 in the U.S. (Shiklo, 2017). As can be seen from the figure (Figure 1) in 2016, 111 Million people in the U.S. were using Mobile banking which constituted 80 percent of 140 million total bank customers, while this figure stood at only around 35 percent in 2010. Also, in the UK, while 30 percent of people were mobile banking users in 2007, the number doubled by 2017 to 63 percent, according to a nationwide study (Figure 1).

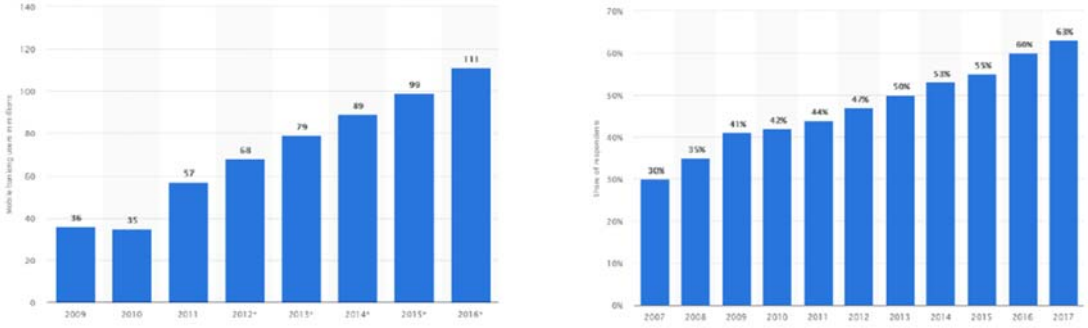

Figure 1. Graph of the number of bank customers using mobile banking in USA (left) and UK (right) over the years (Shiklo, 2017)

According to the Consumers and Mobile Financial Services 2016 Report, most users of such applications use them for basic banking services such as checking their balance, transferring money between accounts, and viewing their recent transactions (Board of Governors of the Federal Reserve System, 2016).

1.2. Mobile banking in Turkey

For an emerging country with a population exceeding 78 million there are surprisingly few studies that focus on financial service innovation in Turkey such as mobile banking. This absence in academic investigation presents a significant research gap as Turkey is a highly relevant example. Turkey has a vibrant banking sector with 52 banks (as of June 2017) operating in the country with profits exceeding TL 38 billion in 2016 (Invest Turkey, 2017). Turkish banks consist of those which are privately and publicly owned, as well as international private banks offering a multiplicity of online and mobile facilities.

Statistics show that the banking sector's asset size in Turkey grew more than 2.7 trillion TL in 2016 while maintaining its unsaturated state in comparison to countries in the Euro zone (Figure 2).

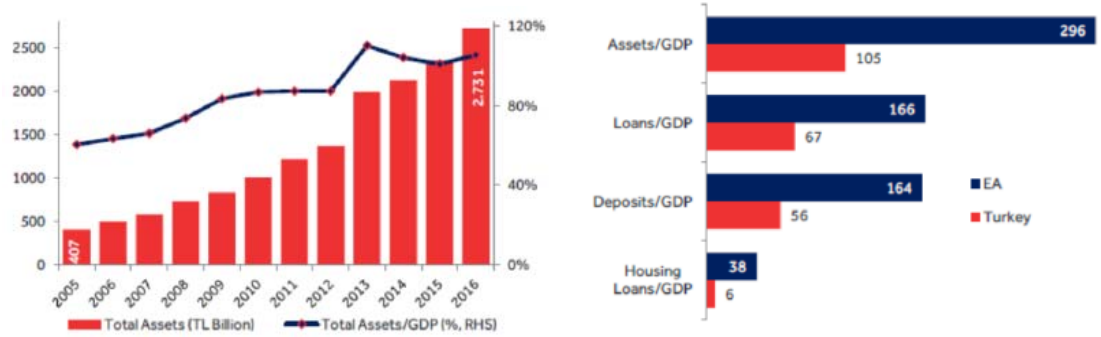

Figure 2. Total asset size for the banking sector in Turkey (left) banking sector comparison with Euro area (right) (The Banks Association of Turkey, 2018)

By the end of 2016, 34% of banking assets were owned by public banks, 37% by private banks and 29% by foreign banks in Turkey (The Banks Association of Turkey, 2018). The share of foreign banks in total assets increased from just 4% in 2004 to 29% in 2016, while the share of state-owned banks decreased to 34% from 38% (Figure 3). As of June 2017, there are 52 banks in Turkey with a total of 34 savings banks, 13 development and investment banks and 5 participation banks (The Banks Association of Turkey, 2018).

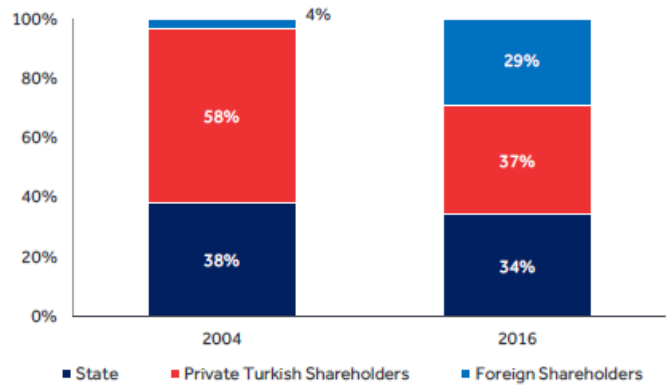

Figure 3. Distribution of banking assets by ownership in Turkey (The Banks Association of Turkey, 2018)

Within the developing banking sector, there is also a focus on alternative technologies that provide low cost and faster transaction services via the internet and through mobile banking. The value of mobile banking transaction rose hundredfold since 2011 with the compound annual growth rate seeing an increase of 145% (Figure 4) and exceeded TL 1 Trillion by 2016 (The Banks Association of Turkey, 2018).

Figure 4. Internet (left) and mobile (right) banking transaction volumes (billion TL) in Turkey (The Banks Association of Turkey, 2018)

In terms of connectivity, the majority of Turkey's population is either online or has a means to access online content. According to Onay and Ozsoz (2013) Turkish banks have started offering transactional internet banking in the second half of 90's and the access to mobile banking services has started in the late 2000s initially with access via WAP. Turkey has a vibrant mobile banking sector with 34 deposit banks of which more than half is offering mobile banking and as of 2017 there are more than 19 million active mobile banking users (Onay and Oztas, 2018). According to data from the International Telecommunications Union and Internet World Stats, Turkey, with over 46 million users, ranks 17th in the world in terms of internet users. Meanwhile, according to the Turkish Statistical Institute, 55.9 per cent of Turkish citizens use the internet as of 2015 with 8 out of 10 households having internet access (Turkstat, 2016).

Furthermore, the same source records that 96.9 per cent of households have a mobile phone (including smart phones). Meanwhile, the value of mobile banking transactions saw a threefold increase since 2011 reaching TL 555 billion in 2015 (Table 1). Having 32 million active users of mobile banking customers in Turkey, mobile banking transaction volume increased from 218 billion TL in 2014 to 2.126

billion in 2017 (The Banks Association of Turkey, 2018). As of March 2018, there are 13.5 million active customers who internet bank whose transactions total 4.855 Billion TL.

Table 1. Number of Customers in Mobile and Internet Banking and Volume of Transactions (The Banks Association of Turkey, 2018).

	Number of Active Customers (Million)		Volume of Transactions (TL Billion)		Volume of Transactions to Gdp** (percent)	
Years	Mobile Banking	Internet Banking	Mobile Banking	Internet Banking	Mobile Banking	Internet Banking
2014	6.7	14.3	218	2.561	11	125
2015	12.2	17.4	555	3.075	24	132
2016	19.2	20.4	1.011	3.727	39	143
2017	29.5	13.1	2.126	4.630	68	149
2018 March	32.0	13.5	2.291	4.855	71	150

According to the Banks Association of Turkey, the number of active individual digital banking customers who have made entry (log-in) transactions during the July-September 2017 period was 30.65 million people. 4.86 million used only internet banking, while 19.10 Million people used only "mobile banking". The number of users of both internet and mobile banking stands at 6.69 Million. By September 2017, there are 55 million registered customer of internet banking, of which, around 12.8 million are active users. While the major transactions are money transfers, balance checking and payments, other usages include credit and loan applications, credit card applications and monthly payment orders. Out of 31 million digital banking customers, around 9 Million users are female while 22 million are male. 2 million users are aged over 55 while 29 million users are aged under 55 (Table 2).

Table 2. Number of Active Retail Digital Banking Customers by Gender and by Age in Turkey (The Banks Association of Turkey, 2018).

	Gender		Age						Total
Period	Female	Male	0-17	18-25	26-35	36-55	56-65	66+	
June 2017	8,654,309	20,474,778	93,189	6,164,722	10,127,458	10,898,147	1,430,861	414,709	29,129,087
Sept. 2017	8,889,169	21,763,454	129,841	6,672,540	10,478,079	11,414,495	1,522,679	434,989	30,652,623
Dec. 2017	9,958,808	23,415,461	178,201	7,542,247	11,116,993	12,272,654	1,692,353	571,821	33,374,269
March 2018	10,498,811	25,174,287	169,598	8,015,059	11,752,652	13,301,248	1,886,864	547,677	35,673,098
June 2018	11,104,440	26,518,674	169,981	8,354,402	12,273,555	14,193,934	2,028,053	603,190	37,623,114

Overall, the above is a strong indication as to why Turkey is an interesting and important country case for consumer resistance to usage of mobile banking.

1.3. Purpose of this study

As highlighted in the previous section, the Turkish banking sector is steamrolling ahead for greater engagement, facilitation and use of mobile banking. Onay and Oztas (2018) show that Turkish banks rely on mobile banking to increase their profitability and expand their customer base. As the number of users of the online and mobile channels for banking increases, so do advances in the technological innovations and services that banks offer. However, while there is increased usage in such services, as is discussed in the literature review section, there remains a significant proportion of banking customers who resist, postpone or reject the use of mobile technology for banking purposes (Laforet and Li, 2005; Zhou et al., 2010). Resistors are absence for the banking industry due they constitute a left behind market share that are unable to take advantage of the online services, which the banks have invested considerable resources in developing.

In order to remedy this problem, the banking industry needs to fully understand the reasons associated with resistance to innovations in mobile banking.

Specifically, this thesis examines usage, time and risk, privacy, and trialability barriers to mobile banking adoption and the extent to which financial literacy may offset these barriers. There are few studies that focus on online financial products that take into consideration the financial competence and activeness off users and previous research by Klapper et al. (2015) on "Financial Literacy around the World" also shows that financial literacy in Turkey is comparatively lower in contrast with other economies (Klapper et al., 2015). This study will help understand the reasons for resistance and serve as a basis for banking managers to be able to modify, remedy and adapt mobile banking for broader appeal and to make sure that fewer customers are left behind. The objective of this thesis is to examine the impact of financial literacy on mobile banking adoption. In doing so, the thesis discusses how mobile banking adoption is a financial decision and financial literacy may influence this decision directly or indirectly through reduction of resistance barriers.

1.4. Significance of research

The significant difference between this study and previous studies is the concentration on evaluating the important determinate of financial literacy and its ability to offset barriers on mobile banking adoption in an emerging economy like Turkey. Specifically, this research examines usage, time and risk, privacy, and trialability barriers to mobile banking adoption and the extent to which financial literacy may offset these barriers. Since there are few studies that focus on online financial products; Turkey provides a solid setting for our research.

CHAPTER 2

LITERATURE REVIEW

In this section, the academic literature in the field of consumer adoption, rejection and barriers in innovation technology and banking will be explained, detailed and analyzed. In doing so, some of the theoretical underpinnings of this thesis will be addressed such as the Technology Acceptance Model (TAM) which emphasizes usability and ease of use, as well as some of TAM's alternatives. This section highlights how different barriers to technological acceptance have been identified and analyzed by different scholars, thus elucidating the reader as to why some of the barriers chosen in this study were identified for further investigation. Explaining the literature on financial literacy is both important and relevant to examine whether it is a moderator for overcoming the barriers to technological innovation acceptance, mobile banking.

2.1 Financial literacy

A useful basic definition of financial literacy is offered by the Organization for Economic Co-operation and Development (OECD, 2011):

"A combination of awareness, knowledge, skill, attitude and behavior necessary to make sound financial decisions and ultimately achieve individual financial wellbeing."

However, scholars in the field offer additional definitions and methods for measuring financial literacy. Remund (2010) defines financial literacy as the degree to which an individual has the knowledge of and the ability to act on basic financial concepts in short-term and long-term financial planning of personal finances. While

Huston (2009) asserts that there is not a clear definition for financial literacy, two main dimensions are identified, namely, understanding and using personal finance tools. Huston (2010) shows that financial literacy is typically measured under four content themes, which are money basics, borrowing, investing and protection of resources, while other behavioral or cognitive issues can also impact financial behavior such as behavioral biases. Fernandes et al. (2014) discuss how financial literacy is an antecedent to consumers' financial behaviors.

In their overview of financial literacy around the world, Klapper et al. (2015) measured financial literacy by asking questions which assessed basic knowledge of the four fundamental concepts in financial decision-making, which are knowledge of interest rates, interest compounding, inflation, and risk diversification (Klapper et al., 2015). Other scholars have identified three "fundamental concepts" associated with identifying financial literacy, specifically numeracy and capacity to do calculations related to interest rates, such as compound interest; understanding of inflation; and understanding of risk diversification for which scholars have identified questions and surveys that test financial knowledge (Lusardi et al., 2014).

In a cross-country study, Grohmann et al. (2018) found that financial literacy has a positive effect of financial inclusion and access to financial services in general. In measuring financial literacy, Grohmann et al. asked questions based on four concepts, namely, risk diversification, inflation, interest rate and interest compounding (Grohmann et al. 2018). Lusardi et al. (2011) measured financial literacy by constructed three questions given to participants that evaluated the understanding of interest compounding, inflation, and risk diversification (Lusardi et al., 2011).

In their study, Akin et al. (2012) examined satisfaction in credit cards and the extent to which financial literacy was a determining factor in the extent that customers were happy with the credit cards in their possession. They found that when people are financially literate, they make better financial choices and are therefore more satisfied. In their research they develop three measures of financial literacy; (i) financial information, (ii) financial activeness and (iii) financial sophistication. Financial information addresses the basic financial knowledge of the consumer, financial activeness measures the financial involvement of the consumer with the credit card market and financial sophistication quantifies the complexity of financial decisions undertaken by the respondent. In this research, Akin et al.'s (2012) methodology is followed but adopts their financial literacy constructs to mobile banking.

Van Rooij et al. (2010) illustrated that financial literacy affects financial decisions making and increases stock market participation in Netherlands. Yet, the level of financial literacy rarely went beyond understanding of basic concepts. However, while they measure literacy with true or false and multiple-choice questions at basic and advanced levels, they also investigate the impact of self-assessed literacy. They revealed that individuals who claimed to have financial literacy in fact ranked in the top quartile. There is a significant and positive association between objective and subjective measures of financial literacy.

2.2 Technology adoption and resistance

Perhaps the most dominant theoretical models associated with technological innovation and service adoption is the Technology Acceptance Model (TAM). The TAM model, which itself was inspired by Ajzen's Theory of Reasoned Action

(Ajzen, 1985), offers valuable insights into the reason as to why one chooses to adopt or reject technological innovation and help in addressing the issue of rejection or resistance and relevant barriers (Davis, 1989). In its most basic form, TAM incorporates the "ease of use" construct indicating the complexity / user-friendliness of the system and usefulness indicating the functional value and performance benefits of a system/service to its users. When a system lacks these two basic qualities the users resist adoption.

Despite its influence, TAM has limitations, especially seeing that its lens for calculating acceptance or rejection was based on rational elements ignoring psychological and societal factors. The Extended TAM version, also known as TAM2, was therefore created by scholars Venkatesh and Davis (2000), bringing additional factors that are of significance to the model in addition to ease of use and perceived usefulness. Some of these additional variables for this extended framework have included facilitating conditions, social factors and influences, beliefs and attitudes (Venkatesh and Davis, 2000; Fathema, et al., 2005). In a study from Lee, Park, Chung and Blakeney (2012) show that monetary value increases perceived usefulness and thereof increases the likelihood for mobile financial services adoption.

Other scholars have modified the TAM model to incorporate perceived enjoyment of a particular technology (Davis et al. 1992; Igbaria et al. 1995; Choi, Kim, Kim, 2011; Rouibah et al. 2016), web security (Cheng, David, Lam, and Yeung, 2006), trialability and perceived advantage (Brown et al., 2003), value for money (Choi, Kim, Kim, 2011), and the importance of trust in that a service will actually be delivered (Ganesan, 1994; Vaux Halliday, 2004; Maghrabi, Dennis, Vaux Halliday, 2010). Wu and Wang (2005) extended TAM to include innovation

diffusion theory, with perceived risk and cost as additional factors and found that perceived risk has a significant direct impact on behavioral intention to use (Wu and Wang, 2005).

Another theory derived from the assumptions of TAM is the Unified Theory of Acceptance and Use of Technology (UTAUT) which seeks to identify consumer usage through the four constructs of expectancy of performance, effort expectancy, social influence, and facilitating conditions or surrounding environment (Venkatesh et al. 2003; Wang et al., 2010; Lin et al., 2008; Verhoeven et al., 2010; Koivumaki et al., 2008).

Apart from the effect of constructs related to TAM and its modified versions, several researchers put forwards viable reasons for innovation resistance. Among these is the well-known Diffusion of Innovations Theory by Rogers (1983), which considers the relative advantage, complexity, trialability, comparability, and observability as factors affecting adoption. This approach is also adopted by others such as Moore and Benbasat (1991) who refined it to consider relative advantage, compatibility, complexity, result demonstrability, visibility, and trialability in addition to voluntariness as predecessors of technology adoption (Moore and Benbasat, 1991).

According to Ram and Seth (1989), the reasons for innovation resistance may stem from it causing a disruption of routine, or a user's content with the status quo and fixation to prior belief structures (Ram and Seth, 1989). This indicates a psychological barrier, which we can also be termed as "tradition". Similarly, in their qualitative study into the reasons for resistance in internet banking, Kuisma, Laukkanen, and Hiltunen (2007) found that both the functional and psychological barriers inhibit adoption. They have observed a lack of willingness to change, risk of

bank account misuse, and the fear of making mistakes as relevant barriers. Further studies on functional and psychological barriers established the significant effect of a diverse set of barriers in internet and mobile banking adoption (Laukkanen et al., 2007; Talke and Heidenreich, 2014). Some of these studies have noted that there are different types of resistance such as active and passive resistance, the former meaning negative attitudes which the consumer has developed towards a new product not in line with the consumer's expectations, while the latter pertains to a consumer's generic predisposition to resist innovation even before actually trying out the new product (Heidenreich and Spieth, 2013; Talke and Heidenreich, 2014).

Among the pioneers in this field is the influential study by Ram and Sheth (1989) in which they present a theoretical framework for consumer resistance with two core resistance constructs – functional and psychological barriers. These two distinct categories are further divided into three sub-dimensions for functional barriers ("usage", "value" and "risk" barriers) and two for psychological barriers ("tradition" and "image" barriers) (Ram and Sheth, 1989). Given the scope and the wide adoption of this model among the researchers in internet and banking technologies (Laukkanen et al., 2007, 2008, 2009; Cruz et al., 2009) it was adopted to be used in this thesis as well.

Among the relevant barriers, the first is the usage barrier, which relates to the major constructs of TAM (perceived usefulness and ease of use). Based on Laukkanen and Kiviniemi (2010), usage indicates the "functional" usability of the product or service. Several studies have also been undertaken in developed and emerging countries on mobile banking channels, applications, and services under two major domains: adoption and usage (Shaikh and Karjaluoto, 2016; Nysveen et al. 2005).

The second barrier is “risk”, which relates to both the duration it takes a consumer to adapt to mobile banking and the risks associated in actually using the product. This thesis breaks down the risk in the model into time, performance and privacy risk. In terms of time, it denotes the duration it takes to learn and become familiar with a new service and the actual length of time it takes to use the product. Within the context of this study risk represents the functional concern that something will go wrong while using the product. This again relates to Laukkanen and Kiviniemi (2010) who identify that risk perceptions pertaining to the nature of a technology that could lead to loss, perhaps in this instance the connection timing out. They also note the reliability factor in risk, the confidence that an individual has in the product they are using and its self-efficacy, the confidence that the individual has in using the product or service (Laukkanen and Kiviniemi, 2010). Moreover, through focus groups, Kleijnen et al. (2009) pointed out functional and economic risk, as the main antecedent for resistance (rejection, postponement and opposition) to technological innovations (Kleijnen et al., 2009).

The third barrier considers the privacy of consumers’ personal data. This is a significant risk factor that is incorporated into several studies on mobile financial services contexts (Chen and Nath, 2008; Shin, 2009). In this sense, privacy reflects the consumers’ confidence that their data will be used or stored correctly and safely by the service provider. Privacy also refers to “the desire of individuals to control or have some influence over data about themselves” (Bélanger and Crossler, 2011). Privacy is a significant issue in today’s connected world where real-time information on internet browsing, time, location in addition to images and voice data can all be accessed and stored on mobile devices (Sun et al., 2015). For the purpose of this study, privacy concerns were considered not in “risk” construct but separately.

Finally, the trialability barrier, which relates to the extent to which a consumer may be able to "try before they buy" is included in the model. This factor is one of the five elements that affect adoption behavior in diffusion of innovations theory by Rogers (1995). Trialability is based on the premise of "the high likelihood of individuals to adopt an innovation when they can first evaluate it" (Chen, 2013). It can be defined as the extent to which users are provided an opportunity to experiment with an innovation before committing to its usage (Agarwal and Prasad, 1997). Trialability is important because it was considered to be among the significant barriers affecting mobile banking adoption in a variety of settings (Chen, 2013).

Laukkanen, Sinkkonen and Laukkanen (2007) found that psychological barriers are even more significant determinants of resistance than usage and value, constructs related to the traditional TAM. Moreover, their findings highlight the role of self-efficacy in bank customers' risk perceptions to internet banking. They note that the two most useful constructs in innovation resistance are suggested to be habit or satisfaction with an existing behavior and perceived risks associated with innovation adoption (Sheth, 1981). They also highlight the risk barrier as the most intense barrier to internet banking adoption among opponents, followed by image and tradition barriers, respectively (Laukkanen et al., 2007). In a later study, Laukkanen et al. (2009) argued that if communication reduces risk perceptions and resistance in general, it can also be assumed that the greater the resistance among consumers the greater the perceived lack of knowledge and information. Thi Thanh Tran and Corner (2015) showed the effect of communication in a study in New Zealand in which face-to-face communications with bank staff helped increase mobile banking adoption.

A limited number of studies have focused on the relationship between mobile banking and the financial literacy of users and offered valuable insights into the factors for the rejection or postponement of such technology. Prior studies were identified which determined financial literacy via questionnaires designed to identify how well-versed a participant is with managing personal finance were incorporated into this study (Akin et al., 2002; Van Rooji et al., 2010). As will be explained in the following chapter, the theoretical model of the study relates to the relationship between barriers and adoption and the extent to which financial literacy is a moderating factor.

CHAPTER 3

THEORETICAL MODEL AND HYPOTHESES

3.1 Research questions

The literature review looked at the vast literature in the field of consumer adoption, resistance, and financial literacy. Several limitations in the body of literature stand out. The first is that Turkey, an emerging economy with global reach and an ever-increasing population which is young and technologically savvy, has hardly been used. The second is that only a limited number of studies have focused on the relationship between mobile banking and the financial literacy of users. Those that do, however, offer valuable insights as to factors for the rejection or postponement of such technology and are therefore worthy of a significant study such as the one offered in this thesis. Prior studies were identified which determined financial literacy via questionnaires designed to identify how well-versed a participant is with managing personal finance were incorporated into this study (Akin et al. 2002; Van Rooji et al. 2010; Laukkanen et al. 2008). As can be seen in the Figure 5, the theoretical model of the study relates to the relationship between barriers and adoption, and the extent to which financial literacy act as a moderating factor. The research question essentially being can financial literacy be the factor that surmounts the barriers that prevent adoption?

3.2 Hypotheses

3.2.1 Propositions

Based on the research question mentioned above, this study initially had an additional 6 barriers for which propositions were made (usage, value, risk, tradition

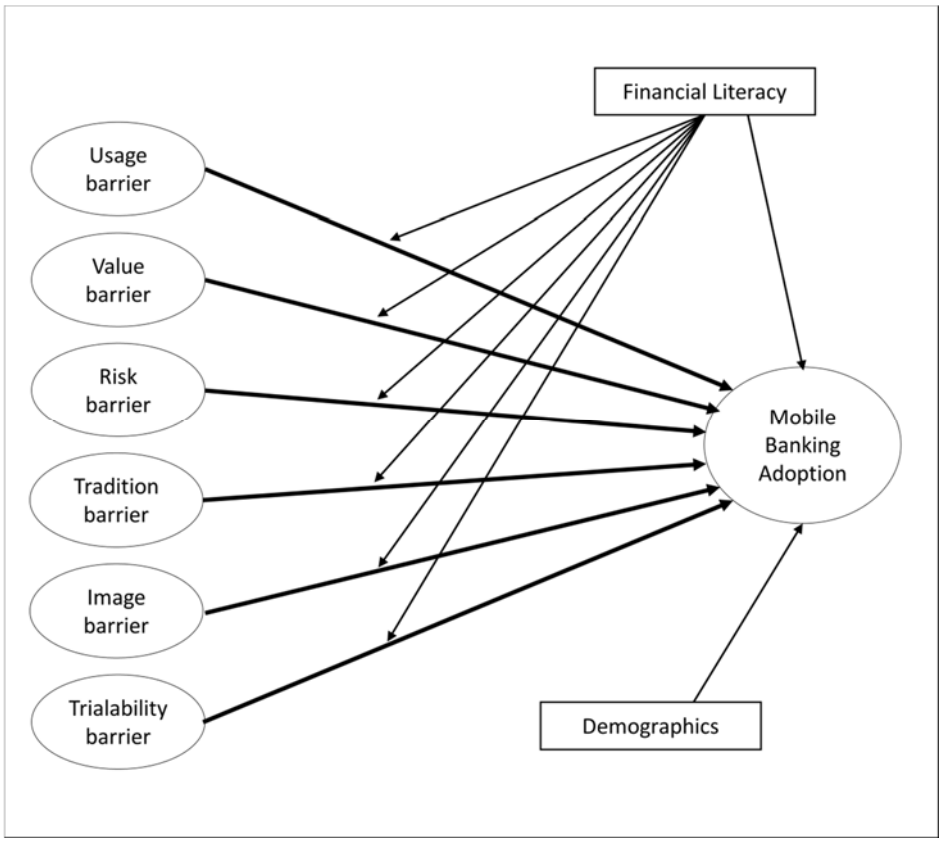

Figure 5. Theoretical model before factor analysis

image, trialability) which related to the theoretical model in figure 1, before factor analysis was conducted. However, after the factor analysis, the number of barriers decreased to 4 and were amended to usage, time and risk, privacy and trialability and therefore became the main barriers that this thesis investigated. All of the propositions are detailed below and derived from identifying potential barriers for research that emerged in the literature.

3.2.1.1 Usage barrier

Previous research shows that usage is a functional barrier that prevents mobile banking adoption (Laukkanen, 2016). Customers are more inclined to adopt mobile when perceived ease-of-use is high, and complexity of services are low (Lee et al.,

2012; Kuishma et al., 2007). Extant literature on technology adoption based on TAM and its variants support the validity of these findings through a similar "ease of use" construct in separate contexts such as online shopping (Gefen, Karahanna, and Straub, 2003) and online banking (Lee, Park, Chung and Blakeney, 2012) and mobile banking (Changchit, Lonkani and Sampet, 2018).

Ease of use factor that constitutes a significant part of the usage barriers was found to be one of the most influential factor affecting mobile payment systems adoption (Dahlberg and Mallat, 2002; Ovum, 2012) along with relative advantage (Yang et al. 2012). Given the strong effects detected in similar contexts, studies on mobile banking also considered and revealed the significance of functional barriers such as complexity/ease-of-use and relative advantage/usefulness in mobile banking adoption (Changchit, Lonkani and Sampet, 2018; Zhang, Lu and Kizildag, 2018).

This study acknowledges the importance of such assumptions, especially those that pertain to perceived usefulness and perceived ease of use, as pivotal factors when examining whether a consumer is more or less likely to adopt a new product. Given well-established studies on technology adoption and resistance, the following is hypothesized:

Proposition 1: Usage barrier can negatively affects mobile banking adoption.

3.2.1.2 Value barrier

The second functional barrier to an innovation for Ram and Seth (1989) is based on the value of the innovation. Unless an innovation offers a strong efficiency in the value between performance and price compared with substitutes, there is no motivation for customers to change (Ram and Seth, 1989). TAM's assumptions of perceived ease of use and usefulness are accentuated when the consumer sees

considerable value or worthiness in the product. By value, this study refers to the worthiness of the innovation.

Previous literature shows the significant effect of perceived usefulness, which relates to relative advantage on the intention to use (Davis et al., 1989). When the worthiness of the innovation is low it is certainly rational for the consumer to doubt the utility of the product, especially if it means an investment in time and effort for low reward. Some of the resistors feel that the relative advantage of Internet banking is minor from their side, since the purchase of a new technology would lead to more costs than benefits (Kuisma et al., 2007). However some studies showed the role of the customers' control over their own financial affairs. Laukkanen (2006) reports that some bank customers feel the necessity of having the control in their own hands and therefore they want to do their banking transactions by themselves via the Internet. The following is hypothesized for the value barrier to see if the value barrier can affect mobile banking adoption like Lee, Park, Chung and Blakeney (2012) show that monetary value effected mobile financial services adoption:

Proposition 2: Value barrier can negatively affect mobile banking adoption.

3.2.1.3 Risk barrier

Perceived risk is a determining factor for the acceptance or rejection of mobile banking for many consumers in Turkey. In this instance by risk it is meant perceptions pertaining to the nature of a technology that could lead to loss, perhaps in this instance the connection timing out that the consumer is concerned about the consequences of making a mistake. When users perceive a new service as risky they are reluctant to try and adopt it. There is abundant evidence supporting this proposition. For instance, Brown, Cajee, Davies and Stroebel (2003) found evidence

in their study on cell-phone banking that the greater the perceived risk the less likely that it will be adopted. Laukkanen et al. (2007) highlighted the risk barrier as the most intense barrier to internet banking adoption among opponents, followed by image and tradition barriers, respectively. In a similar context, perceived risks were found to affect mobile payment services adoption in China (Yang et al. 2012) and Spain (Liébana-Cabanillas et al. 2014) and India (Thakur and Srivastava, 2014). Studies on mobile banking adoption developed upon similar foundations provide evidence for the assumed relationship in both developed and developing countries (Shaikh et al. 2018). Al-Jabri and Sohail (2012) found that perceived risk negatively affects mobile banking adoption in Saudi Arabia.

Risk barrier includes elements also associated with loss of personal data, mobile device falling into wrong hands or the safety of banking details stored on a devise. Abundancy of personal information stored and proneness to loss of data in mobile devices increases the privacy concerns of consumers (Aydin and Burnaz 2016). Chen and Nath (2008) found perceived transaction speed, transaction convenience, compatibility, security and privacy concerns as significant antecedents of mobile payment adoption.

In a similar study on mobile wallets, perceived security, social influence, trust and basic TAM constructs were found to affect users' attitudes towards mobile wallets (Shin, 2009). Aydin and Burnaz (2016) found security of the personal data to be a significant factor affecting attitudes towards and intentions to use mobile payment systems in Turkey. Consequently, the following is hypothesized:

Proposition 3: Risk barrier can negatively affect mobile banking adoption.

3.2.1.4 Tradition barrier

Psychological barriers are mainly arise due to the conflict of the previous beliefs and values with the customer rather than the actual use of an innovation. (Ram and Sheth, 1989). As a psychological barrier; tradition is meant previous patterns of banking and client-customer interaction. By being asked to adopt mobile banking and other forms of banking innovation, at stake is the consumer's traditional behavioral patterns, most likely involving physically going to a local branch and interacting personally with the staff and personnel. This is why the tradition barrier takes place when an innovation is incompatible with an individual's existing values, norms and experiences (Ram and Steth, 1989). Previous studies show that resistance to change has significantly affected customers' attitudes towards the usage of online banking (Al-Somali, Gholami, & Clegg, 2009). This change in behavior might lead to resistance, and this is why the following is hypothesized:

Proposition 4: Tradition barriers can negatively affect mobile banking adoption.

3.2.1.5 Image barrier

Perception is an important social factor in any walk of human interaction. If, for example, purchasing an item of clothing is associated with being trendy, perhaps identified by a magazine or television show, it may very well be a garment that a fashion-conscious individual will want to buy. The same may be true of innovations associated with mobile banking. If an innovation is considered trendy or advanced one may have additional impetus to use it. If, on the other hand, it has developed a negative image, the likelihood of adoption decreased. The image barrier in online banking arises from the wrong impressions that computers and the Internet are

difficult to use (Fain and Roberts, 1997). Kuisma et al. (2007) also states after ten years that some of the Internet banking non-users may have the same negative attitudes and beliefs about seeing the Internet as a service channel.

Still today, some bank customers have similar attitudes towards using banking services online. If consumers perceive that it is very difficult to use new technology, they immediately create negative images of service innovation due to technology (Laukkanen, 2016). This perception stems the following hypothesis to see if the image barrier influences the intention to adopt and use innovation.

Proposition 5: Image barrier can negatively affect mobile banking adoption.

3.2.1.6 Trialability barrier

It is not unreasonable to expect a potential consumer of a new technological innovation which may have far reaching implications in the way that they conduct business or manage affairs to want to test the product. Trialability is therefore an important potential factor that should be tested. When potential new users of a new technology / service have the ability to experiment with it first, they will be more informed and familiar with it. This will increase the likelihood of them adopting this new technology (Moore and Banbesat, 1991; Agarwal and Prasad, 1997).

Evidence from mobile banking studies carried out in a wide range of countries support this proposition. For instance, examining factors for cell-phone banking adoption in South Africa, Brown, Cajee, Davies and Stroebel (2003) found evidence that greater trialability would lead to greater adoption. In a study by Chen (2013) in Taiwan on mobile banking services, trialability was highlighted as one of the most influential factors affecting use. Similarly trialability emerged as a significant factor affecting mobile banking adoption in India (Dash, Bhusan and

Samal, 2014). Therefore the following idea being that if a banking customer was able to test a new mobile application or innovation, they would more likely to use it, especially if they are aware of the financial benefits associated is hypothesized:

Proposition 6: Trialability barriers can negatively affect mobile banking adoption

3.2.1.7 Financial literacy

While literature review postulates that resistance barriers negatively affect mobile banking adoption, earlier research show that financial literacy positively affects financial decision-making and increases financial well-being (Van Rooji et al., 2011; Akin et al., 2012). Accordingly, financial literacy is directly related to the choice of a consumer to adopt mobile banking.

In another study Akin et al. (2012) examined satisfaction in a financial product and how financial literacy acts as a determining factor. After distributing financial literacy measures into three groups; namely, financial information, financial activeness and financial sophistication, they found that when people are financially literate, they make better financial choices and are therefore more satisfied.

In our research, we follow their methodology and adopt their financial literacy constructs to ascertain whether financial literacy solely related to the choice of a consumer to adopt mobile banking. As a series of components of financial literacy namely; financial information, financial activeness, financial sophistication and self-assessed are combined into a single hypothesis as follows:

Proposition 7: Financial Literacy is positively related to consumers' choice to adopt mobile banking.

3.2.1.8 Financial literacy and resistance factors

A limited number of studies focused on the relationship between mobile banking and financial literacy of users and provided valuable insights into factors for rejecting or postponing such technologies. Surveys designed to determine how well a participant is in terms of personal finance management have identified previous studies that determine financial literacy (Akin et al., 2002; Van Rooji et al., 2010). The theoretical model of the study relates to the relationship between barriers and adoption and the extent to which financial literacy is a moderating factor of the resistance barriers and adoption of mobile banking usage. Hypotheses were formed based on the theoretical model of the study about the relationship between the resistance barriers and the extent to which financial literacy is a moderating factor to offset these barriers:

Proposition 8a: Financial literacy positively moderates the relationship between usage barriers and mobile baking adoption (usage barriers will be weaker when the financial literacy is higher).

Proposition 8b: Financial literacy positively moderates the relationship between value barriers and mobile baking adoption (value barriers will be weaker when the financial literacy is higher).

Proposition 8c: Financial literacy positively moderates the relationship between risk barriers and mobile baking adoption (risk barriers will be weaker when the financial literacy is higher).

Proposition 8d: Financial literacy positively moderates the relationship between tradition barriers and mobile baking adoption (tradition barriers will be weaker when the financial literacy is higher).

Proposition 8e: Financial literacy positively moderates the relationship between image barriers and mobile baking adoption (image barriers will be weaker when the financial literacy is higher).

Proposition 8f: Financial literacy positively moderates the relationship between trialability barriers and mobile baking adoption (trialability barriers will be weaker when the financial literacy is higher).

3.2.1.9 Difference hypotheses

Considering the relevant studies' findings on internet banking and mobile banking adoption, demographics such as gender, age, experience, occupation, income and marital status were found to be significant moderating variables (Chawla and Joshi, 2018). The impact of demographics on electronic services adoption has been extensively studied in the past in which focusing on new technologies adoption refer to a predominance of male, younger, more educated and having a higher income, when compared to those who do not adopt innovations (Laukkanen, 2016). As this study ask and collects data related to the demographic background of the participants, the extent to which demographic factors such as age, gender, marital status, education and income are related to the adoption of mobile banking can also be investigated. The following hypotheses therefore emerge:

Proposition 9: There is a difference between consumers in terms of gender.

Proposition 10: There is a difference between consumers in terms of marital statuses.

Proposition 11: There is a difference between consumers in terms of age groups.

Proposition 12: There is a difference between consumers in terms of education levels.

Proposition 13: There is a difference between consumers in terms of income groups.

3.2.2 Hypotheses according to the re-generated theoretical model

Based on the propositions above, the survey (detailed in the next chapter) was conducted. Upon the implementation of the necessary factor analyses, the theoretical model was re-generated and the propositions were revised into 11 hypotheses. This time the barriers identified were usage, time and risk, privacy and trialability.

Hypothesis 1: Usage barriers negatively affect consumers' choice to adopt mobile banking

Hypothesis 2: Time and risk barriers negatively affect consumers' choice to adopt mobile banking.

Hypothesis 3: Privacy barriers negatively affect consumers' choice to adopt mobile banking

Hypothesis 4: Trialability barriers negatively affect consumers' choice to adopt mobile banking.

Hypothesis 5: Financial literacy is positively related to consumers' choice to adopt mobile banking

Hypothesis 6a: Financial literacy positively moderates the relationship between usage barriers and mobile baking adoption (usage barriers will be weaker when the financial literacy is higher).

Hypothesis 6b: Financial literacy positively moderates the relationship between time and risk barriers and mobile baking adoption (time and risk barriers will be weaker when the financial literacy is higher).

Hypothesis 6c: Financial literacy positively moderates the relationship between privacy barriers and mobile baking adoption (privacy barriers will be weaker when the financial literacy is higher).

Hypothesis 6d: Financial literacy positively moderates the relationship between trialability barriers and mobile baking adoption (trialability barriers will be weaker when the financial literacy is higher).

Hypothesis 7: There is a difference between consumers in terms of gender.

Hypothesis 8: There is a difference between consumers in terms of marital statuses.

Hypothesis 9: There is a difference between consumers in terms of age groups.

Hypothesis 10: There is a difference between consumers in terms of education levels.

Hypothesis 11: There is a difference between consumers in terms of income groups.

CHAPTER 4

RESEARCH METHODOLOGY

This section details the research methodology, the data collection process, development of the questionnaire and how the collected data was analysed. This section details adoption barriers and financial literacy scales.

4.1 Survey development

In light of the hypotheses on Chapter 3, a questionnaire is developed to examine the barriers to mobile banking, together with financial literacy as a determinate factor. Three-part survey that identified participants' attitudes towards different potential usage barriers as well as their financial literacy and demographic information was designed. The first part of the questionnaire sought to ascertain the extent of the participant's financial literacy and composed of 9 questions. 2 questions were asked as dependent and control variables about how often a respondent is using mobile or internet banking. The second part of the questionnaire included questions on usage barriers and consisted of 21 questions. The last part asked questions pertaining to the demographics of the respondents and consisted of 5 questions. The questions which were adopted from the literature sources can be found at the table in Appendix A.

4.1.1 Financial literacy of participants

In order to ascertain the financial literacy of the participants and the information necessary to discern its relationship with consumer resistance of mobile banking, a series of variables were adopted from the literature Akin et al. (2012) who examined the impact of financial literacy of an individual satisfaction levels in credit cards.

They found that when people are financially literate, they make better choices and make better use of their cards and are therefore more satisfied. Akin et al. (2012) identified financial literacy in three aspects: financial information, financial activeness, and financial sophistication.

The Financial information variable attempts to capture the overall financial knowledge of a respondent. Interest rate knowledge, Annual fee knowledge, and Deposit guarantee knowledge were the three variables used to measure this aspect of financial literacy (Akin et al., 2012). In this thesis, deposit interest rates, fees and commissions from Akin et al. (2012) were modified to: "The fees and commissions in mobile banking are …….... the fees and commissions received in the branch", and "Deposit interest rates in mobile banking are …….... deposit interest rates in the branch." Answering the question, the participant had the choice between "lower than", "same as", "higher than" and "I have no idea".

Financial activeness was asked with two questions again modified from Akin et al. (2012). They were "Before choosing a bank that offers mobile banking services, I did research among alternatives" and "In the past 12 months, did you attempt to correct a mistake after noticing the bank you use regularly has made concerning your accounts?. The first question had a 5 point Likert scale with the answers of "strongly disagree", "disagree", "neither agree nor disagree", "agree", "strongly agree" while if a respondent gives the answers of "agree" and "strongly agree" will be understood as active and the remaining will be non-active. The second question had a yes/no answer with the exception of a third answer "I haven't noticed".

Financial sophistication questions were again modified from Akin et al. (2012) to, “Have you ever given automatic payment instructions before?” and “Do you make payments through your bank such as tax, insurance and / or pension”.

Questions which measure self-assessment of financial literacy are borrowed from Van Rooij et al. (2010) who focuses on how financial literacy has an effect on participation in the stock market; to measure the general level of financial literacy: “I think I understand Economics and Finance issues well”; “I often use economic and financial issues in my daily activities (work, hobby, etc.)”; “I follow economic and financial indicators”. Each of these questions had answers of 5 point Likert Scale “strongly disagree”, “disagree”, “neither agree nor disagree”, “agree”, “strongly agree”.

4.1.2 Dependent and control variables

Two questions in the questionnaire were asked to determine the usage levels of the participants as the control and dependent variables. They were “How often do you use Internet Banking?” and “How often do you use mobile banking?” in which the participant was asked to rank their usage on a scale between 1 to 5 with 1 being never and 5 representing always.

4.1.3 Measurement of resistance barriers

In order to determine mobile banking adoption barriers, 21 questions pertaining usage, value, tradition, risk, image and trialability were asked to the participants of the survey. The nature of the questions were determined while working on the literature review and examining how different scholars compiled and collected their relevant data. In doing so there were three particular studies which stood out, and, as

a result, the majority of the questions were inspired by the work of Laukkanen et al. (2016), Brown et al. (2003) and Chen et al. (2013) as well as one addition by the authors that can be found in the Appendix C. The questions were based on a 5-point Likert Scale (1: Strongly disagree, 2: Disagree, 3: Neither agree nor disagree, 4: Agree, 5: Strongly agree). Each question was based on a barrier as grouped into the following sections below:

Table 3. Components of the Resistance Barrier Questions

Variable	Number of Items	Source
Usage barrier	5 Items	Laukkanen et al. (2016)
Risk barrier	3 Items 2 Items – Time Risk 2 Items – Privacy Risk	Laukkanen et al. (2016) Chen et al. (2013) Chen et al. (2013)
Value barrier	2 Items	Laukkanen et al. (2016)
Tradition barrier	2 Items	Laukkanen et al. (2016)
Image barrier	1 Item 1 Item	Laukkanen et al. (2016) Chen et al. (2013)
Trialability barrier	3 Items	Brown et al. (2003)

As can be discerned from the questionnaire, the questions that pertained to the usage construct were related to the ease of use, convenience, speed, clarity and novelty of the mobile banking services. The questions associated with risk barriers were based on participants' views and perceptions about the duration of time it takes to use and learn how to use mobile banking, as well as the perception of whether there is fear that the user might make a mistake or that the connection may be unreliable and therefore mobile banking is associated with some degree of risk and also asked participants about whether they fear that key personal data could be lost or stolen or end up in the wrong hands. Such questions also fall into the categories of

privacy and time as well as risk which are later investigated in the regenerated hypotheses. Finally, in addition to questions pertaining to value, tradition, and image (all of which were excluded from the study following the factor analyses), questions associated with trialability were put forward, asking participants the extent to which hands on trial or watching demonstrations of mobile financial products could be a factor for future adoption.

4.1.4 Sample demographics

It could be the case that demographics variables have a correlation between a consumer's acceptance or rejection of mobile banking. Questions pertaining to the demographic details of participants were directly asked to control the impact of demographics of gender, age, marital status, education and income levels of the respondents.

Gender: Two alternatives of "Male" or "Female"

Marital Status: Two alternatives of "Married" or "Single"

Age: Ordinal scales for participant age classification:

"18-25", "26-35", "36-45", "46-55", "56+".

Education: Ordinal scales for education level classification based on final graduation status. The participant had to choose one of the following:

"Primary school", "High school", "University Degree", "Graduate Degree", "PhD and above"

Monthly Income: Ordinal scales were used to ascertain the monthly income level of participants who were obliged to choose one of the following:

" < 1,400 TL ", " 1,401 – 2,500 TL ", " 2,501 – 5,000 TL ", " 5,001 – 10,000 TL", " 10,001 – 15,000 TL ", " 15,001 TL + "

Development of the demographic variables which were designed as dummy variables will be discussed in detail on Chapter 5.

4.2 Data collection

The questionnaire was distributed online using the convenience sampling method. This is a form of non-probability sampling and is named “convenience” simply because of the fact that the participants in the data collection are drawn from a population that happen to be available or willing to be part of the study. The benefits of such an approach is that it does not target a group of people or demographic that is likely to respond in a set way. There is therefore no set conditions or criteria for those who participate in the and hence the participants are random.

A pre-test was carried out before finalizing the measurement instrument. Firstly, the draft questionnaire was reviewed by three scholars to assess its comprehensibility and design. After implementing suggested revisions in wording, the modified version was further pretested by a minor group of people to refine the questionnaire. Feedback on the design, question formats and length of the questionnaire were collected. Following minor changes, the questionnaire was finalized. It was kept online for a period of six weeks from December 2017 to January 2018, took seven minutes to complete. English and Turkish versions of the questionnaire are available in the Appendices B and C. There were a total of 405 respondents who fully completed the questionnaire.

CHAPTER 5

DATA ANALYSIS AND FINDINGS

In this section, the analysis stage is explained as is which methods and techniques were used for these analytical processes. What becomes clear is that when dealing with rich and wide-ranging data, the depth and breadth of the study become apparent. However, in many respects, the data is raw and needs to be treated in a way that it is filtered so that not only are the results both reliable and relevant to the study, but also the threads, correlations and causal relationships which bind the results of the data together.

5.1 Descriptive analysis

Once the online surveys were received, the first step was to undergo a process of data recoding in order to format the data answers to be in proper form to be analyzed using the different quantitative methods.

5.1.1 Demographic profile of the respondents

The demographic data was not based on Likert scales and only categorical group differences were focused, therefore the survey questions were not subject to any form of testing or grading as was the case in the questions about usage barriers and financial literacy. Demographic data combined with barriers and financial literacy proved to offer deeper insights on the nature of resistance behavior. Indeed, collecting such information offered numerous areas of analysis such as the correlation, if any, between education or age or income, or any combination of the three, with financial literacy and each of the adoption barriers. The raw data of the

demographic profile can be seen at the Table 4 in which there are percentages below the regarding groups' average.

Table 4. Demographic Profile of the Respondents

Frequency Table			
		Frequency	Percent
Gender	Male	226	55.8
	Female	179	44.2
Marital Status	Married	230	56.8
	Single	175	43.2
Age	18-25	83	20.5
	26-35	102	25.2
	36-45	81	20.0
	46-55	67	16.5
	56+	72	17.8
Education Status	Primary School Degree	2	0.5
	High School Degree	39	9.6
	University Degree	235	58.0
	Graduate Degree	103	25.4
	Doctorate Degree	26	6.4
Monthly Income	1,400 TL and Below	38	9.4
	1,401 - 2,500 TL	54	13.3
	2,501-5,000 TL	86	21.2
	5,001-10,000 TL	114	28.1
	10,001-15,000 TL	60	14.8
	15,001 TL and over	53	13.1
Total		405	100.0

According to the results, only 2 participants' education level was lower than High School and 39 participants' education level was High School. Therefore, these groups were merged with the group of people whose education level is Primary School or High School Graduate and a new group was defined with 41 respondents. Also, because only 26 of the participants' education level was relatively higher than

the others, the Doctorate Degree group was merged with Graduate Degree group and a new group was defined with 129 respondents whose education level is higher than University Degree. If one were to look at the monthly income segment in order to have a summarized and simple data monthly income level, the lower than 2,500 TL group was created by merging the under 1,400TL group with the between 1,401TL and 2,500TL group to reach a total respondent group of 92. Also, only 53 respondents' monthly income level was higher than 15,000 TL. Therefore, this group was merged with the group of people whose monthly income level was between 10,001 TL and 15,000 TL and a new group was defined with 113 respondents whose monthly income level was higher than 10,001 TL. After these adjustments, the research demographic groups were determined as seen in Table 5.

Table 5. Adjusted Demographic Profile of the Respondents

Frequency Table			
		Frequency	Percent
Gender	Male	226	55.8
	Female	179	44.2
Marital Status	Married	230	56.8
	Single	175	43.2
Age	18-25	83	20.5
	26-35	102	25.2
	36-45	81	20.0
	46-55	67	16.5
	56+	72	17.8
Education Status	Primary /High School Degree	41	10.1
	University Degree	235	58.0
	Graduate Degree	129	31.9
Monthly Income	2,500 TL and Below	92	22.7
	2,501-5,000 TL	86	21.2
	5,001-10,000 TL	114	28.1
	10,001 TL and over	113	27.9
Total		405	100.0

As can be seen in Table 5, there was an almost even split between male and female participants and the two marital statuses. Most participants had an undergraduate degree or higher, and in terms of income, the spread was quite even across the different thresholds.

5.1.2 Demographic variables

Using categorical data is a powerful method to include non-numeric data types into a regression model. Categorical data refers to data values which represent categories - data values with a fixed and unordered number of values. In a regression model, these values can be represented by dummy variables - variables containing values such as 1 or 0 representing the presence or absence of the categorical value. Dummy variables were created for each demographic item in order to analyze demographic variables in the logistic regression models. Gender equals “1” if it’s a female while it is “0” for the male, Marital Status equals “1” if a respondent is married and “0” if they are not. For age, education and income; since there are more than one option in each demographic variable dummies are created with each dummy value is “1” for the represented variable, and the rest are “0”. For example Age 26-35 equals “1” if the age is between 26 and 35 and otherwise gets “0” value for this particular dummy. In Table 6 below the column titled “Mean” is the frequency for when the relevant dummy variable equals “1” and the columns titled “Mean Score” reports the average usage levels for when the relevant dummy variable equals 1.

By including dummy variable in a regression model, however, one should be careful of the Dummy Variable Trap. The Dummy Variable trap is a scenario in which the independent variables are multicollinear - a scenario in which two or more

variables are highly correlated; in simple terms one variable can be predicted from the others.

There is an extreme situation, called multicollinearity, where collinearity exists between three or more variables even if no pair of variables has a particularly high correlation. This means that there is redundancy between predictor variables. In the presence of multicollinearity, the solution of the regression model becomes unstable.

Table 6. Demographics With the Mean Scores of Internet Banking Usage vs. Mobile Banking Usage

Variable	Categories	n = 405	Internet Banking Usage		Mobile Banking Usage	
		%	Mean	Std. Dev.	Mean	Std. Dev.
Gender	Male	55.8%	4.288	1.265	4.288	1.262
	Female	44.2%	3.777	1.448	3.799	1.459
Marital Status	Married	56.8%	4.161	1.375	3.904	1.475
	Single	43.2%	3.931	1.359	4.291	1.194
Age	18-25	20.5%	3.747	1.342	4.217	1.169
	26-35	25.2%	4.069	1.307	4.480	1.032
	36-45	20.0%	4.519	1.050	4.358	1.133
	46-55	16.5%	4.105	1.361	3.821	1.392
	56+	17.8%	3.861	1.681	3.236	1.804
Education Level	Primary /High School Degree	10.1%	3.488	1.690	3.902	1.562
	University Degree	58.0%	3.983	1.399	4.021	1.385
	Graduate Degree	31.9%	4.388	1.113	4.217	1.281
Income Level	2.500 TL and Below	22.7%	3.446	1.515	3.728	1.505
	2,501-5,000 TL	21.2%	4.023	1.363	4.267	1.278
	5,001-10,000 TL	28.2%	4.228	1.344	4.105	1.244
	10,001 TL and over	27.9%	4.425	1.100	4.168	1.412

For a given predictor (p), multicollinearity can be assessed by computing a score called the variance inflation factor (or VIF), which measures the extent to

which the variance of a regression coefficient is inflated due to multicollinearity in the model.

The smallest possible value of VIF is one (absence of multicollinearity). As a rule of thumb, a VIF value that exceeds 5 or 10 indicates a problematic amount of collinearity (Kassambara, 2017).

When faced to multicollinearity, the concerned variables should be removed, since the presence of multicollinearity implies that the information that this variable provides about the response is redundant in the presence of the other variables (Kassambara, 2017).

Table 7. VIF Scores of the Demographic Variables

Coefficients[a]			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Gender = Female	0.816	1.226
	Marital Status = Single	0.558	1.791
	Age = 26-35	0.306	3.266
	Age = 36-45	0.279	3.579
	Age = 46-55	0.315	3.174
	Age = 56+	0.314	3.186
	Education = Primary / High School	0.603	1.659
	Education = University Degree	0.740	1.352
	Income = 2,500 TL and Below	0.323	3.093
	Income = 2,501-5,000 TL	0.676	1.478
	Income = 10,001 TL and over	0.650	1.540

Excluded Variables[a]				
Model		Beta In	Collinearity Statistics	
			VIF	Minimum Tolerance
1	Gender = Male	*.a*		0.000
	Marital Status = Married	*.a*		0.000
	Age = 18-25	*.a*		0.000
	Education = Graduate Degree	*.a*		0.000
	Income = 5,001-10,000 TL	*.a*		0.000
a. Dependent Variable: Mobile Banking Usage				

According to VIF analysis Gender = Male, Marital Status = Married, Age = 18-25, Education = Graduate Degree, Income = 5,001-10,000 TL values are defined as reference categories.

5.1.3 Dependent and control variable

Information on respondents' mobile banking and internet banking usage frequency were also collected in the study. Around 73% of the respondents were regular users of mobile banking as illustrated in Table 8.

Table 8. Mobile and Internet Banking Usage of the Respondents

How often do you use ____ banking?	Mobile Banking		Internet Banking	
	Frequency	Percent	Frequency	Percent
Never	46	11.4%	40	9.9%
Rarely	14	3.5%	32	7.9%
Sometimes	49	12.1%	32	7.9%
Very often	52	12.8%	60	14.8%
Always	244	60.2%	241	59.5%
Total	405	100%	405	100.0%

In statistics, logistic regression is a regression model where the dependent variable is categorical. A categorical variable is sometimes called "dichotomous", "binomial", "binary" or "dummy". This research uses a dichotomous dependent variable where the output can take only two values, "0" and "1", which represent the outcome whether a respondent is using mobile banking or not. There are in total 5 answers in 5 Point Likert scale, which were recoded into dichotomous dependent variables, "0" value for non-users "Rarely" and "Never", "1" value for users "sometimes", "very often" and "always".

5.1.4 Cross-tab analysis

Cross –tabs analysis was carried out to determine respondents' demographic based mobile banking and internet banking usage interval specifications which were previously discussed in Chapter 3. First of all, demographic specifications were investigated. The results of the usage and demographic cross tabulation are shown in the Table 9 below. According to results of the analysis, while there is a difference on the usage of both channels that male respondents are using internet banking more than mobile banking, while for female respondents the usage is the same. Married people are also using both channels more than single respondents, and the more educated an individual, the more they are used. Therefore Hypotheses 7, 8 and 9 are proved according to cross-tab analysis. Respondents between the ages of 26-35 are using mobile banking more than internet banking and leading the usage intervals between other age groups. They are followed by the age groups 18-25 and 36-45. Hypothesis 9 is therefore proved according to cross-tab analysis. Hypothesis 10 stated that with the increase of income level the more an individual will use mobile banking is not supported. However, the hypothesis is supported for the group with the second highest income level of 5,000 – 10,000 TL.

5.2 Dimension reduction

The next step was to identify areas for data reduction through Exploratory Factor Analysis (EFA) and Principal Components Analysis (PCA). Both EFA and PCA are techniques used for data reduction statistical software in order to execute this task. Although both go through the same process of extraction, interpretation and rotation, there are some differences between them. In PCA, large chunks of data are reduced

Table 9. Cross-Tab Analysis of Mobile and Internet Banking Usage of the Respondents

		Mobile Banking Usage				Internet Banking Usage				Total	
		Count	% within MB Usage	Count	% within MB Usage	Count	% within IB Usage	Count	% within IB Usage		
		Never, Rarely		Always, Often, Sometimes		Never, Rarely		Always, Often, Sometimes		Count	% within Category
Gender	Male	25	41,7%	201	58,3%	30	41,7%	196	58,9%	226	55,8%
	Female	35	58,3%	144	41,7%	42	58,3%	137	41,1%	179	44,2%
Marital Status	Married	45	75,0%	185	53,6%	37	51,4%	193	58,0%	230	56,8%
	Single	15	25,0%	160	46,4%	35	48,6%	140	42,0%	175	43,2%
Age	18-25	6	10,0%	77	22,3%	19	26,4%	64	19,2%	83	20,5%
	26-35	7	11,7%	95	27,5%	16	22,2%	86	25,8%	102	25,2%
	36-45	8	13,3%	73	21,2%	7	9,7%	74	22,2%	81	20,0%
	46-55	12	20,0%	55	15,9%	11	15,3%	56	16,8%	67	16,5%
	56+	27	45,0%	45	13,0%	19	26,4%	53	15,9%	72	17,8%
Education Level	Primary / High School	9	15,0%	32	9,3%	14	19,4%	27	8,1%	41	10,1%
	University	34	56,7%	201	58,3%	47	65,3%	188	56,5%	235	58,0%
	Graduate Degree	17	28,3%	112	32,5%	11	15,3%	118	35,4%	129	31,9%
Income Level	< 2500 TL	19	31,7%	73	21,2%	29	40,3%	63	18,9%	92	22,7%
	2500-5000 TL	10	16,7%	76	22,0%	16	22,2%	70	21,0%	86	21,2%
	5000-10000 TL	13	21,7%	101	29,3%	18	25,0%	96	28,8%	114	28,1%
	> 10000 TL	18	30,0%	95	27,5%	9	12,5%	104	31,2%	113	27,9%
Total		60	100,0%	345	100,0%	72	100,0%	333	100,0%	405	100,0%

by sifting it through the creation of at least one index variable by creating a weighted average, or linear combination, of a given set of variables, in this case the results of the survey investigating the responses to those pertaining to financial literacy. While EFA is also a data reduction tool, it is different because it points to the latent variable. In more simplistic terms, EFA reduction points to the relationship that runs between the data. In this case, the connecting thread between the responses to the Likert questionnaire on usage barriers. Dimension reduction for adoption barriers was done with EFA similar to Laukkanen (2016) paper while dimension reduction for Financial Literacy constructs was made with PCA following Akın et al. (2012).

5.2.1 Factor analysis

Exploratory Factor Analysis via SPSS (IBM SPSS STATISTICS Version 25) was used in order to test the convergent and discriminant validity of the variables. This is especially helpful when considering the different barriers being tested. In other words, EFA is helpful in confirming or rejecting the different hypotheses of this thesis as a reason for consumer resisters of mobile banking innovation.

5.2.1.1 First iteration

The next step was to undergo factor analysis. What was important was to identify levels of similarity and to examine reliability. It was important to identify the Cronbach Alpha which is a measurement of the consistency of a data set and the reliability of data results. In the case of this study 21 factors were examined in the first iteration. The first reliability analysis score using the Cronbach Alpha is 0.773 and because the value is bigger than 0.7 it can be stated that mobile banking usage barriers are consistent and reliable. Meanwhile a Kaiser-Meyer-Olkin (KMO) score was required since it measures if the data acquired is suited for factor analysis. KMO and Bartlett's Test score is 0.863, and due the value is between 0.8 and 1 it is indicating the sample is adequate to run the factor analysis. Bartlett tests the extent to which there is equal variance in the data. A significance level of 0.000 (Bartlett's Test Sphericity) acquired also indicating that the mean sample is reliable.

The results of the factor analysis indicated that the total variance explained can be reduced to five variable factors which can describe 65.65 per cent of the total data. Because of total variance's value is greater than 60%, the results can be considered as satisfying. In that factor analysis, principle components method and varimax method were used.

Following a rotated component matrix four items were discarded out of 21 items (bring the total down to 17) explained in the below table (Table 10).

Table 10. Excluded Items for Second Iteration of Factor Analysis

4 Removed items - Rotated Component Matrix[a]							
Component	1	2	3	4	5	Paper / Scale	Reason
In my opinion, mobile/Internet banking does not offer any advantage compared to handling my financial matters in other ways.			0.369	0.304		Laukkanen, 2016 / Value Barrier	Item loading lower than 0.40.
I prefer to try mobile banking technologies before I start using them.				-0.712		Brown et al., 2003 / Trialability	Negative item loading
I find self-service alternatives more pleasant than personal customer service.					0.677	Laukkanen, 2016 / Tradition Barrier	Single Component
Patronizing in the banking office and chatting with the teller is a nice occasion on a weekday.		0.61				Laukkanen, 2016 / Tradition Barrier	Single Relative Barrier after the one item is removed

5.2.1.2 Second iteration

Following on a second iteration of factor analysis was conducted, this time increasing the Cronbach Alpha to 0.784 (Table 11), KMO and Bartlett Test score of 0.855 and significance level of 0.00 (Table 12) respectively; which indicating the sample is adequate to run the factor analysis and the mean sample is reliable.

Following another rotative component matrix, a key component of the analysis as it measures the correlations between the variables and components within the data, the results of the factor analysis indicated that the total variance explained can be reduced to 4 variable factors which can describe 68.65 per cent of the total data. Because of total variance's value is greater than 60%, the results can be

Table 11. Cronbach's Alpha Analysis Results of Resistance Barriers

Reliability Statistics	
Cronbach's Alpha	N of Items
.784	17

Table 12. KMO and Bartlett's Test of Sphericity Values for Resistance Barriers - Second Iteration

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.855
Bartlett's Test of Sphericity	Approx. Chi-Square	4106.369
	df	136
	Sig.	.000

considered as satisfying. According to the results of factor analysis, 17 items were reduced to 4 simplified barrier factors named as Usage, Time and Risk, Privacy and Trialability; of which variances explained can be seen at the Table 13.

After the results, factor analysis reliability was conducted to each summarized factor individually in order to check whether the barriers were consistent and reliable. Cronbach Alpha values stated that mobile banking usage barriers are also consistent and reliable independently.

It can be concluded that since all of the determinants which were placed in theoretical model couldn't be determined as significant factors, the final model is modified and summarized as in Figure 6.

5.2.2 Principal component analysis

5.2.2.1 Recoding

In this research Financial Literacy was examined in four aspects: financial information, financial activeness, financial sophistication and self-assessed. Before

Table 13. Factor Solution for Mobile Banking Barriers with Items Loaded

Factor Name	Variance Explained	Cronbach 's Alpha	Related Paper	Related Subject	Items	Item Loadings
Usage Barrier	30.72%	0.892	Laukkanen, 2016	Usage Barrier	In my opinion, mobile/Internet banking services are fast to use.*	0.909
			Laukkanen, 2016	Usage Barrier	In my opinion, the use of mobile/Internet banking services is convenient.*	0.896
			Laukkanen, 2016	Usage Barrier	In my opinion, mobile/Internet banking services are easy to use.*	0.896
			Laukkanen, 2016	Usage Barrier	In my opinion, progress in mobile/Internet banking services is clear.*	0.880
			Laukkanen, 2016	Value Barrier	In my opinion, the use of mobile/Internet banking services increases my ability to control my financial matters by myself.*	0.763
			Self-Added	Image Barrier	I think the banks offering mobile banking services are more innovative.*	0.627
			Laukkanen, 2016	Usage Barrier	The use of changing PIN codes in mobile/Internet banking services is convenient.*	0.518
Time and Risk Barrier	22.88%	0.775	ChauShen Chen, 2013	Time Risk	I think it takes time to use mobile banking.	0.772
			ChauShen Chen, 2013	Time Risk	I think it takes time to learn mobile banking.	0.768
			Laukkanen, 2016	Risk Barrier	I fear that while I am using a mobile/Internet banking service, I might tap out the information of the bill wrongly.	0.672
			Laukkanen, 2016	Risk Barrier	I fear that while I am using mobile/Internet banking services, the connection will be lost.	0.599
			Laukkanen, 2016	Image Barrier	In my opinion, new technology is often too complicated to be useful.	0.517
Privacy Barrier	8.48%	0.845	ChauShen Chen, 2013	Privacy Risk	My confidential information can be stolen by others while using mobile banking services.	0.852
			ChauShen Chen, 2013	Privacy Risk	Mobile banking services are not able to keep personal datas confidential.	0.845
			Laukkanen, 2016	Risk Barrier	I fear that the list of PIN codes may be lost and end up in the wrong hands.	0.780
Trialability Barrier	6.58%	0.872	Brown et al., 2003	Trialability	If I could try mobile banking services, my chances of using them would be increased.	0.906
			Brown et al., 2003	Trialability	If I could watch a demo of the usage of mobile banking services, my chances of using them would be increased.	0.899
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.[a]						
a. Rotation converged in 6 iterations.						
* Reversed Item						

the Principal Component Analysis was conducted; all financial literacy items were recoded into dummy variables (Table 14).

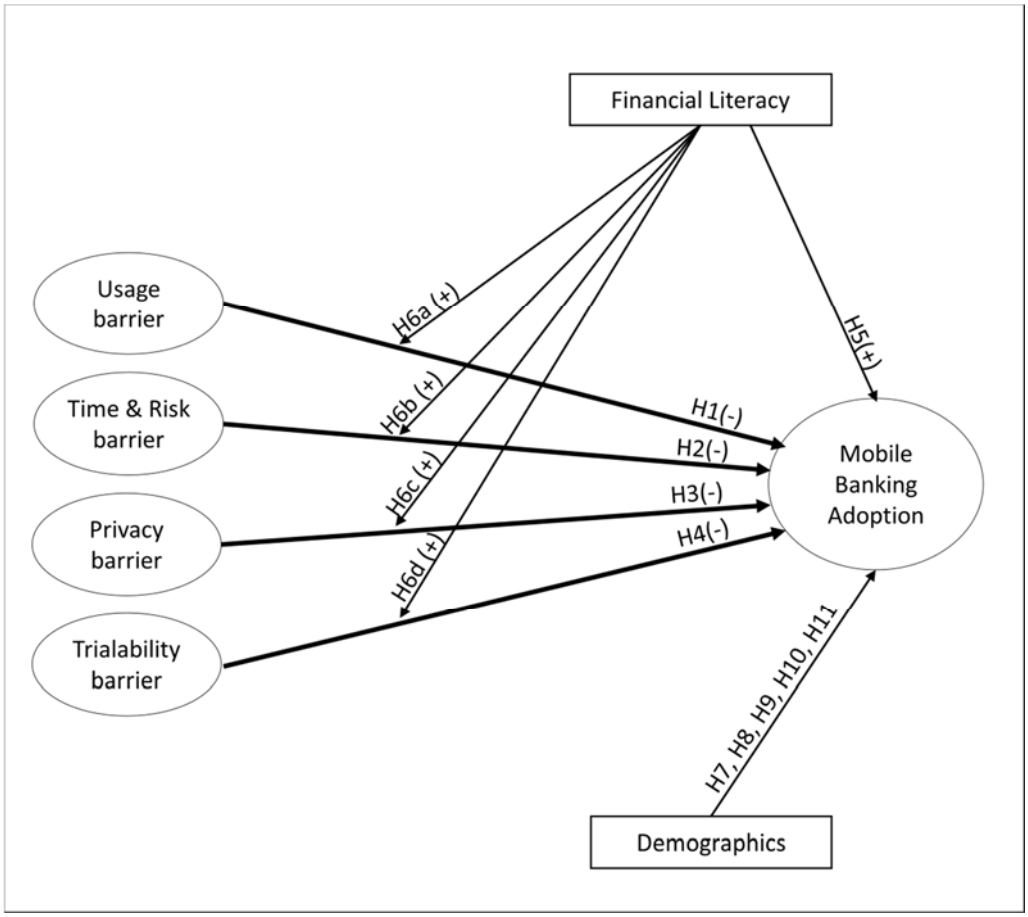

Figure 6. Theoretical model after factor analysis

The three Self-assessed questions were asked in the questionnaire as Likert scale answers, two Financial Sophistication questions were asked in the questionnaire as two option categorical questions; each of these questions had a yes/no answers. Two Financial Activeness questions were asked in the questionnaire; first one having a categorical three option and the second having a Likert scale answers. Financial Information questions were asked in the questionnaire as 4 option categorical questions; each of these questions had a “lower than”, “same with”,

"higher than" and "I have no idea" answers. The correct answer for the first question is "lower than" while the correct answer for the second question is "Higher Than". Responses were recoded into dichotomous variables.

Table 14. Recoding of Financial Literacy Items Into Dummy Variables Before PCA

ITEMS	QUESTIONS	ANSWERS	DUMMY VALUE
Self-Assessed	I think I understand Economics and Finance issues well.	"Strongly disagree", "disagree", "neither agree nor disagree"	0
		"Agree", "strongly agree".	1
Self-Assessed	I often use economic and financial issues in my daily activities (work, hobby, etc.).	"Strongly disagree", "disagree", "neither agree nor disagree"	0
		"Agree", "strongly agree".	1
Self-Assessed	I follow economic and financial indicators (interest rates, inflation, etc.).	"Strongly disagree", "disagree", "neither agree nor disagree"	0
		"Agree", "strongly agree".	1
Financial Sophistication	Have you ever given automatic payment instructions before?	"No"	0
		"Yes"	1
Financial Sophistication	Do you make payments through your bank such as tax, insurance and / or pension contributions?	"No"	0
		"Yes"	1
Financial Activeness	In the past 12 months, did you attempt to correct a mistake after noticing the bank you use regularly has made concerning your accounts?	"No", "I haven't realized"	0
		"Yes"	1
Financial Activeness	Before choosing a bank that serves mobile banking services, I did research among alternatives.	"Strongly disagree", "disagree", "neither agree nor disagree"	0
		"Agree", "strongly agree".	1
Financial Information	The fees and commissions in the mobile banking are …….. the fees and commissions received in the branch.	"Same with", "higher than", "I have no idea"	0
		"Lower than"	1
Financial Information	Deposit interest rates in mobile banking are …….. deposit interest rates in the branch.	"Same with", "lower than", "I have no idea"	0
		"Higher than"	1

5.2.2.2 Analysis

By using PCA, a single variable was aimed to be created from each of these categories by using STATA. In the first iteration, Self-Assessed items showed multicollinearity, which showed that the model includes multiple factors that are correlated not just to our response variable, but also to each other.

After removing the self-assessed items from the model, a second iteration was conducted. Because of this methodology, each of the new component is a weighted linear combination of the underlying variables showing a Kaiser-Meyer-Olkin measure of sampling adequacy overall as 0.6561, indicating the sample is adequate to run the PCA (Table 15). In the PCA, the principle components method and orthogonal varimax methods were used.

Table 15. Kaiser-Meyer-Olkin Measure of Sampling Adequacy of Financial Literacy Items

Variable	KMO
FS1	0.5877
FS2	0.6282
FA2	0.7765
FI1	0.7248
FI2	0.6396
FA1	0.8213
Overall	0.6561

Following the rotated components matrix of the results of the PCA, it was indicated that the total variance explained can be reduced to 3 components which can describe 73.67 percent of the total data (Table 16). Because of total variance's value is greater than 60%, the results can be considered as satisfying.

According to the results of PCA, 6 financial literacy items were reduced to 3 simplified financial literacy components named as financial information, financial activeness, financial sophistication, of which the item loadings are seen at the below table (Table 17).

Table 16. Rotated Components Matrix of the Results of the PCA

```
Principal components/correlation                  Number of obs    =        405
                                                  Number of comp.  =          3
                                                  Trace            =          6
    Rotation: orthogonal varimax (Kaiser off)     Rho              =     0.7367

    ------------------------------------------------------------------------------
       Component |     Variance   Difference        Proportion   Cumulative
    -------------+----------------------------------------------------------------
           Comp1 |      1.76426      .232914            0.2940       0.2940
           Comp2 |      1.53134      .406845            0.2552       0.5493
           Comp3 |       1.1245            .            0.1874       0.7367
    ------------------------------------------------------------------------------
```

Table 17. Results of the Principal Component Analysis of Financial Literacy Items

STATA Components for Mobile Banking Financial Literacy with Items Loaded				
Component Name	Related Paper	Related Subject	Items	Item Loadings
Financial Sophistication	Akın et al. (2012)	Financial Sophistication	Have you ever given automatic payment instructions before?	0.719
	Akın et al. (2012)	Financial Sophistication	Do you make payments through your bank such as tax, insurance and / or pension contributions?	0.592
Financial Activeness	Akın et al. (2012)	Financial Activeness	Before choosing a bank that serves mobile banking services, I did research among alternatives.	0.684
	Akın et al. (2012)	Financial Activeness	In the past 12 months, did you attempt to correct a mistake after noticing the bank you use regularly has made concerning your accounts?	0.703
Financial Information	Akın et al. (2012)	Financial Information	Deposit interest rates in mobile banking are …….. deposit interest rates in the branch.	0.598
	Akın et al. (2012)	Financial Information	The fees and commissions in the mobile banking are …….. the fees and commissions received in the branch.	0.730

5.3 Logistic regression

The data was then analyzed through logistic regression as this method has many practical advantages over other regression analyses especially when using it in customer based decision making as it allows for additional viewpoints to emerge.

The analysis to test the hypotheses consisted of examining the three separate logistic regression models in which the dichotomous dependent variable is mobile banking usage. The independent variables in the models consisted of computed four resistance factors, as well as the three financial literacy components. Variables were also generated for the categorical demographic variables of gender, marital status, age, education level and income. In doing so, the analyses followed a stepwise logistic regression together with the forward conditional method. This automated process of choosing predictive items begins with no items in the model and then continues by trying each item one by one and then including them in order by way of statistical significance. In other words, the study tests the hypotheses outlined in the previous section through three separate logistic regression models.

Logistic Regression Model Equation: $\ln(p/1\text{-}p) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k$

Model I consisted of the evaluation of the four adoption barriers together with the five categorical barriers which were tested in a single block.

$\ln(p/1\text{-}p) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9$

$\ln(p/1\text{-}p)$ = Mobile Banking Adoption

X_1 = Usage Barrier

X_2 = Time and Risk Barrier

X_3 = Privacy Barrier

X_4 = Trialability Barrier

X_5 = Gender

X_6 = Marital Status

X_7 = Age

X_8 = Education Level

X_9 = Income Level

Model II consisted of four adoption barriers and five categorical barriers tested in the first block and three financial literacy components added as a second block to the analysis.

$$\ln(p/1\text{-}p) = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + \beta_{12}X_{12}$$

$\ln(p/1\text{-}p)$ = Mobile Banking Adoption

X_1 = Usage Barrier

X_2 = Time and Risk Barrier

X_3 = Privacy Barrier

X_4 = Trialability Barrier

X_5 = Gender

X_6 = Marital Status

X_7 = Age

X_8 = Education Level

X_9 = Income Level

X_{10} = Financial Activeness

X_{11} = Financial Sophistication

X_{12} = Financial Information

Model III: After the result of the first two models were acquired, the interaction terms between barriers and financial literacy factors are added to the model II to investigate joint impact.

Through the models outlined above, the results of the thesis can be determined as can the extent to which the hypotheses presented in this thesis can be validated. The final model does not include any statistically nonsignificant items.

Model I Equation:

Mobile Banking Adoption = 8.027 + (-1.347 * Usage Barrier) + (-0.466 * Time and Risk Barrier) + (-0.462 * Privacy Barrier) + (-1.584 * Age) + (-0.984 * Income)

Model II Equation:

Mobile Banking Adoption = 7.404 + (-1.31 * Usage Barrier) + (-0.477 * Time and Risk Barrier) + (-0.437 * Privacy Barrier) + (-1.586 * Age) + (-0.834 * Income) + (1.162 * Financial Activeness)

Model III Equation:

Mobile Banking Adoption = 6.879 + (-1.451 * Usage Barrier) + (-0.786 * Time and Risk Barrier) + (-1.367 * Age) + (0.569 * Financial Activeness * Usage Barrier)

5.4 Similar service adoption and robustness testing

A similar service adoption, Internet Banking adoption, was included into the model for robustness testing of the results of this study since participants had also been asked how often they use internet banking (Table 7). The answers then again recoded as dichotomous control variables, “0” value for non-users “Rarely” and “Never”, “1” value for users “sometimes”, “very often” and “always”.

Model I and Model III are replicated as Model IV and Model V respectively including Internet Banking, consisted of the evaluation of four adoption barriers together with the five categorical barriers in a single block. The dichotomous Internet Banking Usage Variable was added as a control variable to the analysis (Table 19).

Model IV equation:

Internet Banking Adoption = 6.117 + (-1.164 * Usage Barrier) + (-0.344 * Time and Risk Barrier) + (-0.513 * Privacy Barrier) + (-1.519 * Age) + (-0.474 * Income) + (1.591 * Internet Usage)

Model V equation:

Internet Banking Adoption = 6.069 + (-1.361 * Usage Barrier) + (-0.34 * Time and Risk Barrier) + (-0.497 * Privacy Barrier) + (-1.543 * Age) + (-0.272 * Income) + (1.565 * Internet Usage[b]) + (0.478 * Financial Activeness * Usage Barrier)

CHAPTER 6

RESULTS, DISCUSSION, AND CONCLUSION

6.1 Results

The results of the logistic regression analysis (Table 18) indicated that in Model I the significance of the usage barrier (-1.347; $p < 0.001$) meant that it was the biggest obstacle for mobile banking adoption with reference to hypothesis 1. This was followed by privacy (-0.462; $p = 0.030$) and then time and risk (-0.465; $p = 0.049$) which were the hypotheses 2 and 3 respectively. In addition, it was found that elderly (-1.584; $p < 0.001$) and lower income (-0.983; $p = 0.014$) also significantly negatively affect mobile banking adoption decisions. Trialability, at least in this study, was however, insignificant as a barrier. Meanwhile, of the categorical barriers, age was discovered to be related to consumer choices in mobile banking adoption. Young people were expected to use mobile banking more than the elderly and it was discovered particularly those aged above 56 who are less likely adopt which is supporting hypothesis 9. Hypothesis 11 is also supported for income, especially those with a monthly salary below 2,500TL as the use of mobile banking was also expected to increase as income level increases. Due age and income were the only supported categorical barriers; gender, marital status and education were not shown differences for mobile banking adoption in this model.

Model II consisted of analyzing the three supported adoption barriers of Usage (-1.310; $p < 0.001$), Time and Risk (-0.476; $p = 0.049$), and privacy (-0.436; $p = 0.043$) as well as the supported age (-1.585; $p < 0.001$) and income (-0.833; $p = 0.042$) factors with those of the three different components of financial literacy. All significant variables in Model I also entered to the Model II with the same

significance values. Financial activeness, especially emerged as significant (1.162; p = 0.022) with a positive coefficient means that increases adoption. Higher Financial Activeness means higher adoption according to the model.

Table 18. Results of the Logistic Regression Models

Model	Independent Variables	*B*	S.E.	Wald	df	Sig.	Exp(*B*)
Model I	Usage Barrier	-1.347	0.195	47.584	1	0.000	0.260
	Time and Risk Barrier	-0.465	0.236	3.867	1	0.049	0.628
	Privacy Barrier	-0.462	0.212	4.726	1	0.030	0.630
	Age > 56 Years (18-25 Years)[a]	-1.584	0.400	15.677	1	0.000	0.205
	Income < 2,500 TL (5,000-10,000 TL)[a]	-0.983	0.399	6.065	1	0.014	0.374
	Constant	8.026	0.924	75.495	1	0.000	3060.304
Model II	Usage Barrier	-1.310	0.198	43.816	1	0.000	0.270
	Time and Risk Barrier	-0.476	0.242	3.864	1	0.049	0.621
	Privacy Barrier	-0.436	0.216	4.100	1	0.043	0.646
	Age > 56 Years (18-25 Years)[a]	-1.585	0.408	15.089	1	0.000	0.205
	Income < 2,500 TL (5,000-10,000 TL)[a]	-0.833	0.410	4.126	1	0.042	0.435
	Financial Activeness	1.162	0.507	5.256	1	0.022	3.195
	Constant	7.404	0.941	61.956	1	0.000	1641.927
Model III	Usage Barrier	-1.451	0.203	50.909	1	0.000	0.234
	Time and Risk Barrier	-0.786	0.193	16.488	1	0.000	0.456
	Age > 56 Years (18-25 Years)[a]	-1.367	0.383	12.712		0.000	0.255
	Financial Activeness by Usage Barrier	0.568	0.180	9.965	1	0.002	1.766
	Constant	6.878	0.766	80.616	1	0.000	970.745

[a] Reference Category

Dependent Variable = Mobile Banking Usage Interval

Never, Rarely [0] Always, Often, Sometimes [1]

In model III, the analysis consisted of testing the extent to which the financial literacy variable of financial activeness related to the adoption barriers. Usage (-1.451; $p < 0.001$), Time and Risk (-0.786; $p < 0.001$) as well as age (-1.367; $p < 0.001$) and income were analyzed as the interaction terms of the financial literacy variable financial activeness. It was through this model that it was supported that the financial literacy variable of financial activeness (0.568; $p = 0.002$) does indeed offset the Usage barrier, although not the other barriers. In other words, proving only the hypotheses H6a and offering an interesting correlation of financial literacy in overcoming mobile banking usage barriers.

Table 19. Logistic Regression Goodness of Fit Measures.

Model fit statistics	Model I	Model II	Model III
−2 Log likelihood	246.58	219.13	223.71
Cox & Snell R^2	20.6%	25.8%	24.9%
Nagelkerke R^2	36.2%	45.4%	43.9%
$\chi 2$ (df)	93.20 (2)	120.66 (6)	116.07 (4)
	$p < 0.001$	$p < 0.001$	$p < 0.001$
Hosmer–Lemeshow test	29.60, $p = 0.000$	39.33, $p = 0.000$	24.94, $p = 0.002$
Classification percentage	87.20%	90.60%	90.90%

As can be seen in Table 19, the $\chi 2$ ($p = 0.001$) is highly significant and demonstrates that there is a good fit between the data and all of the three models (Table 19). The results for the Hosmer–Lemeshow tests in Models I, II and III also ($p = 0.000, 0.000, 0.002$) show the models a good fit. Furthermore, the classical fit percentages of all three of the models indicate that the independent variables in the logistic model together account the percentages for the explanation if the mobile banking is adopted.

The results of the similar service adoption via internet banking indicated that if a consumer uses internet banking, there would be a higher likelihood of using mobile banking (Table 20). Indeed, the findings on mobile banking in this study echo several findings of other studies on internet banking, especially those pertaining to barriers, with the exception of the triability barrier which of Brown et al. (2003) and Talke and Heidenreich (2014), have found significant in their study.

Table 20. Results of the Robustness of Logistic Regression Models

	Variables in the Equation						
Model	Independent Variables	*B*	S.E.	Wald	df	Sig.	Exp(*B*)
Model IV	Usage Barrier	-1.164	0.204	32.547	1	0.000	0.312
	Time and Risk Barrier	-0.344	0.245	1.975	1	0.160	0.709
	Privacy Barrier	-0.513	0.220	5.417	1	0.020	0.599
	Age > 56 Years (18-25 Years)[a]	-1.518	0.421	13.004	1	0.000	0.219
	Income < 2,500 TL (5,000-10,000 TL)[a]	-0.473	0.447	1.121	1	0.290	0.623
	Internet Usage[b]	1.591	0.416	14.622	1	0.000	4.908
	Constant	6.117	0.991	38.074	1	0.000	453.439
Model V	Usage Barrier	-1.360	0.224	37.007	1	0.000	0.257
	Time and Risk Barrier	-0.339	0.250	1.837	1	0.175	0.712
	Privacy Barrier	-0.497	0.222	5.029	1	0.025	0.608
	Age > 56 Years (18-25 Years)[a]	-1.543	0.430	12.877	1	0.000	0.214
	Income < 2,500 TL (5,000-10,000 TL)[a]	-0.272	0.468	0.338	1	0.561	0.762
	Internet Usage[b]	1.565	0.426	13.478	1	0.000	4.782
	Financial Activeness by Usage Barrier	0.478	0.190	6.304	1	0.012	1.612
	Constant	6.068	0.989	37.664	1	0.000	431.855

[a] Reference Category

[b]Control Variable = Internet Banking Usage Interval

Never, Rarely [0] Always, Often, Sometimes [1]

As can be discerned from Table 21, the logistic regression goodness of fit measures of SSA and Robustness are $\chi 2$ ($p < 0.001$) highly significant and demonstrates that there is a good fit between data and both of the models in accordance with the previous models (Table 21). The results for the Hosmer–Lemeshow tests in models IV and V show the models are not a good fit. However, the classical fit percentage of both models indicates that there is a remarkably high accuracy in prediction of the phenomenon 89.6% and 90.4% respectively, which is the supporting result of all three of the previous models with the robustness test.

Table 21. Comparison of Logistic Regression GOF Measures With Robustness

Model fit statistics	Model I	Model II	Model III	Model IV	Model V
−2 Log likelihood	246.58	219.13	223.71	210.36	203.73
Cox & Snell R^2	20.6%	25.8%	24.9%	27.4%	28.5%
Nagelkerke R^2	36.2%	45.4%	43.9%	48.2%	50.2%
$\chi 2$ (df)	93.20 (2)	120.66 (6)	116.07 (4)	129.42 (6)	136.06 (7)
	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$
Hosmer–Lemeshow test	29.60	39.33	24.94	11.27	10.86
	$p = 0.000$	$p = 0.000$	$p = 0.002$	$p = 0.187$	$p = 0.210$
Classification percentage	87.2%	90.6%	90.9%	89.6%	90.4%

Overall, according to the results 7 hypotheses were supported in this study (Table 22) while the remaining hypotheses were not supported, most especially that the privacy, time and risk, and trialability barriers did not emerge to be offset by financial literacy for the adoption of mobile banking.

Table 22. Summary Table of the Supported Hypotheses

Hypotheses	Supported	Not Supported
Hypothesis 1: Usage barriers negatively affect consumers' choice to adopt mobile banking	✓	
Hypothesis 2: Time and risk barriers negatively affect consumers' choice to adopt mobile banking.	✓	
Hypothesis 3: Privacy barriers negatively affect consumers' choice to adopt mobile banking	✓	
Hypothesis 4: Trialability barriers negatively affect consumers' choice to adopt mobile banking.		X
Hypothesis 5: Financial literacy is positively related to consumers' choice to adopt mobile banking	✓	
Hypothesis 6a: Financial literacy positively moderates the relationship between usage barriers and mobile baking adoption (usage barriers will be weaker when the financial literacy is higher).	✓	
Hypothesis 6b: Financial literacy positively moderates the relationship between time and risk barriers and mobile baking adoption (time and risk barriers will be weaker when the financial literacy is higher).		X
Hypothesis 6c: Financial literacy positively moderates the relationship between privacy barriers and mobile baking adoption (privacy barriers will be weaker when the financial literacy is higher).		X
Hypothesis 6d: Financial literacy positively moderates the relationship between trialability barriers and mobile baking adoption (trialability barriers will be weaker when the financial literacy is higher).		X
Hypothesis 7: There is a difference between consumers in terms of gender.		X
Hypothesis 8: There is a difference between consumers in terms of marital statuses.		X
Hypothesis 9: There is a difference between consumers in terms of age groups.	✓	
Hypothesis 10: There is a difference between consumers in terms of education levels.		X
Hypothesis 11: There is a difference between consumers in terms of income groups.	✓	

6.2 Theoretical implications

There is an important difference between this study and previous studies about both mobile and internet banking. Specifically, this study focused on evaluating the

important determinate of financial literacy and its ability to offset barriers in an emerging country with a vibrant economy like Turkey. Although financial literacy did not prove able to offset the privacy and trialability barriers, in the case of the usage barrier, it was found that financial literacy may offset a consumer's tendency to resist adoption, especially if the consumer is financially active.

The results of this study fit into studies such as those of Shaikh and Karjaluoto (2016) in which it is emphasized the potency of the usage barrier and Laukkanen and Kiviniemi (2010) who found that information and guidance about mobile banking mitigated the usage barriers. It also fits into the scholarly work on financial literacy and its ability to offset barriers by scholars such as Akin et al. (2002) who focus on financial literacy as a means to overcome barriers for product adoption and Van Rooij et al. (2010) who identify financial literacy as a decision-making factor. It also complements Fernandes et al. (2014) who highlighted that financial literacy is an antecedent to the behavior of consumers.

The significance of the Time & Risk barrier showing parallelism with the studies of; Sheth (1981) highlighting the risk barrier as the most intense barrier, Wu et al. (2005) found that perceived risk has a significant direct impact on behavioral intention to use, Laukkanen and Kiviniemi (2010) identify that risk perceptions pertaining to the nature of a technology that could lead to loss, perhaps in this instance the connection timing out; and Chen (2013) noting the importance of consumer concerns for risk.

The results found for the Privacy barrier in this thesis fit into study of Kuisma et al. (2007) in which they inhibit adoption and noticed a lack of willingness to change, risk of bank account misuse, and the fear of making mistakes as some of the barriers.

Other relevant literature is not supported in this study since Trialability barrier is not emerged as significant at the logistic regression models, and other terms of barriers such as tradition, image and value is discarded at the factor analysis.

Since gender differences was not shown as significant in the models of this study; the literature on the mobile banking adoption differences of different genders which is studied by Riquelme and Rios (2010), gender differences for financial literacy is studied by Almenberg and Dreber (2015) and gender differences in the perceived risk of buying online is focused by Garbarino and Strahilevitz (2004) were not supported. Literature on educational and marital status differences are also not supported due they are not emerged in this study as significant.

6.3 Managerial implications

The results of this study showed that in terms of mobile banking adoption; usage barrier is considered to be more important than the time and risk barrier, however they are both significant barriers for the adoption of mobile banking and that financial literacy is a means to offset the usage barrier. This is good news for banking executives because by providing and improving the services of mobile banking executives have the opportunity to win loyal consumers concerned about their finance. The research discovered that significant barriers for the adoption of mobile banking pertain to usage, time and risk, and privacy; however, it was also discovered that although there are barriers, they were certainly not impenetrable walls. In other words, they can be overcome.

It is observed that digital channels are becoming more prominent in the banking sector and the transactions to be made through these channels in the near future will become more widespread. The change and transformation in finance and

banking spearheads the rapid digitalization of individuals and society. In a very short period of time, the transactions made by digital channels reached the number of transactions made from the physical banks, or even past. In this study, we see that the most important expectations of the customers who use digital banking in this century focus on usage, time and risk, while privacy issues remain secondary.

The aim of this study was also to investigate the relationship between the demographic characteristics of the participants and the factors affecting the level of resistance of the participants to mobile banking. In the study, it was found that there was a relationship between demographic characteristics of the participants and the use of mobile banking only in terms of age and income level. This situation shows the banking executives that the sector has been purified from gender discrimination, and it will be better addressing marketing specialists to consumers who have different income levels and varying ages should be prioritized as a target audience. Bank managers should group requests and needs in line with the demographic characteristics of customers. According to the requests and needs of these groups, services should be developed and promoted to customers. In order to create loyalty in accordance with customer satisfaction, customer-oriented marketing approach based on demographic information and financial activeness of mobile banking users should be provided. It may be advisable for banks to choose young age as a target group for the use of internet banking.

For users, the importance of time has been high, so banks should make arrangements to reduce the duration of transactions in digital banking. Risk concerns of individuals using mobile banking should also be eliminated. Information on safety-related systems and applications should be provided to the customer frequently.

The issue of the image, which has an important place in the literature, has been insignificant in our study, so the image concerns of the banks can be replaced by the users or potential users to raise their financial activeness. Financial literacy and one of its subcomponents, financial activeness, is something that can be taught and encouraged. In fact, having financial knowledge and take ownership in ones finance is not only good practice to a banking customer but also helpful for the banking sector. In order for banking executives to maximize the potential for the growth of mobile banking, they must see through plans to broaden and encourage financial activeness and literacy in general. At the same time, they might want to promote mobile banking as a means of doing so and help consumers airing on the side of resistance to understand that mobile banking is a tool for greater financial activeness and literacy.

6.4 Limitations and future research

This study focused on the extent to which financial literacy may offset adoption barriers in mobile banking adoption. Although this study examined a wide range of barriers, there were some which were beyond the scope of the study, especially those of psychological nature. The scholarly field would certainly benefit from more studies that investigate such additional barriers. Also, this thesis focused on Turkey, on a respondent rate consisting of 73% users of mobile banking channels. Perhaps studies in other countries with different rates, economic histories and realities, might lead to different results; offering banking executives information as to how to deal with mobile banking adoption of resistors in different ways. Also, this study used a quantitative methodology. Although scholarly sound, the field always benefits from

qualitative specialists who use focus groups and/or face to face interviews to further probe into the subject of resistance.

6.5 Conclusion

There is an important difference between this study and previous studies about both mobile and internet banking. Specifically, this study focused on evaluating the important determinate of financial literacy and its ability to offset barriers. It was discovered that in Turkey the significant barriers for the adoption of mobile banking pertain to usage, time and risk, and privacy. However, it was also discovered that although there might be barriers, they are not impregnable and may be overcome with financial literacy.

This thesis has built on much of the growing literature in the field of mobile banking, resistance, adoption and financial literacy to discover that financial literacy, is indeed an important factor in offsetting those who resist mobile banking adoption due to usage. Indeed, when the consumer is financially active, the usage barrier is mitigated, and the consumer will proceed to use mobile banking.

The ramifications of the finding of this thesis are important. Banking executives should know that there is the potential to increase mobile banking usage by promoting financial literacy and activeness. Mobile banking is not only a tool for the financially active, but also increased financial literacy can encourage more users. Mobile banking itself may even be used as a vehicle to improve financial literacy among the population.

APPENDIX A: SOURCES OF THE SURVEY QUESTIONS

Construct		Adopted to questionnaire as:	Source Paper	Source scale item:
Financial Literacy				
Self-assessed	SA1	I think I understand Economics and Finance issues well.	Van Rooij et al., 2011	How would you assess your understanding of economics (on a 7-point scale; 1 means very low and 7 means very high)?
	SA2	I often use economic and financial issues in my daily activities (work, hobby, etc.).	Van Rooij et al., 2011	How much of an understanding of economics do you need during your daily activities (job,hobbies,etc.)?
	SA3	I follow economic and financial indicators (interest rates, inflation, etc.).	Van Rooij et al., 2011	Inflation: Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?
Financial Sophistication	FS1	Have you ever given automatic payment instructions before?	Akin et al., 2012	Are you using your bank's automatic payment order service?
	FS2	Do you make payments through your bank such as tax, insurance and / or pension contributions?	Akin et al., 2012	Are you making insurance or tax payments from your banks?
Financial Activeness	FA1	In the past 12 months, did you attempt to correct a mistake after noticing the bank you use regularly has made concerning your accounts?	Akin et al., 2012	Have you attempted to reduce or cancel your annual credit card usage fees within the past twelve months.
	FA2	Before choosing a bank that serves mobile banking services, I did research among alternatives.	Akin et al., 2012	How much a card user researched the market before acquiring their main credit card?
Financial Infrmation	FI1	The fees and commissions in the mobile banking are ..... the fees and commissions received in the branch.	Akin et al., 2012	Do you know the amount of annual fee you have paid for your main credit card within the previous twelve months?
	FI2	Deposit interest rates in mobile banking are ..... deposit interest rates in the branch.	Akin et al., 2012	What is the standard interest rate on your main credit card?
Resistance Barriers				
Usage Barrier	UB1	In my opinion, mobile banking services are easy to use.*	Laukkanen, 2016	In my opinion, mobile/Internet banking services are easy to use.*
	UB2	In my opinion, the use of mobile banking services is convenient.*	Laukkanen, 2016	In my opinion, the use of mobile/Internet banking services is convenient.*
	UB3	In my opinion, mobile banking services are fast to use.*	Laukkanen, 2016	In my opinion, mobile/Internet banking services are fast to use.*
	UB4	In my opinion, progress in mobile banking services is clear.*	Laukkanen, 2016	In my opinion, progress in mobile/Internet banking services is clear.*
	UB5	The use of changing PIN codes in mobile banking services is convenient.*	Laukkanen, 2016	The use of changing PIN codes in mobile/Internet banking services is convenient.*
Value Barrier	VB1	In my opinion, mobile banking does not offer any advantage compared to handling my financial matters in other	Laukkanen, 2016	In my opinion, mobile/Internet banking does not offer any advantage compared to handling my financial matters in
	VB2	In my opinion, the use of mobile banking services increases my ability to control my financial matters by myself.*	Laukkanen, 2016	In my opinion, the use of mobile/Internet banking services increases my ability to control my financial matters by
Risk Barrier	RB1	I fear that while I am using a mobile banking service, I might tap out the information of the bill wrongly.	Laukkanen, 2016	I fear that while I am using a mobile/Internet banking service, I might tap out the information of the bill wrongly.
	RB2	I think it takes time to learn mobile banking.	ChauShen Chen, 2013	It takes time to learn to how operate mobile banking services.
	RB3	I think it takes time to use mobile banking.	ChauShen Chen, 2013	It takes time to use mobile banking services.
	RB4	I fear that while I am using mobile banking services, the connection will be lost.	Laukkanen, 2016	I fear that while I am using mobile/Internet banking services, the connection will be lost.
	RB5	Mobile banking services are not able to keep personal datas confidential.	ChauShen Chen, 2013	The Mobile banking services can't keep my personal data private
	RB6	My confidential information can be stolen by others while using mobile banking services.	ChauShen Chen, 2013	Personal information when using Mobile banking services may be stolen by others.
	RB7	I fear that the list of PIN codes may be lost and end up in the wrong hands.	Laukkanen, 2016	I fear that the list of PIN codes may be lost and end up in the wrong hands.
Tradition Barrier	TB1	Patronizing in the banking office and chatting with the teller is a nice occasion on a weekday.	Laukkanen, 2016	Patronizing in the banking office and chatting with the teller is a nice occasion on a weekday.
	TB2	I find self-service alternatives more pleasant than personal customer service.*	Laukkanen, 2016	I find self-service alternatives more pleasant than personal customer service.*
Image Barrier	IB1	In my opinion, new technology is often too complicated to be useful.	Laukkanen, 2016	In my opinion, new technology is often too complicated to be useful.
	IB2	I think the banks offering mobile banking services are more innovative.*	Self Added	
Trialability	TRB1	I prefer to try mobile banking technologies before I start using them.	Brown et al., 2003	I would use or be more likely to use cell phone banking if: I could test cell phone banking first.
	TRB2	If I could try mobile banking services, my chances of using them would be increased.*	Brown et al., 2003	I would use or be more likely to use cell phone banking if: I could use it on a trial basis first to see what it can offer.
	TRB3	If I could watch a demo of the usage of mobile banking services, my chances of using them would be increased.*	Brown et al., 2003	I would use or be more likely to use cell phone banking if: I could see a trial demo first.
		*Reversed scale.		

APPENDIX B

THE QUESTIONNAIRE - ENGLISH

Research of Resistance Factors that Affect Mobile Banking Usage

Dear Sirs,

This study is conducted by Bogazici University Management Information Systems Department graduate student Sarp Kohen under the counsultation of Assoc. Prof. Dr. Ceylan Onay and Prof. Dr. Aslıhan Nasır for the content of the graduate thesis. This study aims to determine the reasons for online banking resiliency in Turkey through financial literacy.

Participation in the study is purely voluntary and you are expected to allocate about 5 minutes. No identifying information is required from you in the survey. The answers will be kept strictly confidential and judged by the researchers.

If you need more information now or later, except as given in relation to the purpose of the research, you can contact us at sarpkohen@gmail.com email address. If you want general results to be shared with you when the survey is complete, please send it to us.

Thank you in advance for participating in this work.

* Required

1. **Email address** *

Boğaziçi Üniversitesi - Management Information Systems Department

Financial Literacy

2. **Please indicate your participation in each of the following statements.***
Mark only one oval per row.

	1. Strongly disagree	2. Disagree	3. Neither agree nor disagree	4. Agree	5. Strongly agree
I think I understand Economics and Finance issues well.	◯	◯	◯	◯	◯
I often use economic and financial issues in my daily activities (work, hobby, etc.).	◯	◯	◯	◯	◯
I follow economic and financial indicators (interest rates, inflation, etc.).	◯	◯	◯	◯	◯

3. **Have you ever given automatic payment instructions before?***
Mark only one oval.

◯ Yes
◯ No

4. **Do you make payments through your bank such as tax, insurance and / or pension contributions? ***
Mark only one oval.

◯ Yes
◯ No

5. **In the past 12 months, did you attempt to correct a mistake after noticing the bank you use regularly has made concerning your accounts? ***
Check all that apply.

☐ Yes
☐ No
☐ I haven't noticed

6. **How often do you use Internet Banking? ***
Mark only one oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

7. **How often do you use mobile banking?** *
Mark only one oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

8. **Before choosing a bank that serves mobile banking services, I did research among alternatives.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly agree

9. **Please complete the following sentences with the most appropriate option for you.** *
Check all that apply.

	lower than.	same with.	higher than	I have no idea
The fees and commissions in the mobile banking are …….. the fees and commissions received in the branch.	☐	☐	☐	☐
Deposit interest rates in mobile banking are …….. deposit interest rates in the branch.	☐	☐	☐	☐

Mobile Banking Usage

10. **Please indicate your participation in each of the following statements.** *
Mark only one oval per row.

	1. Strongly disagree	2. Disagree	3. Neither agree nor disagree	4. Agree	5. Strongly agree
In my opinion, mobile banking services are easy to use.					
In my opinion, the use of mobile banking services is convenient.					
In my opinion, mobile banking services are fast to use.					
In my opinion, progress in mobile/ Internet banking services is clear.					
The use of changing PIN codes in mobile/ Internet banking services is convenient.					
In my opinion, mobile banking does not offer any advantage compared to handling my financial matters in other ways.					
In my opinion, the use of mobile banking services increases my ability to control my financial matters by myself.					
I fear that while I am using a mobile banking service, I might tap out the information of the bill wrongly.					
I think it takes time to learn mobile banking.					
I think it takes time to use mobile banking.					
I fear that while I am using mobile banking services, the connection will be lost.					
Mobile banking services are not able to keep personal datas confidential.					

	1. Strongly disagree	2. Disagree	3. Neither agree nor disagree	4. Agree	5. Strongly agree
My confidential information can be stolen by others while using mobile banking services.					
I fear that the list of PIN codes may be lost and end up in the wrong hands.					
Patronizing in the banking office and chatting with the teller is a nice occasion on a weekday.					
I find self-service alternatives more pleasant than personal customer service.					
In my opinion, new technology is often too complicated to be useful.					
I think the banks offering mobile banking services are more innovative.					
I prefer to try mobile banking technologies before I start using them.					
If I could try mobile banking services, my chances of using them would be increased.					
If I could watch a demo of the usage of mobile banking services, my chances of using them would be increased.					

Demographics

11. **Gender** *
Check all that apply.

- [ ] Man
- [ ] Woman

12. **Marital Status** *
Check all that apply.

- [ ] Married
- [ ] Single

13. **Age** *
Check all that apply.

- [ ] 18-25
- [ ] 26-35
- [ ] 36-45
- [ ] 46-55
- [ ] 56 +

14. **Education Status** *
Check all that apply.

- [ ] Primary school graduate
- [ ] High school graduate
- [ ] University Graduate
- [ ] Higher Education Graduation
- [ ] Ph.D. and above

15. **Monthly Income** *
Check all that apply.

- [ ] 1,400 TL and Below
- [ ] 1,401 - 2,500 TL
- [ ] 2,501-5,000 TL
- [ ] 5,001-10,000 TL
- [ ] 10,001-15,000 TL
- [ ] 15,001 TL and over

APPENDIX C

THE QUESTIONNAIRE – TURKISH

Mobil Bankacılık Kullanımına Etki Eden Direnç Faktörlerinin Araştırılması

Merhaba,

Bu çalışma Boğaziçi Üniversitesi Yönetim Bilişim Sistemleri Bölümü yüksek lisans öğrencisi Sarp Kohen tarafından Doç. Dr. Ceylan Onay ve Prof. Dr. Aslıhan Nasır danışmanlıklarında yürütülen yüksek lisans bitirme tezi içeriğinde yapılan bir çalışmadır. Bu çalışma, Türkiye'de çevrimiçi bankacılık direncinin nedenlerini finansal okuryazarlık üzerinden belirlemeyi amaçlamaktadır.

Çalışmaya katılım tamamen gönüllülük esasında olup sizden yaklaşık 5 dakika ayırmanız beklenmektedir. Ankette sizden kimlik belirleyici hiçbir bilgi istenmemektedir. Cevaplar tamamen gizli tutulacak ve araştırmacılar tarafından değerlendirilecektir.

Eğer araştırmanın amacı ile ilgili verilen bu bilgiler dışında şimdi veya sonra daha fazla bilgiye ihtiyaç duyarsanız sarpkohen@gmail.com e-posta adresinden bize ulaşabilirsiniz. Araştırma tamamlandığında genel sonuçların sizinle paylaşılmasını istiyorsanız lütfen bizlere iletiniz.

Bu çalışmaya katıldığınız için şimdiden teşekkür ederiz.

* Required

1. **Email address** *

Boğaziçi Üniversitesi - Yönetim Bilişim Sistemleri Bölümü

Finansal Okuryazarlık

2. **Lütfen aşağıdaki ifadelerden her birine katılım derecenizi belirtiniz.** *
Mark only one oval per row.

	1. Kesinlikle Katılmıyorum	2. Katılmıyorum	3. Kararsızım	4. Katılıyorum	5. Kesinlikle Katılıyorum
Ekonomi ve Finans ile ilgili konuları iyi derecede anladığımı düşünüyorum.	◯	◯	◯	◯	◯
Günlük faaliyetlerimde (iş, hobi vb.) Ekonomi ve Finans ile ilgili konuları sıklıkla kullanıyorum.	◯	◯	◯	◯	◯
Ekonomi ve Finans göstergelerini (faiz, kurlar, enflasyon vb.) takip ederim.	◯	◯	◯	◯	◯

3. **Daha önce hiç otomatik ödeme talimatı verdiniz mi?** *
Mark only one oval.

◯ Evet
◯ Hayır

4. **Vergi, sigorta ve/veya emeklilik katkı payları gibi ödemeleri Bankanız üzerinden yapıyor musunuz?** *
Mark only one oval.

◯ Evet
◯ Hayır

5. **Geçtiğimiz 12 ay içerisinde düzenli olarak kullandığınız bankanızın, hesaplarınız ile ilgili bir hatasını fark ettiyseniz, hatanın düzeltilmesi için girişimde bulundunuz mu?** *
Check all that apply.

☐ Evet
☐ Hayır
☐ Fark Etmedim

6. **İnternet Bankacılığını ne sıklıkla kullanıyorsunuz?** *
Mark only one oval.

	1	2	3	4	5	
Hiç kullanmıyorum	◯	◯	◯	◯	◯	Her zaman kullanıyorum

7. **Mobil Bankacılığı ne sıklıkla kullanıyorsunuz?** *
Mark only one oval.

	1	2	3	4	5	
Hiç kullanmıyorum	◯	◯	◯	◯	◯	Her zaman kullanıyorum

8. **Mobil Bankacılık hizmeti sunan bankamı seçmeden önce alternatifler arasında araştırma yaptım.** *
Mark only one oval.

	1	2	3	4	5	
Kesinlikle katılmıyorum	◯	◯	◯	◯	◯	Kesinlikle katılıyorum

9. **Lütfen aşağıdaki cümleleri sizler için en uygun seçenek ile tamamlayınız.** *
Check all that apply.

	daha azdır.	aynıdır.	daha fazladır.	Bir fikrim yok
Mobil Bankacılıktaki ücret ve komisyonlar; Şubede alınan ücret ve komisyonlara göre	☐	☐	☐	☐
Mobil Bankacılıktaki mevduat faiz oranları; Şubede verilen mevduat faiz oranlarına göre	☐	☐	☐	☐

Mobil Bankacılık Kullanımı

10. **Lütfen aşağıdaki ifadelerden her birine katılım derecenizi belirtiniz.** *
Mark only one oval per row.

	1. Kesinlikle Katılmıyorum	2. Katılmıyorum	3. Kararsızım	4. Katılıyorum	5. Kesinlikle Katılıyorum
Mobil bankacılık servislerinin kullanımını kolay buluyorum.	◯	◯	◯	◯	◯
Mobil bankacılık servislerini kullanışlı buluyorum.	◯	◯	◯	◯	◯
Mobil bankacılık servislerinin kullanımını hızlı buluyorum.	◯	◯	◯	◯	◯
Mobil bankacılık hizmetlerindeki kullanım adımlarını anlaşılır buluyorum.	◯	◯	◯	◯	◯
Mobil bankacılık servislerinde değişen şifre uygulamasını kullanışlı buluyorum.	◯	◯	◯	◯	◯
Mobil bankacılığın alternatif bankacılık kanallarına göre bir avantajı olduğunu düşünmüyorum.	◯	◯	◯	◯	◯
Mobil bankacılık kullanımı finansal işlemlerimi takip etme imkânımı arttırıyor.	◯	◯	◯	◯	◯
Mobil bankacılığı kullanırken tutar bilgisini yanlış girmekten endişe ediyorum.	◯	◯	◯	◯	◯
Mobil bankacılığı öğrenmenin vakit aldığını düşünüyorum.	◯	◯	◯	◯	◯
Mobil bankacılığı kullanmanın vakit aldığını düşünüyorum.	◯	◯	◯	◯	◯
Mobil bankacılığı kullanırken internet bağlantımın kesilmesinden endişe ediyorum.	◯	◯	◯	◯	◯
Mobil bankacılık servisleri kişisel verileri gizli tutamıyor.	◯	◯	◯	◯	◯

	1. Kesinlikle Katılmıyorum	2. Katılmıyorum	3. Kararsızım	4. Katılıyorum	5. Kesinlikle Katılıyorum
Mobil bankacılık servislerini kullanırken kişisel bilgilerim başkaları tarafından çalınabilir.					
Mobil bankacılık şifrelerimin kaybolmasından ve/veya başkalarının eline geçmesinden endişe ediyorum.					
Gün içerisinde Banka şubesine gitmek ve banka çalışanları ile görüşmek güzel bir sosyal aktivite oluyor.					
Self servis hizmetleri Şubedeki bireysel müşteri hizmetlerine tercih ediyorum.					
Mobil Bankacılıktaki yeni teknolojileri genellikle kullanışlı olmaktan çok karışık buluyorum.					
Mobil bankacılık hizmetleri sunan bankaların daha yenilikçi olduğunu düşünüyorum.					
Mobil Bankacılık teknolojilerini kullanmaya başlamadan önce denemeyi tercih ederim.					
Mobil Bankacılık hizmetlerinin kullanımını deneyebilseydim mobil bankacılık hizmetlerini kullanma ihtimalim artardı.					
Mobil Bankacılık hizmetlerinin kullanımın demosunu izleyebilseydim mobil bankacılık hizmetlerini kullanma ihtimalim artardı.					

Demografik

11. **Cinsiyetiniz** *
Check all that apply.
- [ ] Erkek
- [ ] Kadın

12. **Medeni durumunuz** *
Check all that apply.
- [ ] Evli
- [ ] Bekar

13. **Yaş aralığınız** *
Check all that apply.
- [ ] 18-25
- [ ] 26-35
- [ ] 36-45
- [ ] 46-55
- [ ] 56 +

14. **Eğitim Durumunuz** *
Check all that apply.
- [ ] İlköğretim Mezunu
- [ ] Lise Mezunu
- [ ] Üniversite Mezunu
- [ ] Yüksek Lisans Mezunu
- [ ] Doktora ve üstü Mezunu

15. **Aylık Gelir Düzeyiniz** *
Check all that apply.
- [ ] 1,400 TL ve Altı
- [ ] 1,401 - 2,500 TL
- [ ] 2,501-5,000 TL
- [ ] 5,001-10,000 TL
- [ ] 10,001-15,000 TL
- [ ] 15,001 TL ve üstü

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