Journal of Business, Economics and Finance
Year: 2016 Volume: 5 Issue: 1

ADOPTION OF MOBILE PAYMENT SYSTEMS: A STUDY ON MOBILE WALLETS

DOI: 10.17261/Pressacademia.2016116555

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ABSTRACT

This study aims to understand the factors contributing to consumer attitude development towards and intention to use mobile payment systems. One of major mobile network operators' mobile wallet application in Turkey was used as a proxy of the mobile payment systems. Survey methodology is used to collect data from subscribers by stratified random sampling among two distinct groups (users and non-users). A total of 1395 questionnaires were collected from subscribers and analyzed using partial least squares structural equation modeling. The findings highlight the importance of ease of use and usefulness in attitude development. On the other hand, security concerns were found to have low level of effects on attitudes and use intentions. Effect of social influence was found to be insignificant among the users. There were differences between users' and non-users' perceptions and beliefs indicated by significant differences in the majority of the constructs employed in the study.

Keywords: Mobile payment, mobile wallet, innovativeness, mobile app, technology adoption.
JEL Classification: M30, M31, M39

1. INTRODUCTION

New technologies and digitalization of life are shaping the ways of doing business as well as the behaviors of consumers. Finding opportunities in the dynamic business scape and benefiting from them using new technologies is a major area of focus for organizations in creating value. In this new digital era, mobile devices have become one of the most prominent consumer products ever to be launched. These devices and the services provided by them rapidly became basic necessities of daily life throughout the world. The increasing popularity of the mobile devices around the globe may be attributed to their omni-present access to a wide-range of services (communication, access to information, entertainment, or commerce). Mobile devices create value in a multitude of dimensions for their users. Another trend emerged with the increasing mobile device adoption is the move towards mobile devices in accessing the Internet. The mobile traffic is replacing desktop reach as indicated by a research by ComScore (2014), 60% of the consumers in the U.S. prefer mobile devices as their primary method of Internet access. Another indicator of the increasing importance of these devices is the finding that 65% of the emails are opened on mobile devices (Burdge, 2014). These changes in behavior revealed by the aforementioned statistics from developed countries have also been spilling over to developing countries. For instance, in Turkey 28.4% Internet page views originated from mobile devices as of June 2015, and time spent on mobile devices increased by 115% annually between June 2015 and 2014 (IAB Turkey, 2015).

Increasing adoption of mobile devices and e-commerce led to the emergence of m-commerce. Use of mobile devices for buying products and services is getting more common every year. According to a research on 3,000 retailers by Criteo in 2015, mobile devices accounted for 31% of e-commerce transactions in the U.S. (that corresponds to a 15% annual increase) and half of the transactions in Japan and South Korea (Criteo, 2015).

This increasing popularity is also evident in the recent report by IBM analyzing the so-called Black Friday sales in the U.S. IBM's report (IBM Commerce, 2015) revealed that 40% of the online transactions and nearly 60% of the online traffic originated from mobile devices. The increase in the use of mobile devices in e-commerce coupled with the popularity of mobile phones also led to the emergence of mobile payment tools. Within this context mobile payment (MP) can be defined as ''payments for goods, services, and bills with a mobile device such as mobile phone etc. by taking advantage of wireless and other communication technologies'' (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008). A similar definition by Pousttchi (2008) highlights the initiation, authorization, or completion processes of payment via mobile communication techniques and devices. In agreement with these definitions, MP is considered as an important alternative method of payment to credit cards and cash. MP systems are expected to be major tools in various transactions owing to the increasing popularity of mobile devices and rapidly emerging mobile commerce activities (Ondrus & Pigneur, 2006). Mobile payment systems around the world haven't reached mass adoption however in certain developed countries they are used by a significant portion of active mobile users. According to a report from 2011, 33% of active mobile users in Japan have used their mobile devices for payment in the last six months (Vodafone, 2013). A more recent report by Capgemini forecasts an annual growth of 60.8% through 2015 as mobile devices have become common devices for shopping online. Nearly 80 million U.S. consumers, which corresponds to half of digital buyers in this country are expected to make purchases using mobile devices (Capgemini & RBS, 2015). Forrester forecasts mobile payments in the U.S. to reach 142 billion US$ by 2019 up from 52 billion US$ in 2014 (Carrington, 2014). The increasing popularity of mobile payment systems in developed countries is expected to reflect into developing countries. In fact, the mobile payments in China increased by 170% and reached 4.5 billion transactions in 2013 according to Capgemini and RBS (2015). Another developing country of interest with a promising mobile market is Turkey. This country offers an attractive market to mobile service providers with a young rapidly developing market (half of the population aged under 30) and around 72 million mobile subscriptions. This corresponds to over 90% mobile penetration rate as of 2015 Q2. Moreover, the penetration rates exceed 100% when the population aged 0-9 are excluded from the calculations (ICTA, 2015). In accordance with the high adoption rates of mobile devices, the mobile applications market is also thriving in Turkey, which ranked among the most rapidly growing markets with 60% annual increase rate in application download numbers in 2014 (App Annie & MEF, 2014). Within this booming market mobile payment systems are also getting the attention of mobile users. As of 2015, all the three mobile operators active in the country offer various mobile payment systems, first of which was launched in 2009.

The alternative mobile payment forms are increasing worldwide with the addition of Apple and Samsung Pay to the ones offered by telecom companies and financial institutions. Understanding motivations and barriers of adoption will help all the participants of the mobile payment ecosystem ranging from smart phone producers to banks and small and large vendors to design sustainable strategies.

1.1.Mobile Wallets

New technologies and digitalization of life are shaping the ways of doing business as well as the behaviors of consumers. Finding opportunities in the dynamic business scape and benefiting from them using new technologies is a major area of focus for organizations in creating value. In this new digital era, mobile devices have become one of the most prominent consumer products ever to be launched. These devices and the services provided by them rapidly became basic necessities of daily life throughout the world. The increasing popularity of the mobile devices around the globe may be attributed to their omni-present access to a wide-range of services (communication, access to information, entertainment, or commerce). Mobile devices create value in a multitude of dimensions for their users. Another trend emerged with the increasing mobile device adoption is the move towards mobile devices in accessing the Internet. The mobile traffic is replacing desktop reach as indicated by a research by ComScore (2014), 60% of the consumers in the U.S. prefer mobile devices as their primary method of Internet access. Another indicator of the increasing importance of these devices is the finding that 65% of the emails are opened on mobile devices (Burdge, 2014). These changes in behavior revealed by the aforementioned statistics from developed countries have also been spilling over to developing countries. For instance, in Turkey 28.4% Internet page views originated from mobile devices as of June 2015, and time spent on mobile devices increased by 115% annually between June 2015 and 2014 (IAB Turkey, 2015).

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2. LITERATURE REVIEW

A considerable amount of research is dedicated to understand user motivation and behavior in a wide range of settings related to new technologies and systems. In extant literature, the theory of reasoned action (TRA) by Fishbein and Ajzen (1975), the Theory of planned behavior (TPB) by Ajzen (1991) and the Technology Acceptance Model (TAM) by Davis (1989) emerge as the most popular models explaining the attitudes and behavior. In TRA attitude and subjective norms were accepted as the major factors affecting behavioral intention (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). Attitude in this context was defined as 'the degree of a person's favorable or unfavorable evaluation or appraisal of the behavior in question'. TRA is extended into TPB by Ajzen with the addition of perceived behavioral control construct that is defined as "the perceived ease or difficulty of performing the behavior". In TPB, which also assumes individuals are rational decisions makers, the behaviors of individuals are assumed to be determined by intention to perform the particular behavior (Ajzen, 1991). On the other hand, in TAM by Davis (1989), which was founded upon TRA, individuals' intention to adopt a new information technologies (IT) is accepted to be determined by perceived usefulness and

perceived ease of use. Albeit some criticism from researchers TAM is probably the most widely used model in studies that try to explain adoption of new technology and information systems. TAM in its basic form was found to fare better than TRA and TPB and also benefited from the inclusion of various other constructs to explain user adoption intention in a wide range of technology products (Hong, Thong, & Tam, 2006). The popularity of TAM and many variations developed upon it led to the development of Unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris, B.Davis, & Davis, 2003). This model founded upon the aforementioned models introducing similar constructs with slightly different definitions and different names. Consequently effort expectancy, performance expectancy, social influence and facilitating conditions are considered as factors affecting behavioral intention in UTAUT.

The research on mobile payments and mobile wallets have benefited from the relevant models highlighted in foundations section. Unfortunately most of the studies on mobile payment have rather limited sample sizes ranging between 200 and 300. This creates an important research gap and a need to repeat and confirm the findings to establish generalizability of the findings. The relevant studies on mobile payment in the literature revealed the following:

- Pousttchi and Wiedemann study on consumer's use intention of mobile payment systems found performance expectancy, effort expectancy, facilitating conditions and social influence as significant factors affecting intentions (Pousttchi & Wiedemann, 2007).
- Chen and Nath found out that perceived transaction speed, transaction convenience, compatibility, security and privacy concerns have significant effects on adoption intention (Chen & Nath, 2008).
- Shin, in a study on mobile wallets found that in addition to perceived security, social influence and trust, the TAM constructs ease of use and perceived usefulness have significant effects on users' attitudes towards mobile wallets (Shin, 2009).
- Yang et.al. found social influence, perceived risk, compatibility, personal innovativeness, and relative advantage as significant predecessors of intention to adopt mobile payment systems (Yang, Lu, Gupta, Cao, & Zhang, 2012).
- Liébana-Cabanillas found ease of use, external influences, usefulness, trust and risk, and costs as significant factors affecting attitudes and use intentions of mobile payment systems (Liébana-Cabanillas, Sánchez-Fernández, & Muñoz-Leiva, 2014).
- Phonthanikitithaworn and Fong found compatibility, subjective norms, perceived trust and perceived cost as significant factors that have impacts on intention to adopt in their study in Thailand (Phonthanikitithaworn, Sellitto, & Fong, 2015).

All the relevant factors that were found to affect the attitudes and use intentions in mobile services that are incorporated into the present study are defined and analyzed in depth in the following sections.

Personal traits (innovativeness), perceptions on mobile payment system (ease of use, usefulness, compatibility, and risks) and extrinsic motivators (rewards) are considered as antecedents of attitudes and intention to adopt mobile payment systems.

2.1.Personal Innovativeness (INO)

Innovativeness is defined as "willingness of an individual to try out any new information technology" (Midgley & Dowling, 1978) and also refers to the extent to which a customer adopts an innovation earlier than others in accordance with the diffusion of innovations theory (Rogers, 2003). Personal innovativeness, similarly, denotes the inclination of an individual to try out new products and technologies (Agarwal & Prasad, 1998; Chang, Cheung, & Lai, 2005). Innovative individuals are more open to new technologies and intent to try them more than their non-innovative counterparts. To test this effect in various IT systems applied studies were carried out and INO was found to affect adoption behavior of various innovations in IT systems (Agarwal & Prasad, 1998; Chang & Chin, 2011) in online shopping environments (Blake, Neuendorf, & Valdiserri, 2003) and also mobile services (Zarmpou, Saprikis, Markos, & Vlachopoulou, 2012). Individuals with high personal innovativeness are more curious, more open to trying new things (Kim, Mirusmonov, & Lee, 2010). Mobile payment systems, a new technology, can accurately be considered in its initial life stages as a service product. It

is intuitive to expect highly innovative consumers to try and adopt this new technology in line with the diffusion of innovations theory. Furthermore, highly innovative users will have more profound knowledge of the mobile payment system's features and use it more easily. Adopting this perspective, high personal innovativeness is expected to lead to positive attitudes towards and use intention of mobile wallets, thus the following were developed:

H_1: Personal innovativeness has a positive effect on mobile wallet's perceived ease of use.
H_2: Personal innovativeness has a positive effect on attitudes towards the mobile wallet.
H_3: Personal innovativeness has a positive effect on use intention for the mobile wallet.

2.2.Perceived Ease of Use (EAS)

One of the major factors concerning consumers' acceptance of a system is how easy they perceive the system to use. It is considered as one of the dimensions that have the largest influence on the acceptance of new technologies (Davis, Bagozzi, & Warshaw, 1992; Moore & Benbasat, 1991). The perceived ease of use refers to the individual's perception that using a certain system is effortless or easy to do (Davis, 1989). Depending on TAM developed by Davis et al. (Davis et al., 1992; Davis, 1989), if a system is perceived as easy to use, it also provides more usefulness to its users (Davis et al., 1992). This is related to instrumentality of the ease of use construct and approved by various researchers in mobile services context (Liébana-Cabanillas et al., 2014; Phonthanikitithaworn et al., 2015; Wang, Wang, Lin, & Tang, 2003). As proposed in related theories and confirmed in empirical studies, perceptions on a technological system's ease of use has an impact on users' attitudes towards that system and also their use intentions (i.e. Gefen, Karahanna, & Straub, 2003; Teo, Lim, & Lai, 1999). This construct have also appeared in other models in relevant literature, for instance the meta-analysis by Tornatzky and Klein (1982) revealed complexity (opposite of the ease of use construct) as a factor affecting adoption behavior. Also UTAT, a model developed on and after TAM accepts "effort expectancy" again a similar construct to EAS as the major antecedents of attitude and adoption behavior. In MP applications, the users should find the system easy enough to use compared to their current payment methods to adopt it, otherwise may not be worth trying and adopting a new payment system. Consequently, EAS should be established in a better way or at least on par with comparative payment methods such as credit cards. In the mobile payments setting, this factor appeared to be one of the most important elements in providing value and shaping attitudes (Dahlberg & Mallat, 2002; Liébana-Cabanillas et al., 2014; Ovum, 2012).

H_4: Perceived ease of use has a positive effect on perceived usefulness of the mobile wallet.

H_5: Perceived ease of use has a positive effect on attitudes towards mobile wallet.

2.3.Perceived Compatibility (CMP)

Compatibility in the related literature is defined as the degree to which using a new system (an innovation) is perceived as consistent with the existing values, beliefs, experiences, and needs of individuals (Moore & Benbasat, 1991; Schierz, Schilke, & Wirtz, 2010). Compatibility is considered as an important element of technology adoption models and incompatibility of the individual's values with the innovation is accepted to impede the adoption (Rogers, 2003). Moore and Benbasat (1991) showed that perceived relative advantage, compatibility, complexity were among the antecedents of technology acceptance behavior. These three dimensions were also found to be three significant elements of innovation characteristics related to adoption by Tornatzky and Klein (1982). Previous research on technology adoption has revealed positive effects of compatibility on attitudes towards and perceived usefulness of various information systems (Karahanna, Agarwal, & Angst, 2006; Schierz et al., 2010). These effects were also observed in mobile commerce, mobile and financial services contexts (Chen & Nath, 2008; Dash, Bhusan, & Samal, 2014; Mallat, Rossi, Tuunainen, & Öörni, 2009; Wu & Wang, 2005; Yang et al., 2012). Moreover, Chen and Nath (2008) found compatibility to have the strongest effect on acceptance of mobile payment systems. We expect people's lifestyles to affect their view towards MP services. An individual preferring cash as his/her major payment method due to the lifestyle or values will have low compatibility with MP systems. Consequently it is expected for that individual to develop a negative attitude towards these systems (Shatskikh, 2013). Compatibility is expected to affect consumer's attitudes towards MP systems and use intentions (Kim et al., 2010; Lu, Yang, Chau, & Cao, 2011):

H_6: Perceived compatibility has a positive effect on perceived usefulness of the mobile wallet.
H_7: Perceived compatibility has a positive effect on attitudes towards the mobile wallet.
H_8: Perceived compatibility has a positive effect on use intention for the mobile wallet.

2.4.Perceived Usefulness (USE)

The lack of actual benefits or a clear understanding of these benefits offered by mobile payment systems is one of the major barriers of mass adoption of mobile payment systems (Shatskikh, 2013). When a user finds a system to be useful he or she develops a positive attitude towards it, furthermore if able, he or she uses the system to obtain the perceived benefits. This is one of the underlying assumptions of TAM and the usefulness offered by a system / new technology is operationalized as the perceived usefulness construct in the relevant literature (Davis, 1989; Davis et al., 1992). This construct is also incorporated into similar models, one being relative advantage by Tornatzky and Klein (1982) another being performance expectancy by Venkatesh et al. (2003). Perceived usefulness was originally defined by Davis (1989) as "the degree to which a person believes that using a particular system would enhance his or her performance", another definition more relevant to the present study is that "the use of a given technology should be useful for someone in achieving a particular result" (Vijayasarathy, 2004). In different contexts usefulness of a system/service appeared among the key factors shaping attitudes and also explaining use intentions (Davis, 1989; Jackson, Chow, & Leitch, 1997; Kim & Lee, 2011; Leng & Lada, 2011; Malhotra, Galletta, & Kirsch, 2008; Taylor & Todd, 1995). Within the mobile payments context, customers indicate new payment solutions as useful if these systems make their lives easier and this construct incorporates the performance (Davis, 1989; Moore & Benbasat, 1991) and mobility factors (Arvidsson, 2013). Consequently we hypothesize that:

H_9: Perceived usefulness has a positive effect on attitudes towards the mobile wallet.

2.5.Perceived Security (SEC)

Security concerns are a hindrance to the use of many paid digital services and e-commerce activities (Linck, Pousttchi, & Wiedemann, 2007; Pousttchi & Wiedemann, 2007). Accordingly, concerns regarding the security of mobile payment systems appear among the key factors affecting attitudes (Liébana-Cabanillas et al., 2014; Linck et al., 2007; Shatskikh, 2013). The objective security of the mobile payment systems can be considered not inferior to other payment methods such as online credit cards. Use of various technologies including cryptography provides high-level of security in related transactions (Crowe & Tavilla, 2012). However concerns on the perceived security of mobile payment systems, not the actual security, create a barrier in the adoption of these systems (Kim et al., 2010; Linck et al., 2007; Ovum, 2012). Losing mobile phones, which is not an uncommon occurrence and identity theft are the major concerns of the consumers (Gross, Hogarth, & Schmeiser, 2012). In addition, number of parties involved including in mobile payments such as banks, telecom companies, numerous merchants also may lead to increases in the privacy and security related concerns among populace. The effect of risk perceptions and the security offered to counter these concerns within the mobile payment system are incorporated into the study by the perceived construct. The following two assumptions were proposed to link perceived security to attitudes and use intentions:

H_{10}: Perceived security has a positive effect on attitudes towards the mobile wallet.
H_{11}: Perceived security has a positive effect on use intention for the mobile wallet.

2.6.Rewards (REW)

Rewards, in the form of tangible benefits (monetary incentives, coupons, free sample gifts, sweepstakes etc.), can motivate consumers. This type of motivation is extrinsic (Davis et al., 1992) and applies to certain behavior of individuals that aims to achieve particular outcomes. Consumers are willing to make an effort to obtain these rewards/tangible incentives (Kim & Han, 2014; Varnali, Yilmaz, & Toker, 2012). In terms of marketing communication and advertisements, it was observed that customers' concentration on ads increase when the message includes benefits (Kim & Han, 2014). It is assumed by scholars that the extrinsic motivation elements are internalized (taking in values and goals as one's own) in the long run (Deci, Vallerand, Pelletier, & Ryan, 1991; Ryan & Deci, 2000). In this way the externally regulated behavior may become internally regulated by consumers through the use of penalties or rewards (Ryan & Connell, 1989). In mobile payment context, the

tangible benefits offered for downloading and using mobile wallets (i.e. free value-added services, discounts, internet access etc.) may lead consumers to develop positive attitudes and improve use intentions. Adopting this perspective, the rewards construct was incorporated into the model to reflect the tangible incentives and assumed to have positive effect on attitudes and use intentions.

H_{12}: Rewards have a positive effect on attitudes towards the mobile wallet.
H_{13}: Rewards have a positive effect on use intention for the mobile wallet

2.7.Social Influence (SOC)

The beliefs of the people important to an individual including family, friends and reference groups have effects on individuals' intention to behave in a certain way. This statement as one of the postulations of TRA creates the subjective norms, which corresponds to social influence concept in the context of the present study (Ajzen & Fishbein, 1980). When consumers encounter a new technology product, they may feel a certain uncertainty regarding the product and the consequences of its use. This uncertainty may be minimized by getting the opinions of others that an individual value. In mobile payment systems, this effect may be defined as the way the individuals' social environment perceives MP systems (Schierz et al., 2010). This concept in its classical form was defined by Fishbein & Ajzen (1975, p. 302) as "the person's perception that most people who are important to him think he should or should not perform the behavior in question". Empirical evidence confirming this assumption was found in the literature on various new technology systems and services settings (Hu, Poston, & Kettinger, 2011; Leng & Lada, 2011; Venkatesh & Davis, 2000) and in mobile services context (Liébana-Cabanillas et al., 2014; Lu, Yao, & Yu, 2005; Oliveira, Faria, Thomas, & Popovič, 2014). In line with the theoretical foundations and relevant studies SOC is expected to affect attitudes towards MP systems and following is proposed:

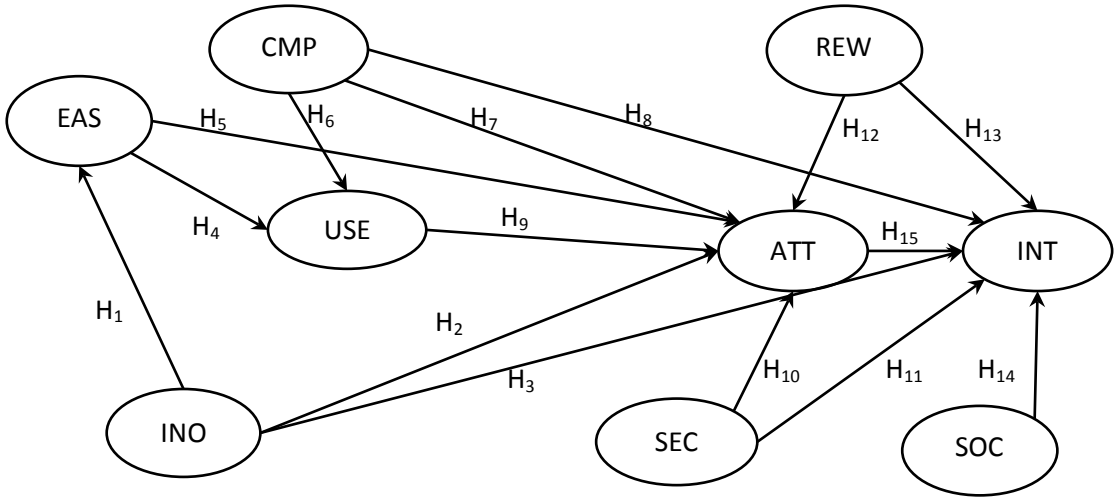
H_{14}: Social influence has a positive effect on attitudes towards the mobile wallet.

3. DATA AND METHODOLOGY

The research model developed using the hypotheses based on theoretical foundations is visualized in Figure 1.

To test the model and uncover the relationships between the constructs, the mobile wallet application of one of the leading mobile network operators in Turkey was chosen. The network provider helped in creating the resources needed to carry out the research on a large scale by employing a global professional market research company and also providing the user database. Respondents were asked to indicate the extent of their agreement with a series of statements on a five-point Likert scale (1 = "strongly disagree" and 5= "strongly agree"). The constructs and scales used in the study are summarized in Table 1 and also provided in detail in Appendix-1.

Figure 1: Proposed Model



INO: Personal Innovativeness, SEC: Perceived Security, EAS: Ease of Use, COM: Compatibility, USE: Perceived Usefulness, SOC: Social Influence, REW: Rewards, ATT: Attitude, INT: Use Intention

Table 1: Scales and Constructs

Construct	# of Items	Source(s)
Attitude	4	(Ajzen, 1991)
Compatibility	4	(Agarwal & Prasad, 1998; Moore & Benbasat, 1991; Plouffe, Huland, & Vandenbosch, 2001)
Perceived Ease of Use	5	(Davis, 1989; Venkatesh & Davis, 2000)
Personal Innovativeness	6	(Agarwal & Prasad, 1998)
Perceived Security	5	(Luarn & Lin, 2005; Parasuraman, Zeithaml, & Malhotra, 2005)
Social Influence	4	(Ajzen, 1991; Venkatesh & Davis, 2000)
Perceived Usefulness	6	(Bhattacherjee, 2001; Van der Heijden, 2004)
Rewards	3	Author generated
Use Intention	4	(Bhattacherjee, 2001; Venkatesh & Davis, 2000)

3.1. Data Collection & Sampling

Stratified random sampling was used in selection of the sample. The two basic groups among the population were 54,000 registered downloaders of the MP application and over 10 million registered users that gave prior permission to be contacted by the network provider company. Targeted sample sizes were selected as 700 for the users and 750 for non-users with 95% confidence level and 3.68 and 3.58 confidence intervals respectively. The research was implemented by GfK Research, one of the major global marketing research firms active in Turkey. The contact data on potential respondents selected randomly from the telecom operators' database were used to carry out the study. The user database was contacted via computer aided telephone interview (CATI) method and data was collected from the respondents with a maximum interview length of 20 minutes. Ordering of the questions was randomized each time a call was made to reduce respondent fatigue effect. As an outcome of the CATI survey, 1395 questionnaires were collected. A total of 3940 people declined to participate in the research and an additional 483 interviews could not be completed fully (line dropped or survey takes too long). After a careful screening process to eliminate low quality surveys (all answers coded the same etc.) a total of 1305 questionnaires; 639 from mobile wallet users and 666 from non-users with smartphones were used in the analysis. These numbers are over the recommended sample size of 548 for SEM analysis of the proposed model as calculated by Daniel Soper's "A-priori Sample Size Calculator" (Soper, 2016).

Basic demographic information of these two sample groups is presented in Table 2. It can be noticed that the user profile is mostly male and younger on average than non-users. Overall the sample is well-educated and young, which is a result of excluding mobile phone users that don't have smartphones.

Table 2: Main Characteristics of the Sample

Demographic	Value	Users (N=639)		Non-Users (N=666)	
		Frequency	Percent	Frequency	Percent
Age	18-24	192	30%	88	13%
	25-32	259	41%	256	38%
	33-47	164	26%	261	39%
	48+	24	3%	62	9%
Gender	Male	590	92%	233	35%
	Female	50	8%	434	65%
Education	Elementary & Middle School	90	14%	130	19%
	High School	291	45%	259	39%
	University	224	35%	221	33%
	Graduate Degree	35	5%	57	9%
Employment Status	Working	507	79%	482	72%
	Not Working	133	21%	185	28%
Socio-Economic Status	A/B	224	35%	268	40%
	C1	209	33%	188	28%
	C2	169	26%	159	24%
	D/E	38	6%	51	8%

4. FINDINGS AND DISCUSSIONS

The descriptive statistics of the data collected, which are presented in Appendix-2 were examined before carrying out the path analysis. An important finding of descriptive statistics analysis was the detection of non-normality in the data. On average 27 out of 34 items showed significant Kurtosis and 23 items showed significant Skewness. To handle the detected non-normality, the data collected was analyzed using a component based partial least squares structural equation modeling (PLS-SEM) application that does not assume normal distributions. PLS technique among SEM tries to maximize the explained variance of the indicators in the model instead of maximizing the co-variation among all indicators. This approach is considered a useful technique for prediction-oriented analysis where the research aims to predict key target constructs / key driver constructs or testing an extension of an existing theory (Anderson & Gerbing, 1988; Hair, Ringle, & Sarstedt, 2011; Henseler, Ringle, & Sinkovics, 2009). These are in parallel with the aims of the present study. PLS have gained popularity among other SEM applications due to various advantages such as ability to work with formative constructs or non-normal data with relatively small sample sizes (Ringle, Sarstedt, & Straub, 2012). The significance of loadings and path coefficients were assessed by a non-parametric method, the bootstrap procedure, due to the fact that parametric significance tests cannot be applied to PLS-SEM (Davison & Hinkley, 1997) to test the significance of estimated path coefficients. In this approach subsamples are created from the original dataset with drawing random observations and then each subsample is used to estimate the model. This process was repeated 3,000 times in the present study.

As the first step of SEM analysis, the validity and reliability of the measures in the study were evaluated and the findings are provided in Table 3. First of all the internal consistency reliability of the model is tested using composite reliability (CR) and Cronbach's alpha (CA), all of which were higher than 0.7 as suggested in literature (Carmines & Zeller, 1979; Fornell & Larcker, 1981; Nunnally, 1978). This led to the conclusion that the internal consistency reliability conditions are met. Following the initial analysis, a total of five indicators, one of each from EAS, INO, INT and two from SEC constructs were left out of further analysis due to low outer loadings (Churchill, 1979). As the second step, the convergent validity of the model was evaluated using

average variance extracted (AVE) and the indicators' loadings on their own constructs (outer loadings). The discriminant validity was assessed by comparing the indicators' loadings on their own constructs to the loadings on all other constructs (cross-loadings). The loading data, which is presented in the Appendix-2, reveals that the outer loadings were higher than cross-loadings for all the items. Square root of AVE was compared to the between-item-correlations (Fornell & Larcker, 1981) to assess the validity. All the outer loadings were greater than recommended level of 0.50; AVE was also above the recommended 0.50 value and the inter-item correlations were lower than the square root of AVE (Hair, Tomas, Hult, Ringle, & Sarstedt, 2013). These findings led to the conclusion that the convergent and discriminant validity conditions were satisfied.

Table 3: Quality Criteria, Construct and Discriminant Validity Analysis for User Sample

Latent Var.	AVE	CR	CA	Avg. I.I.C.	ATT	CMP	EAS	INO	INT	REW	SEC	SOC	USE
ATT	0.854	0.959	0.943	0.458	**0.924**								
CMP	0.656	0.883	0.821	0.438	0.647	**0.810**							
EAS	0.638	0.876	0.812	0.411	0.686	0.558	**0.798**						
INO	0.581	0.873	0.818	0.201	0.269	0.285	0.255	**0.762**					
INT	0.610	0.859	0.809	0.434	0.746	0.574	0.566	0.274	**0.781**				
REW	0.671	0.800	0.540	0.335	0.480	0.552	0.384	0.204	0.451	**0.819**			
SEC	0.615	0.864	0.802	0.380	0.585	0.532	0.490	0.265	0.530	0.368	**0.784**		
SOC	0.757	0.926	0.893	0.320	0.452	0.485	0.428	0.139	0.441	0.384	0.450	**0.870**	
USE	0.672	0.909	0.871	0.445	0.747	0.707	0.623	0.250	0.641	0.504	0.478	0.479	**0.820**

* The square root of AVE is provided on the diagonal. Avg-IIC: Average Inter-item correlations.

Table 4: Quality Criteria, Construct and Discriminant Validity Analysis for Non-User Sample

Latent Var.	AVE	CR	CA	Avg. I.I.C.	ATT	CMP	EAS	INO	INT	REW	SEC	SOC	USE
ATT	0.849	0.957	0.940	0.498	**0.921**								
CMP	0.754	0.902	0.836	0.495	0.665	**0.868**							
EAS	0.643	0.878	0.817	0.470	0.627	0.601	**0.802**						
INO	0.621	0.891	0.847	0.287	0.361	0.375	0.389	**0.788**					
INT	0.812	0.928	0.884	0.493	0.797	0.653	0.588	0.397	**0.901**				
REW	0.740	0.851	0.654	0.431	0.548	0.618	0.532	0.391	0.534	**0.860**			
SEC	0.620	0.866	0.799	0.463	0.615	0.621	0.588	0.275	0.580	0.475	**0.787**		
SOC	0.751	0.923	0.889	0.341	0.500	0.506	0.415	0.169	0.466	0.373	0.474	**0.867**	
USE	0.806	0.943	0.920	0.497	0.735	0.721	0.697	0.374	0.676	0.651	0.618	0.404	**0.898**

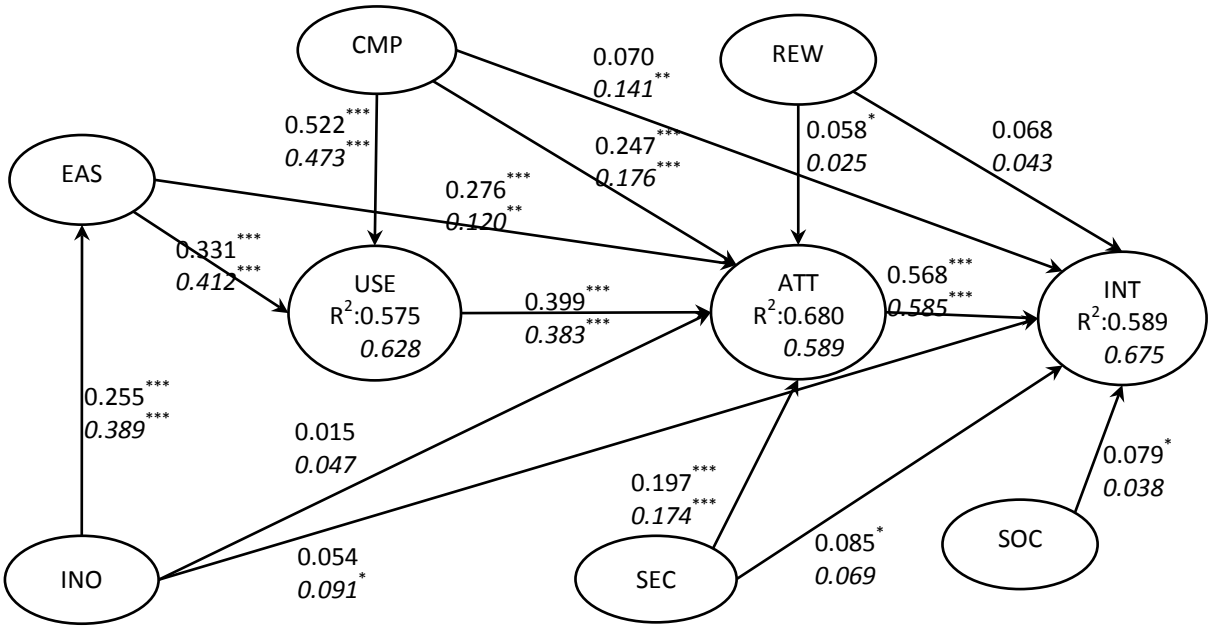
* The square root of AVE is provided on the diagonal. Avg-I.I.C.: Average Inter-item correlations.

After confirming the validity and reliability of the analyzed model, the path model results are evaluated. The lack of a universal good-of-fit criteria for PLS-SEM analysis lead to the use of coefficients of determination (R^2), significance of the path coefficients and predictive relevance (Q^2) criteria to evaluate the quality of the model as suggested by Hair et al. (Hair et al., 2013). The hypotheses related path coefficients and their significance for both groups are visualized in Figure 2 and also provided in Table 4.

R^2 of ATT construct was calculated 0.680 for users and 0.612 for non-users. These figures indicate high level of predictive accuracy for the proposed model (Hair et al., 2013). Stone-Geisser's Q^2 value (Geisser, 1974; Stone, 1974) was calculated using blindfolding procedure to evaluate the predictive power of the model. In blindfolding procedure the sample is reused by omitting every nth data point, in this case 7 was used as omission distance. With the blindfolding procedure, each data point of the indicators of selected latent variables has been removed from the dataset and then predicted using the model. In this way the blindfolding procedure compares the original values in the sample with the predicted values of a construct (Henseler et al., 2009). When the prediction error is small (the predicted and the original values are close to each other), the

path model shows high predictive accuracy (Hair et al., 2013). As an outcome of the calculations the Q^2 values obtained for ATT among users were 0.576 and 0.516 for non-users. The same figures for INT were calculated as 0.371 for users and 0.539 for non-users. All the values exceeding 0.350 suggest large predictive relevance for the model (Hair et al., 2013; Henseler et al., 2009).

Figure 2: Path Analysis Results for Users and Non-users



*p ≤ 0.05; **p ≤ 0.01; ***p ≤ 0.001. Italicized text denotes results for non-users.

Four hypotheses among the users and five among non-users out of the fifteen tested were rejected as an outcome of the path analysis. The expected effects of INO on ATT and REW on INT were not detected for both groups. In addition, the direct effects of INO and CMP on INT were insignificant among users and the effects of REW, SEC and SOC on INT were insignificant among non-users. All the effects detected were positive; consequently increases/improvements in a construct lead to improvements in the related constructs. When the strength of the effects were analyzed, the largest direct effect on ATT was observed in usefulness construct for both groups. This effect is followed by ease of use for users and compatibility for non-users in terms of strength. CMP appeared as the strongest contributor affecting the USE construct. EAS appeared as the construct creating the second strongest effect on USE and also the fourth largest effect on ATT.

To better evaluate the results and understand the strength of a construct's effect on another construct, the total effects between constructs were calculated and presented in Table 6. The total effects were obtained adding indirect effects through other paths into the path coefficients (direct effects). When the total effects were analyzed, all the tested effects were found to be significant for the user group. On the other hand, the effects of REW on ATT and INT in addition to the effect of SOC on INT were found to be insignificant for the non-user group. The largest total effects on ATT were observed in EAS, USE and CMP constructs for the user group. Ordered by their strength USE, CMP and EAS were the three constructs with highest effects on ATT towards mobile wallet in the non-user group. CMP's effect on ATT was partially generated by an indirect effect through USE construct.

INT was dominantly affected by ATT in both groups as expected. The other factors of note that affect INT were CMP, USE and EAS for users and CMP and USE for non-users. The effect of INO on ATT and INT were moderated by EAS construct for both sample groups. SEC appeared as a significant factor that has an impact on ATT and INT for the both groups. However the strength of this factor on ATT and INT were less than the aforementioned

three constructs. SEC appeared as the factor with the fourth or fifth largest effect on ATT and INT for both groups. CMP's effect on ATT and INT were partly generated by the indirect effect through USE construct.

Table 5: Paths and Hypothesis Testing

Hyp.	Path	Users			Non- Users			Users vs. Non-Users		
		Path Coef.	St.Dev.	t- stat.	Path Coef.	St.Dev.	t-stat	|Path coef. difference|	t-value	p-value
H_1	INO->EAS	0.255	0.042	6.071	0.389	0.040	9.735	**0.134**	**2.321**	**0.021**
H_2	INO->ATT	0.015	0.026	0.572	0.047	0.034	1.380	0.032	0.747	0.455
H_3	INO->INT	0.054	0.055	1.643	0.091	0.028	3.290	0.037	0.857	0.391
H_4	EAS->USE	0.331	0.041	8.022	0.412	0.038	10.892	0.081	1.451	0.147
H_5	EAS->ATT	0.276	0.037	7.407	0.120	0.046	2.589	**0.156**	**2.624**	**0.009**
H_6	CMP->USE	0.522	0.036	14.528	0.473	0.034	13.895	0.049	0.999	0.318
H_7	CMP->ATT	0.247	0.037	6.646	0.176	0.048	3.658	0.106	1.716	0.086
H_8	CMP->INT	0.070	0.044	1.576	0.141	0.043	3.322	0.071	1.162	0.246
H_9	USE->ATT	0.399	0.047	8.464	0.383	0.062	6.203	0.016	0.204	0.838
H_{10}	SEC->ATT	0.197	0.031	6.281	0.174	0.042	4.167	0.023	0.442	0.658
H_{11}	SEC->INT	0.085	0.041	2.097	0.069	0.039	1.762	0.016	0.264	0.769
H_{12}	REW->ATT	0.058	0.029	2.005	0.025	0.034	0.748	0.033	0.731	0.465
H_{13}	REW->INT	0.068	0.038	1.797	0.043	0.034	1.277	0.025	0.480	0.631
H_{14}	SOC->INT	0.079	0.034	2.327	0.038	0.029	1.285	0.041	0.924	0.356
H_{15}	ATT->INT	0.568	0.048	12.165	0.585	0.042	14.004	0.017	0.260	0.795

$^{*}p \le 0.05$; $^{**}p \le 0.01$; $^{***}p \le 0.001$. Greyed out text indicates insignificant paths.

The differences in paths for the two sample groups were assessed by two approaches to test for potential differences in attitudes and use intentions formation. The first one is a parametric approach offered by Keil et al. (2000) and the latter is a non-parametric approach based on bootstrapping results offered by Henseler et al. (2009). Both methods are explained briefly below, for a detailed explanation please see Sarstedt et al. (2011). In the first approach, the path coefficients and standard errors were used to test for differences. In the latter approach, each bootstrapping result (path coefficient) of the first group is compared to the second groups' all other bootstrapping results. This process leads to 9 million comparisons per path between groups for 3,000 bootstrapping cases. Both approaches led to the same conclusion highlighted in Table 4. Only two paths; EAS towards ATT and INO towards EAS, were significantly different at 95% confidence level. The remaining 13 paths were not significantly different between two sample groups, which can also be interpreted as the two structural models were fairly similar to each other.

Table 6: Total Effects

	Users			Non-Users		
Path	**Direct Effect**	**St. Dev.**	**t- stat.**	**Total Effect**	**St.Dev.**	**T-stat**
ATT -> INT	0.568	0.052	10.929	0.585	0.042	14.004
CMP -> ATT	0.279	0.038	7.415	0.357	0.045	7.868
CMP -> INT	0.228	0.043	5.295	0.350	0.046	7.586
CMP -> USE	0.522	0.036	14.436	0.473	0.034	13.895
EAS -> ATT	0.408	0.038	10.624	0.278	0.045	6.222

EAS -> INT	0.232	0.030	7.758	0.163	0.028	5.741
EAS -> USE	0.331	0.041	8.022	0.412	0.038	10.892
INO -> ATT	0.119	0.032	3.741	0.155	0.035	4.479
INO -> EAS	0.255	0.042	6.077	0.389	0.040	9.735
INO -> INT	0.122	0.037	3.319	0.182	0.036	5.121
INO -> USE	0.084	0.017	4.872	0.160	0.022	7.308
REW -> ATT	0.058	0.029	2.005	0.025	0.034	0.748
REW -> INT	0.101	0.040	2.493	0.043	0.034	1.277
SEC -> ATT	0.197	0.031	6.281	0.174	0.042	4.167
SEC -> INT	0.197	0.038	5.161	0.170	0.040	4.261
SOC -> INT	0.079	0.034	2.327	0.038	0.029	1.285
USE -> ATT	0.399	0.047	8.464	0.383	0.062	6.203
USE -> INT	0.226	0.030	7.644	0.224	0.039	5.720

$^{*}p \leq 0.05$; $^{**}p \leq 0.01$; $^{***}p \leq 0.001$

In addition to assessing differences in paths using the aforementioned techniques, a paired t-test was performed on factor scores to gain insights on potential dissimilarities in each dimension between two groups. The results of this analysis that are provided in Table 7 indicate significant differences in 8 of the 9 constructs employed in the study.

As can be seen from Table 7 all factor scores excluding social influence were different between the users and non-users. It is evident that users and non-users have distinct attitudes towards mobile payment systems and have dissimilar perceptions on the various constructs tested in the present study.

The users perceive themselves more innovative than non-users. This was an intuitive outcome given that the mobile wallet applications are in their preliminary steps of life-cycle and adoption. The security concerns are lower among users compared to non-users. Non-users have a slightly negative perception of the security provided by the mobile wallet. No significant differences between groups were detected in social influence mainly attributable to the low penetration and awareness levels of the MP systems among general populace. Overall attitudes towards the mobile wallet are positive, user group being significantly more positive than the non-users. Similar to the attitudes, the intentions to use or continue using the mobile wallet are considerably higher for users.

Table 7: T-test Results between Users and Non-Users Factor Scores

Factor(s)	Users		Non-users		Difference		
	Mean	Std. Dev.	Mean	Std. Dev.	Mean Difference	Std. Error Difference	Sig.
Innovativeness	3.928	0.897	3.342	1.008	-0.586	0.051	.000
Attitude	3.726	1.068	3.198	1.085	-0.528	0.058	.000
Intention	3.774	1.062	3.184	1.143	-0.591	0.059	.000
Ease of use	3.764	0.981	3.405	0.989	-0.359	0.053	.000
Security	3.357	1.004	2.886	0.954	-0.471	0.053	.000
Social Influence	2.506	1.102	2.474	1.034	-0.032	0.057	.580
Compatibility	3.280	1.181	2.817	1.143	-0.464	0.062	.000
Rewards	3.332	1.178	3.117	1.183	-0.215	0.063	.001
Usefulness	3.660	1.092	3.289	1.151	-0.371	0.060	.000

5. CONCLUSION

The present study on the adoption of mobile wallet was carried out by one of the leading global market research companies in a large developing country thus offers a good point of reference for future studies. In addition to testing relevant theories and models in mobile payments context and contributing to the theoretical understanding of consumer attitudes towards the mobile payments, the study also offers comparable findings by the use of well-established scales. Thus far there are no similar studies carried out in Turkey in such a scale and similar studies in other developing countries are also limited in supply.

One important finding of the study is the lack or the low impact of social influence on use intentions. This may be attributed to the low number of users in this new product category which is actually at the beginning of its life cycle. One upside of this finding is that without a strong effect from others, consumers' attitudes are influenced by individual factors or perceptions, the latter of which can be influenced by direct marketing activities.

Personal innovativeness, which was expected to be a significant factor, had no direct impact on attitudes. In addition, this construct's effect on use intentions was also not significant for users and only a low level of effect was detected for non-users. On the other hand, as a result of the indirect effects through ease of use, innovativeness affected attitudes and use intentions. It was seen that users who perceive themselves more innovative (high INO scores) find the mobile wallet easier to use, develop a more positive attitude towards and intent to use the mobile wallet.

The most important factor affecting users' attitudes appeared to be the ease of use of the mobile wallet among users. This factor is the second most important in attitude formation for non-user group. Taking into account its positive effect on usefulness, ease of use appears among the primary areas to focus on to improve attitudes among potential users of mobile wallets. Providing an intuitive and easy to use interface will both increase perceived usefulness of the system and increase chance of adoption. The increasing proliferation of mobile devices should be kept in mind in developing related applications and interfaces.

One of the findings that should be pondered by the marketing practitioners is the strong effect of usefulness on attitudes and use intentions. This finding indicates that the users should perceive superior benefits in mobile wallets compared to alternative payment methods. The lack of a clear understanding of these benefits appears as a major barrier in developing positive attitudes and use intentions. Within the mobile payments context, customers expect payment solutions to make payment processes easier by offering benefits related to mobility and performance.

Unlike particular studies in literature (Kim et al., 2010; Linck et al., 2007), in which the perceived security appeared among the major barriers of mobile payment systems acceptance, this factor appeared among the factors with lower impact on attitudes and use intentions in the present study. This finding is in accordance with Pousttchi and Wiedmann's (2007) study that showed that subjective security was not an important influencer of mobile payment acceptance. The relatively low concern among the consumers towards security indicates that the users are overcoming this barrier slowly. This creates opportunities for marketers to focus on other dimensions to promote however this finding should not be interpreted as perceived security is not important at all. More accurately, the consumers' security concerns are less important than their concerns regarding the mobile wallets' usefulness and ease of use.

Compatibility was another factor to note influencing attitudes towards mobile wallets. This factor had a stronger effect on the non-user group's attitudes and use intentions compared to users. The total effect generated partly by the indirect effect through perceived usefulness makes this factor the second most important factor influencing the attitudes for non-users. When the consumers find an application to be compatible with their behavior they more easily accept and adopt it. To enable this, marketers may focus on developing and utilizing marketing communication that highlights the compatibility of the application with use cases and benefits for differing lifestyles among their target markets.

The results of the between group analysis of direct effects lead to the conclusion that trial of the product increases the perceived usefulness of the system. The user group perceives the mobile wallet easier to use and more useful than the non-users. An implication of this finding is that when the consumers try and use mobile wallet applications their perceptions improve in many dimensions including ease of use, usefulness, security and find the application more compatible with their lifestyle. Companies should offer more and innovative ways to let users try the mobile app.

The present study in spite of its large sample size and random sampling employed was carried out only in one country, which can be counted among its basic limitations. Another limitation is focusing on one method of mobile payment, which was needed to create a basis to work on and to associate the mobile payment with a real product that the consumers can use. The third limitation is the use of subscriber base of only one mobile network services provider. A specific network provider and application was chosen to help in creating the resources needed to carry out the research on a large scale.

REFERENCES

Agarwal, R., & Prasad, J. 1998, "A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology", *Information Systems Research*, Vol.9, no.2, pp. 204–215.

Ajzen, I. 1991, "The theory of planned behavior." *Organizational behavior and human decision processes*, No.50, pp. 179–211.

Ajzen, I., & Fishbein, M. 1980, *Understanding Attitudes and Predicting Social Behaviour*, Englewood Cliffs, NJ: Prentice Hall PTR.

Anderson, J., & Gerbing, D. 1988, "Structural equation modeling in practice: A review and recommended two-step approach." *Psychological Bulletin*, Vol.103, no.3, pp. 411–423.

App Annie & MEF. 2014, "Emerging Markets and Growth in the Global App Economy". http://blog.appannie.com/app-annie-mef-global-app-economy-q3-2014/

Arvidsson, N. 2013, "Consumer attitudes on mobile payment services – results from a proof of concept test." *International Journal of Bank Marketing*, Vol.32, no.2, pp. 150–170.

Bhattacherjee, A. 2001, "An empirical analysis of the antecedents of electronic commerce service continuance." *Decision Support Systems*, Vol.32, no.2, pp. 201–214.

Blake, B. F., Neuendorf, K. a., & Valdiserri, C. M. 2003, "Innovativeness and variety of Internet shopping". *Internet Research*, Vol.13, no.3, pp. 156–169.

Burdge, B. 2014, "New Research Shows Mobile Dominates Desktops". MovableInk. Retrieved from http://blog.movableink.com/new-research-shows-mobile-dominates-desktops-with-65-of-total-email-opens-in-q4-2013/

Capgemini, & RBS. 2015, *World Payments Report 2015*. https://www.worldpaymentsreport.com

Carmines, E. G., & Zeller, R. A. 1979, *Reliability and Validity Assessment*. Beverly Hills, California: Sage Publications.

Carrington, D. 2014, US Mobile Payments Will Reach $142B by 2019. Forrester. Retrieved November 25, 2015, from http://blogs.forrester.com/denee_carrington/14-11-17-us_mobile_payments_will_reach_142b_by_2019

Chang, C.-C., & Chin, Y.-C. 2011, "Predicting the Usage Intention of Social Network Games: An Intrinsic-Extrinsic Motivation Theory Perspective", *International Journal of Online Marketing*, Vol.1, no.3, pp. 29–37.

Chang, M. K., Cheung, W., & Lai, V. S. 2005, "Literature derived reference models for the adoption of online shopping." *Information and Management*, Vol.42, no.4, pp. 543–559.

Chen, L., & Nath, R. 2008, "Determinants of mobile payments: an empirical analysis", *Journal of International Technology and Information*, Vol.17, no.1, pp. 9 – 20.

ComScore. 2014, "The US Mobile App Report." http://www.slideshare.net/LudovicP/comscore-us-mobile-app-report-june-2014-datatheusmobileappreport

Criteo. 2015, "State of Mobile Commerce." Http://www.criteo.com/resources/mobile-commerce-report/

Crowe, M., & Tavilla, E. 2012, "Mobile Phone Technology: "Smarter" Than We Thought How Technology Platforms are Securing Mobile Payments in the U.S.", Boston, USA. http://www.bostonfed.org/bankinfo/payment-strategies/index.htm

Dahlberg, T., & Mallat, N. 2002, "Mobile Payment Service Development - Managerial Implications of Consumer Value Perceptions", *Proceedings of the Tenth European Conference on Information Systems*, pp. 649–657.

Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A. 2008, "Past, present and future of mobile payments research: A literature review", *Journal of Commerce Research and Applications*, 7, pp. 165–181.

Dash, M., Bhusan, P. B., & Samal, S. 2014, "Determinants of Customers' Adoption of Mobile Banking: An Empirical Study by Integrating Diffusion of Innovation with Attitude", *Journal of Internet Banking and Commerce*, Vol.19, no.3, pp. 1–21.

Davis, F. D. 1989, "Perceived usefulness, perceived ease of use, and user acceptance of information technology". *MIS Quarterly*, Vol.13, no.3, pp. 319–340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. 1992, "Extrinsic and intrinsic motivation to use computers in the workplace". *Journal of Applied Social Psychology*, Vol.22, no.14, p. 1111.

Davison, A. C., & Hinkley, D. V. 1997, "Bootstrap Methods and Their Application". Cambridge, UK: Cambridge University Press.

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. 1991, "Motivation and Education: The Self-Determination Perspective". *Educational Psychologist*, Vol.26, no.3-4, pp. 325–346.

Fishbein, M., & Ajzen, I. 1975, *Belief, attitude, intention, and behavior: an introduction to theory and research* Reading: Addison-Wesley.

Fornell, C., & Larcker, D. F. 1981, "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error", *Journal of Marketing Research*, Vol.18, no.1, pp. 39–50.

Gefen, D., Karahanna, E., & Straub, D. 2003, "Trust and TAM in online shopping: an integrated model" *MIS Quarterly*, Vol.27, no.1, pp. 51–90.

Geisser, S. 1974, "A predictive approach to the random effect model", *Biometrika*, No.61, pp. 101–107.

Gross, M. B., Hogarth, J. M., & Schmeiser, M. D. 2012, "Use of Financial Services by the Unbanked and Underbanked and the Potential for Mobile Financial Services Adoption", *Federal Reserve Bulletin*, No.98, pp. 1–20.

Hair, J. F., Ringle, C. M., & Sarstedt, M. 2011, "PLS-SEM: Indeed a Silver Bullet", *The Journal of Marketing Theory and Practice*, Vol.19, no.2, pp. 139–152.

Hair, J. F., Tomas, G., Hult, M., Ringle, C. M., & Sarstedt, M. 2013, *A Primer on Partial Least Squares Structural Equation Modeling* (PLS-SEM). Thousand Oaks: Sage Publications, Inc.

Van der Heijden, H. 2004, "User acceptance of hedonic information systems", *MIS Quarterly*, Vol.28, no.4, pp. 695–704.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. 2009, "The use of partial least squares path modeling in international marketing", *Advances in international marketing*, No.20, pp. 277–320.

Hong, S., Thong, J. Y. L., & Tam, K. Y. 2006, "Understanding continued information technology usage behavior: A comparison of three models in the context of mobile internet", *Decision Support Systems*, Vol.42, no.3, pp. 1819–1834.

Hu, T., Poston, R., & Kettinger, W. 2011, "Nonadopters of online social network services: Is it easy to have fun yet?", *Communications of the Association of IS*, No.29, pp. 441–458.

IAB Turkey. 2015, "The Locomotive of Page View: Mobile", IAB Bulletin. Retrieved October 10, 2015, from http://www.iabturkiye.org/sites/default/files/infografik_haziran_ing.pdf.

IBM Commerce. 2015, "Black Friday Report 2015", Somers NY. http://www-01.ibm.com/software/marketing-solutions/benchmark-reports/black-friday-2013.html

ICTA. 2015, "ELECTRONIC COMMUNICATIONS MARKET IN TURKEY". Ankara. http://www.btk.gov.tr/en-US/Pages/Market-Data

Jackson, C. M., Chow, S., & Leitch, R. A. 1997, "Toward an Understanding of the Behavioral Intention to Use an Information System", *Decision Sciences*, Vol.28, no.2, pp. 357–389.

Karahanna, E., Agarwal, R., & Angst, C. M. 2006, "RECONCEPTUALIZING COMPATIBILITY BELIEFS IN TECHNOLOGY ACCEPTANCE RESEARCH", *MIS Quarterly*, Vol.30, no.4, pp. 781–804.

Keil, M., Tan, B. C. Y., Wei, K. K., Saarinen, T., Tuunainen, V., & Wassenaar, A. 2000, A cross-cultural study on escalation of commitment behaviour in software projects. *MIS Quarterly*, No.24, pp. 299–325.

Kim, C., Mirusmonov, M., & Lee, I. 2010, ""An empirical examination of factors influencing the intention to use mobile payment", *Computers in Human Behavior*, Vol.26, no.3, pp. 310–322.

Kim, J., & Lee, J. E. R. 2011, "The Facebook Paths to Happiness: Effects of the Number of Facebook Friends and Self-Presentation on Subjective Well-Being", *Cyberpsychology Behavior and Social Networking*, Vol.14, no.6, pp. 359–364.

Kim, Y. J., & Han, J. 2014, "Why smartphone advertising attracts customers: A model of Web advertising, flow, and personalization", *Computers in Human Behavior*, No.33, pp. 256–269.

Leng, G., & Lada, S. 2011, "An Exploration of Social Networking Sites (SNS) Adoption in Malaysia Using Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB) And Intrinsic Motivation", *Journal of Internet Banking & Commerce*, Vol.16 No.2, pp. 1–27.

Liébana-Cabanillas, F., Sánchez-Fernández, J., & Muñoz-Leiva, F. 2014, Antecedents of the adoption of the new mobile payment systems: The moderating effect of age. *Computers in Human Behavior*, No.35, pp. 464–478.

Linck, K., Pousttchi, K., & Wiedemann, D. G. 2007, "Security Issues in Mobile Payment from the Customer Viewpoint", *Proceedings of the 14th European Conference on Information Systems (ECIS 2006),* pp. 1–12.

Lu, J., Yao, J. E., & Yu, C. S. 2005, "Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology", *The Journal of Strategic Information Systems*, Vol.14, no.3, pp. 245–268.

Lu, Y., Yang, S., Chau, P. Y. K., & Cao, Y. 2011, "Dynamics between the trust transfer process and intention to use mobile payment services: A cross-environment perspective", *Information and Management*, Vol.48, no.8, pp. 393–403.

Luarn, P., & Lin, H.-H. 2005, "Toward an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior*, Vol.21, no.6, pp. 873–891.

Malhotra, Y., Galletta, D. F., & Kirsch, L. J. 2008, "How Endogenous Motivations Influence User Intentions: Beyond the Dichotomy of Extrinsic and Intrinsic User Motivations", *Journal of Management Information Systems*, Vol.25, no.1, pp. 267–300.

Mallat, N., Rossi, M., Tuunainen, V. K., & Öörni, A. 2009, "The impact of use context on mobile services acceptance: The case of mobile ticketing", *Information & Managemen*t, Vol.46, no.3, pp. 190–195.

Midgley, D. F., & Dowling, G. R. 1978, "Innovativeness: The Concept and Its Measurement", *Journal of Consumer Research*, Vol.4, no.4, p. 229.

Moore, G., & Benbasat, I. 1991, "Development of an instrument to measure the perceptions of adopting an information technology innovation", *Information systems research*, Vol.2, no.3, pp. 192–222.

Nunnally, J. C. 1978, *Psychometric theory*. New York: McGraw-Hill, c1978.

Oliveira, T., Faria, M., Thomas, M. A., & Popovič, A. 2014, "Extending the understanding of mobile banking adoption: When UTAUT meets TTF and ITM", *International Journal of Information Management*, Vol.34, no.5, pp. 689–703.

Ondrus, J., & Pigneur, Y. 2006, "Towards a holistic analysis of mobile payments: A multiple perspectives approach", *Electronic Commerce Research and Applications*, Vol.5, no.3, pp. 246–257.

Ovum. 2012, Digital Wallet Dynamics. , pp. 1–12. Retrieved from http://www.mahindracomviva.com/wp-content/uploads/2015/02/Mahindra-Comviva-Digital-Wallet-Whitepaper.pdf

Parasuraman, a., Zeithaml, V. a., & Malhotra, A. 2005, "E-S-QUAL: A Multiple-Item Scale for Assessing Electronic Service Quality", *Journal of Service Research*, 7(Feb.), pp. 1–21.

Phonthanikitithaworn, C., Sellitto, C., & Fong, M. 2015, "User Intentions to Adopt Mobile Payment Services: A Study of Early Adopters in Thailand", *Journal of Internet Banking and Commerce*, Vol.20, no.1, pp. 1–29.

Plouffe, C. R., Huland, J. S., & Vandenbosch, M. 2001, "Research report: richness versus parsimony in modeling technology adoption decisions-- understanding merchant adoption of a smart card- based payment system", *Information systems research*, Vol.12, no.2, pp. 208–222.

Pousttchi, K. 2008, "A modeling approach and reference models for the analysis of mobile payment use cases", *Electronic Commerce Research Applications*, Vol.7, no.2, pp. 182–201.

Pousttchi, K., & Wiedemann, D. G. 2007, "What Influences Consumers ' Intention to Use Mobile Payments?" *LA Global Mobility Round table*, pp. 1–16.

Ringle, C. M., Sarstedt, M., & Straub, D. W. 2012, "A Critical Look at the Use of PLS-SEM in MIS Quarterly", *MIS Quarterly*, Vol.36, no.1, pp. iiv–8.

Rogers, E. M. 2003, *Diffusion of Innovations*. New York, USA: Free Press.

Ryan, R., & Deci, E. 2000, "Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions", *Contemporary educational psychology*, Vol.25, no.1, pp. 54–67.

Ryan, R. M., & Connell, J. P. 1989, "Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, Vol.57 No.5, pp. 749–761.

Sarstedt, M., Henseler, J., & Ringle, C. M. 2011, "Multigroup Analysis in Partial Least Squares (PLS) Path Modeling: Alternative Methods and Empirical Results" in: C. R. T. Marko Sarstedt, Manfred Schwaiger (Ed.), *Measurement and Research Methods in International Marketing* Vol.22, pp. 195–218.

Schierz, P. G., Schilke, O., & Wirtz, B. W. 2010, "Understanding consumer acceptance of mobile payment services: An empirical analysis". *Electronic Commerce Research and Applications*, Vol. 9, no.3, pp. 209–216.

Shatskikh, A. 2013, "Consumer acceptance of Mobile Payments in Restaurants". Master Thesis, University of South Florida, Department of Hospitality Administration, (January), pp. 1–57.

Shin, D.-H. 2009, "Towards an understanding of the consumer acceptance of mobile wallet", *Computers in Human Behavior*, Vol.25, no.6, pp. 1343–1354.

Soper, D. 2016, "A-priori Sample Size Calculator for Structural Equation Models" Retrieved January 23, 2016, from http://www.danielsoper.com/statcalc3/calc.aspx?id=89

Stone, M. 1974, "Cross-validatory choice and assessment of statistical predictions", *Journal of the Royal Statistical Society*, No.36, pp. 111–147.

Taylor, S., & Todd, P. 1995, "Understanding information technology usage: A test of competing models", *Information Systems Research*, Vol.6, no.2, pp. 144–176.

Teo, T. S. ., Lim, V. K. ., & Lai, R. Y. 1999, "Intrinsic and extrinsic motivation in Internet usage", *Omega International Journal of Management Science*, Vol.27, no.1, pp. 25–37.

Tornatzky, L., & Klein, K. 1982, Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management*, Vol. 29, no.1, pp. 28–43.

Varnali, K., Yilmaz, C., & Toker, A. 2012. "Predictors of attitudinal and behavioral outcomes in mobile advertising: A field experiment", *Electronic Commerce Research and Applications*, Vol.11, no.6, pp. 570–581.

Venkatesh, V., & Davis, F. 2000, "A theoretical extension of the technology acceptance model: four longitudinal field studies", *Management Science*, Vol.46, no.2, pp. 186–204.

Venkatesh, V., Morris, M. G., B.Davis, G., & Davis, F. D. 2003, "User acceptance of information technology: toward a unified view", *MIS Quarterly*, Vol.27, no.3, pp. 425–478.

Vijayasarathy, L. R. 2004, "Predicting consumer intentions to use on-line shopping: The case for an augmented technology acceptance model", *Information and Management*, Vol. 41, no.6, pp. 747–762.

Vodafone. 2013, "Tokyo-drift-how-japan-leads-the-way-on-m-payments", Retrieved from http://www.vodafone.com/business/global-enterprise/tokyo-drift-how-japan-leads-the-way-on-m-payments-2013-08-13

Wang, Y.-S., Wang, Y.-M., Lin, H.-H., & Tang, T.-I. 2003, "Determinants of user acceptance of Internet banking: an empirical study", *International Journal of Service Industry Management*, Vol.14, no.5, pp. 501–519.

Wu, J. H., & Wang, S. C. 2005, "What drives mobile commerce? An empirical evaluation of the revised technology acceptance model", *Information and Management*, No.42, pp. 719–729.

Yang, S., Lu, Y., Gupta, S., Cao, Y., & Zhang, R. 2012, "Mobile payment services adoption across time: An empirical study of the effects of behavioral beliefs, social influences, and personal traits", *Computers in Human Behavior*, Vol.28, no.1, pp. 129–142.

Zarmpou, T., Saprikis, V., Markos, A., & Vlachopoulou, M. 2012, "Modeling users' acceptance of mobile services", *Electronic Commerce Research*, Vol.12, no.2, pp. 225–248.

APPENDIX – 1: CONSTRUCTS

Construct	Items	Source(S)
Perceived Usefulness	I think MP is useful for me to buy products or services.	Bhattacherjee (2001), Van der Heijden (2003)
	I think MP makes it easier for me to buy products or services.	
	I think MP saves time for me to buy products or services.	
	Using mobile payments would make it easier for me to conduct transactions.	
	Overall, I find the mobile wallet to be useless for making payments.	
	Using mobile wallet would take more time and effort than using traditional payment methods.	
Perceived Ease of Use	I think using mobile wallet is easy.	Venkatesh and Davis 2000; Davis 1989
	My interaction with a mobile wallet would be clear and understandable.	
	It would be difficult for me to become skillful at using a mobile wallet.	
	I think it is easy for me to learn how to use mobile wallet.	
	It is easy to perform the steps required to use mobile wallet.	
Perceived Security	The risk of abuse of usage information (e.g., names of business partners, payment amount) is low when using mobile wallet.	Luarn and Lin (2005), Parasuraman et al. (2005)
	The risk of abuse of billing information (e.g., credit card number, bank account data) is low when using mobile wallet.	
	I find mobile payment services secure for conducting my payment transactions.	
	I am afraid for unreasonable or fraudulent charges if using mobile wallet.	
	I am comfortable with having my credit card integrated into my mobile phone.	
Social Influence	People who are important to me would find using mobile services beneficial.	Ajzen 1991; Venkatesh and Davis (2000)
	People who influence my behavior think I should use mobile wallet.	
	People who are important to me think I should use mobile wallet.	
	People who I appreciate would encourage me to use mobile wallet.	
Compatibility	I would appreciate using mobile payment services in a restaurant/cafe/bar instead of alternative modes of payment (e.g., credit card, cash).	Moore and Benbasat (1991) Plouffe et al. (2001)
	I think mobile wallet is not compatible with my lifestyle.	
	Using mobile wallet at a restaurant/cafe/bar fits well with the way I like to purchase products and services.	
	Using mobile wallet is compatible with all aspects of my shopping behavior.	
Personal innovativeness in IT	When I hear about a new IT, I would look for ways to experiment with it.	Agarwal and Prasad (1998)
	Among my peers, I am usually the first to explore new information technologies.	
	I like to experiment with new information technologies.	
	In general, I am hesitant to try out new information technologies.	
	I know more about new products before other people do.	
	New products excite me.	
Rewards	I have / would like to benefit from promotions offered by the mobile wallet	Author generated
	I wouldn't (have) download(ed) mobile wallet if no promotions were offered	
	I would like to use/continue to use mobile wallet as long as promotions are offered	
Intention to Use / Continued Use Intention	I am likely to use/continue using mobile payment services in the near future	Venkatesh and Davis 2000 ; Bhattacherjee, 2001
	I am willing to use/continue using MP services in near future rather than not use it.	
	I intend to use / continue using mobile payment services at least as often within the next month as I have previously used.	
	I intend to use mobile payment services when the opportunity arises	
Attitudes	Using mobile wallets is a good idea.	Ajzen, 1991
	Using mobile wallets is beneficial.	
	Using mobile wallets is favorable.	
	Using mobile wallets is a wise thing to do.	

APPENDIX – 2: Descriptive Statistics & Cross Loadings

Items (Range: 1-5)	Mean	Std.Dev	ATTI	COMP	EOUS	INNO	SECU	SOCI	USEF
INOV_1	3.980	1.207	0.238	0.248	0.189	0.826	0.194	0.078	0.220
INOV_2	3.525	1.290	0.199	0.213	0.175	0.749	0.139	0.060	0.163
INOV_3	4.373	0.964	0.178	0.219	0.203	0.833	0.185	0.015	0.207
INOV_5	3.906	1.075	0.201	0.186	0.182	0.741	0.209	0.088	0.169
INOV_6	3.958	1.155	0.150	0.200	0.123	0.646	0.117	0.013	0.153
EOUS1	3.755	1.292	0.540	0.492	0.804	0.152	0.354	0.329	0.578
EOUS2	3.664	1.225	0.533	0.464	0.770	0.219	0.395	0.390	0.511
EOUS4	4.014	1.174	0.478	0.283	0.797	0.197	0.326	0.224	0.371
EOUS5	3.945	1.149	0.497	0.311	0.775	0.162	0.322	0.223	0.384
SECU1	3.500	1.349	0.248	0.216	0.245	0.137	0.671	0.208	0.160
SECU2	3.505	1.345	0.322	0.230	0.248	0.120	0.750	0.178	0.192
SECU3	3.527	1.242	0.546	0.475	0.413	0.228	0.871	0.317	0.447
SECU6	3.236	1.289	0.543	0.505	0.419	0.187	0.813	0.442	0.469
COMP1	3.431	1.444	0.526	0.811	0.443	0.203	0.408	0.436	0.614
COMP2	3.758	1.314	0.391	0.644	0.348	0.165	0.325	0.197	0.437
COMP3	3.348	1.309	0.516	0.874	0.424	0.262	0.429	0.402	0.554
COMP4	3.213	1.328	0.536	0.875	0.408	0.264	0.432	0.372	0.591
USEF1	3.638	1.210	0.606	0.589	0.456	0.226	0.355	0.368	0.797
USEF2	3.614	1.228	0.669	0.610	0.522	0.230	0.426	0.414	0.890
USEF3	3.839	1.222	0.629	0.564	0.528	0.236	0.373	0.348	0.872
USEF4	3.755	1.229	0.626	0.567	0.546	0.154	0.368	0.347	0.863
USEF5	3.681	1.342	0.413	0.420	0.324	0.109	0.287	0.222	0.567
SOCI1	2.927	1.479	0.342	0.374	0.338	0.018	0.390	0.825	0.361
SOCI2	2.748	1.483	0.364	0.400	0.362	0.092	0.357	0.882	0.399
SOCI3	2.447	1.454	0.325	0.375	0.299	0.069	0.321	0.884	0.345
SOCI4	2.531	1.489	0.309	0.400	0.310	0.062	0.285	0.876	0.375
ATTI1	3.795	1.153	0.919	0.555	0.597	0.263	0.512	0.360	0.689
ATTI2	3.766	1.147	0.935	0.580	0.603	0.223	0.540	0.358	0.677
ATTI3	3.777	1.143	0.922	0.554	0.613	0.209	0.526	0.360	0.682
ATTI4	3.780	1.108	0.912	0.581	0.599	0.249	0.527	0.352	0.675