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Are You Ready To Take The Risks Of Mobile Payment App? Early Adopters Vs Laggards

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Abstract

Mobile payment apps are rather a new, but a quickly developing technology which newly takes attention of the academicians and practitioners. In order for them to be accepted by the masses, first of all, risks that are related to the use of technology should be understood. This study is an attempt to understand the related risks with the mobile payment apps while differentiating between early adopters and laggards. To do this, a research model that reflects the three risk factors, namely financial, privacy and security risk, are developed on the technology acceptance model (TAM). The model is empirically tested by structural equation modeling with a dataset of 133 early adopters and 105 laggards. The results imply that there are different perceptions of risks of early adopters and laggards in m-payment app use. Additionally, their attitude toward the app use and their intention to use the mobile payment apps are dependent on different factors for early adopters and laggards.

Keywords: *Early Adopters, Laggards, Mobile Payment App, Technology Acceptance Model, Risk*

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Mobil Ödeme Uygulamasının Risklerini Almaya Hazır mısınız? Erken Benimseyen ve Son Benimseyen Tüketicilerin Karşılaştırması

Öz

Mobil ödeme uygulamaları oldukça yeni, ancak hızla gelişen bir teknoloji olarak akademisyenlerin ve uygulayıcıların yeni yeni dikkatini çekmektedir. Kitleler tarafından kabul edilebilmesi için öncelikle mobil ödeme uygulama teknolojisinin kullanımı ile ilgili risklerin anlaşılması gerekmektedir. Bu çalışma, mobil ödeme uygulamalarıyla ilgili tüketicilerin algıladığı riskleri anlamaya çalışırken, aynı zamanda yeniliklerin adaptasyonu eğrisindeki erken benimseyenler ve son benimseyenler arasındaki farkları da araştırmaya yönelik bir girişimdir. Bu amaçlara ulaşmak için, teknoloji kabul modeli (TAM) üzerinde üç risk faktörünü, yani finansal risk, gizlilik riski ve güvenlik riski, yansıtan bir araştırma modeli geliştirilmiştir. Oluşturulan model yapısal eşitlik modellemesi kullanılarak, 133 erken benimseyen ve 105 geç benimseyen tüketicilerden oluşan bir veri kümesiyle ampirik olarak test edilmiştir. Sonuçlar, mobil ödeme uygulamalarını kullanmak konusunda erken benimseyen tüketicilerin ve geç benimseyen tüketicilerin farklı risk algılamaları olduğunu ortaya koymaktadır. Bu sonuca ek olarak, mobil ödeme uygulamalarını kullanımına yönelik tutumları ve kullanma niyetleri, erken benimseyen tüketiciler ve geç benimseyen tüketiciler için farklı faktörlerden etkilenmektedir.

Anahtar Kelimeler: *Erken Benimseyenler, Geç Benimseyenler, Mobil Ödeme Uygulaması, Teknoloji Kabul Modeli, Risk*

Introduction

In recent years, the use of mobile devices has increased more than any other device that we use in our daily lives. With the introduction of the technology to our daily lives, the consumer shopping behavior is influenced (Jack and Suri, 2011). The ways we search for the products, compare the prices, check for the sale locations are all re-defined. As a result, traditional shopping is gradually shifting to electronic shopping, thus to mobile.

Keeping this adoption in mind, there raised a question: If a consumer has the commercial activity on mobile devices, why not to pay with the device itself, but still require a physical evidence of the credit card? With this thought in mind, a new payment form has emerged: Mobile payment (m-payment); using your mobile device to complete the payment process. It is possible in two different ways: (1) Using a Near Field Communication (NFC)-enabled mobile device (2) Using an application (app) downloaded to the device beforehand to complete the payment process. App use in m-payment, being rather a newer technology, is the mainly deal of the study.

The apps are essential to the mobile commerce (m-commerce). The m-payment apps are expected to be one of the essential applications of the m-commerce (Leong, Hew, Tan, and Ooi, 2013). With their introduction to the virtual world, mobile devices become the strongest candidates to replace traditional payment methods (Shin, 2010).

However, the acceptance of innovations takes time (Kotler, 1994); especially if it is the acceptance of a new technology. Just like every other, it comes with its inherent risks. On the other hand, there are people in the market ready to take risks, and there are others who aren't. People's approach to the innovations is different from each other. As early adopters (EA) quickly accept the new products, further try to be the one to experience it; laggards (LA) are the last to try them (Kotler, 1994).

With this basic introduction to m-payment and adoption of innovations; the aim of this study is to apply technology acceptance model (TAM) to two different groups of consumers (i.e. EA and LA) under the adoption of innovation curve in the context of perceived risks of m-payment apps. Specifically, the study seeks out to answer (1) to what extend TAM constructs contribute to the acceptance of m-payment apps of (a) EA and (b) LA (2) to what extend risk perceptions influence (a) EA and (b) LA acceptance of m-payment apps (2) how does the risk perceptions of EA differ from LA in m-payment app acceptance. It is reasonable to compare the EA with LA, since consumer adoption of m-payment apps is grounded from characteristics of the consumers, in addition to the technology. Moreover, the study will give an answer to the question of how does the risk perceptions will get changed over EA and LA.

In the study, the risk factors are limited to financial risk, privacy risk, and security risk, since they are the ones that are accepted by many academic researchers as the main influencing risks which are very specific to the mobile technological innovations.

1. Theoretical Background and Hypotheses Development

1.1.Technology Acceptance Model in the Context of Mobile Payments

Technology Acceptance Model (TAM) has been widely used to test the acceptance of a variety of information technology (IT) related innovations. Introduced by Davis (1989), it is used for modeling the individual's intention to use the IT innovations. TAM claims that individual intention is the result of perceived ease of use (PEoU), and perceived usefulness (PU), which directly influences attitudes (ATU). And the attitudes impacts behavioral intention to use (IU) and actual system use (Figure 1).

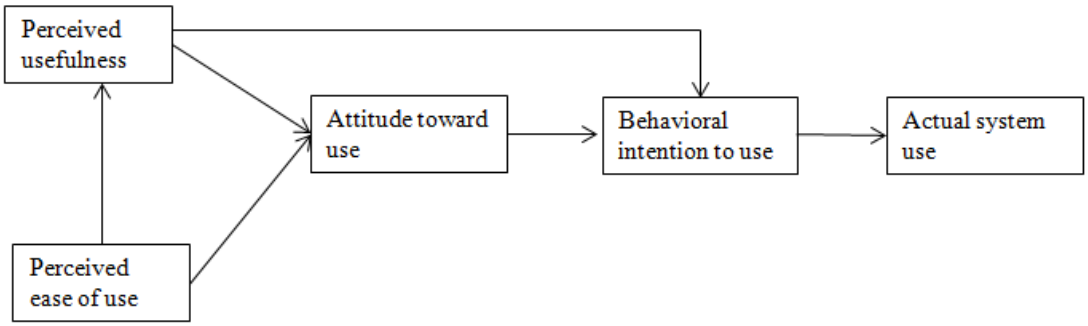

Figure 1. Technology Acceptance Model (Davis, 1989)

TAM has been utilized in many different technology adoption studies; including mobile banking (Akturan and Tezcan, 2011); NFC-enabled m-payment (Kim, Mirusmonov, and Lee, 2010; Thakur and Srivastava, 2014); online banking (Lassar, Manolis, and Lassar, 2005; Alsajjan and Dennis, 2010); mobile marketing acceptance (Gao, Rohm, and Sultan, 2013) in the marketing context. Based on the previous research, current study employs TAM, since it has the proven capability to predict IT-based services'/products' adoption.

The main purpose of TAM is predicting the impact of external variables on internal intentions and attitudes (Legris, Ingham, and Collerette, 2003). In the previous studies, many different external variables were added to TAM. As suggested by Davis, Bagozzi, and Warshaw (1989), adding different external variables will improve the predicting power of the model. In the current study; TAM is extended with the addition of three risk factors.

1.2.Mobile payments

There are many different definitions of m-payment in the literature. The commonly shared elements of definitions are: (1) it includes the use of mobile devices; e.g. wireless handsets, near field communication (NFC) enabled devices and Bluetooth-enabled devices (2) at least one phase of the transaction (i.e. initiation, authorization or confirmation) is completed through a mobile device. In the study, the m-payment definition will be the one that is suggested by Ghezzi, Renga, Balocco, and Pescetto (2010) with some modifications: "Mobile payment is a method of payment in which all the phases of transactions are completed using a mobile device over a mobile network, and through an application which is downloaded to the mobile device beforehand" (p. 4).

There are two ways to complete the payment with a mobile device. (1) Using an NFC, Bluetooth or RFID-enabled mobile device which requires you to wave your mobile device through a card reader. In this case, mobile device acts like a contactless credit card. (2) Using an application (app) in the mobile device to make the payment. An app is downloaded to the device; and with a click of a button, money is transferred from the customer's account to the merchant's account. Some examples are GarantiPay of Garanti Bank, FastPay of Denizbank, BKMExpress, and PayPal. In the second case, there is no requirement of the physical card reader. Money is transferred through electronic data interchange (EDI). The second one is rather a new method of m-payment compared to first one.

There are already many studies on the adoption of the first method of payment (Khalilzadeh, Ozturk, and Bilgihan, 2017; Thakur and Srivastava, 2014; Shin, 2010; Kim et al., 2010). This study takes a different approach in m-payment by examining the app use while comparing EA and LA.

1.3.Early Adopters vs Laggards in Adoption of New Technologies

Kotler (1994, p.348) defines the adoption process as "the mental process through which an individual passes from first hearing about an innovation to the final adoption". When the individual becomes a regular user, then he/she is considered as adapted (Kotler, 1994).

It is for sure that some time has to pass for the innovations to be spread to the masses. But before adapted by the masses, there are some people ready to accept innovations immediately while others accept it with a great lag: EA and LA.

EA have similar characteristics with opinion leaders (Kotler, 1994; Van Eck, Jager, and Leeflang, 2011). That's why they are considered as leaders in disseminating the new product information. Roger (1995, p.27) defines opinion leadership as "the degree to which an

individual is able to influence other individual's attitudes or overt behavior informally in a desired way with relative frequency". Opinion leaders are highly involved with the marketplace in their field of expertise (Goldsmith, Flynn, and Goldsmith, 2003). They are highly capable of influencing decisions of others (Flynn, Goldsmith, and Eastman, 1996; Rogers and Cartano, 1962).

Since EA are the pioneers, their perception of the new technology is critical for the dissemination of the m-payments. They have the ability to speed the information stream, hence the adoption process (Kotler 1994; Van Eck et al., 2011). Since EA' opinions are contagious (Van Eck et al., 2011), their probability of influencing followers are high (Goldsmith et al., 2003; Risselada, Verhoef, and Bijmolt, 2014).

On the other hand, LA is tied with tradition, and skeptic (Moore, 1999). They are almost the last to accept new technologies and adopted them only when the product/service becomes the "measure of tradition itself" (Kotler, 1994). According to the previous literature, LA is frustrated with the technology, neglect the service/product until it is a "must use" service/product, and don't perceive any usefulness in using the product (Dhaigude, Kapoor, and Ambekar, 2016). Taking the characteristics of LA into account along with considering the use of a new technology reserves many risks, it is expected that LA will be the last to take any risk in the use of a new technology service.

Combining the TAM with the literature about EA and LA, the following hypotheses are proposed:

H1a. Perceived usefulness (PU) affects early adopters (EA) positively in their attitude toward m-payment app use (ATU).

H1b. Perceived usefulness (PU) has no effect on laggards (LA) in their attitude toward m-payment app use (ATU).

H2a. Perceived ease of use (PEoU) affects early adopters (EA) positively in their attitude toward m-payment app use (ATU).

H2b. Perceived ease of use (PEoU) has no effect on laggards (LA) in their attitude toward m-payment app use (ATU).

H3a. Perceived ease of use (PEoU) has a positive effect on perceived usefulness (PU) for early adopters (EA) in their m-payment app use.

H3b. Perceived ease of use (PEoU) has no effect on perceived usefulness (PU) for laggards (LA) in their m-payment app use.

H4a. Perceived usefulness (PU) affects early adopters (EA) positively in their intention to use m-payment app (IU).

H4b. Perceived usefulness (PU) has no effect on laggards (LA) in their intention to use m-payment app (IU).

H5a. Attitude toward m-payment app use (ATU) affects early adopters (EA) positively in their intention to use m-payment app (IU).

H5b. Attitude toward m-payment app use (ATU) has no effect on laggards (LA) in their intention to use m-payment app (IU).

There is no hypothesis proposed regarding actual system use since LA haven't tried the system yet.

1.4.Perceived Risk and Behavioral Intention

There are many studies in the previous literature proving that risk is a significant influencer in behavioral intention to adopt and use new technologies. To state some examples, in online banking concept, Pikkarainen, Pikkarainen, and Karjaluoto (2004) have pointed out the negative impact of perceived risk in usage intention. Later on, Vessel and Drennan (2010) verified the negative effect of the perceived risk in mobile banking. In m-payment concept, Thakur and Srivastava (2014); Shin (2010) have demonstrated risk as an inhibitor in consumer adoption intention.

In this study; having accepted the impact of perceived risk in new technology adoption; it is argued that the degrees of perceptions are different for EA and LA.

1.5.Perceived risk

Risk perception is one of the most important barriers to the adoption of new technologies, thus it directly affects the attitude and intention to use the technology (Koenig-Lewis, Palmer, and Moll, 2010; Shin, 2009; Hanafizadeh, Behboudi, and Koshksaray, 2014). As Bauer states (1960) "any uncertainty regarding the consequences of the behavior, and some of which are likely to be unpleasant" (p.24) could lead to risk perception. Jacoby and Kaplan (1972), building on the Bauer's work, define five key dimensions of risk; financial, performance, physical, social, and psychological risks. Today, with the introduction of new online technologies, there are some additional constructs to the consumers' risk perception (Hanafizadeh et al., 2014). Specifically, ICT introduces two new forms of risk dimensions: Privacy risk (Cases, 2002, Pikkarainen et al., 2004; Akturan and Tezcan, 2012) and security risk (Pikkarainen et al., 2004; Akturan and Tezcan, 2012). When the literature is reviewed in the context of technological adoptions; additional to these two risks, there appears financial risk

as another essential influencer (Tan, Ooi, Chong, and Hew, 2014; Leong et al., 2013) in the adoption of new technologies.

The interpretation of risk, however, is different for each person (Kotler, 1994). In the adoption of innovations context, people with different characteristics perceive different levels of risks. At the two end of this continuum, there are EA and LA. That's why the risk perception differences of those two groups of people are taken as the basis for this research.

1.6.Perceived security risk (SR)

The security risk is one of the main influencing risks when the use of the mobile technologies is considered (Cheung and Lee, 2006; Lee, 2009; Hampshire, 2017). In mobile, SR is conceptualized as loss of control over financial information (Akturan and Tezcan, 2012) and theft and loss or damage given to mobile devices (Hampshire, 2017). It is particularly of concern to the people which do not have any previous experience with the technology (Bauer, Reichardt, Barnes, and Neumann, 2005). Keeping in mind that the LA will be the last to try new technologies, they will have more concern for their security.

According to Shin (2010), the perceived security is a major factor for the system to market breakthrough. Thakur and Srivastava (2014) state that customers use the m-payment system only they believe that the use of the system, along with their personal information, is secure.

Based on the literature, following hypothesis is proposed:

H6. Early adopters are less likely to be negatively influenced by security risk in their attitude toward m-payment app use, compared to LA.

1.7.Perceived privacy risk (PR)

The requirement of giving the sensitive information, including the identity, credit card number and financial information, to the merchants' system, causes a considerable amount of uncertainty about the privacy of the individual user.

According to Dewan and Chen (2005), consumers' primary concern about privacy is mostly related to the secondary use and unauthorized access to the users' personal and the financial data. The PR is in the merchants' use of this personal information inappropriately –e.g. unauthorized access to the financial information-, hence invading the individual's privacy (Nyshadham, 2000). The risk is not only the invaders but also the service providers' intention to collect, disclose or sell sensitive data without the customer's consent (Yang et al., 2012).

Previous research reported that PR significantly affects user adoption of the new technologies, including location-based services (Wang and Lin, 2017), mobile banking (Akturan and Tezcan, 2012), and ubiquitous commerce (Sheng, Nah, and Siau, 2008). Furthermore, there are studies on PR perception on mobile payment, resulting in discouragement on intention to use (Thakur and Srivastava, 2014). It has the ability to prevent the widespread adoption of the new technology (Tsai, Kelley, Cranor, and Sadeh, 2010).

When two different groups, EA and LA, are compared based on their characteristics, it seems reasonable to assume that the first group is willing to take more PR.

The above arguments lead to the development of the following hypothesis:

H7. Early adopters are less likely to be negatively influenced by privacy risk in their attitude toward m-payment app use, compared to laggards.

1.8.Perceived financial risk (FR)

Financial risk mainly includes the problems that can be encountered during the financial transactions, hence, losing money because of the system mistakes. It is also the potential losses that may be associated with the initial purchase price (Akturan and Tezcan, 2011).

Since losing money or encountering with hidden, unexpected charges (Wu and Wang, 2005) are the biggest concerns of the consumers; perceived financial risk is one of the most important barriers to the adoption of new technologies, especially in the context of payments (Tan et al., 2014; Leong et al., 2013; Ong, Poong, and Ng, 2008). Keeping in mind that LA is more skeptical about their loss (Kotler, 1994), the following hypothesis is proposed:

H8. Early adopters are less likely to be negatively influenced by financial risk in their attitude toward m-payment app use, compared to laggards.

The research model and hypotheses are summarized as in Figure 2.

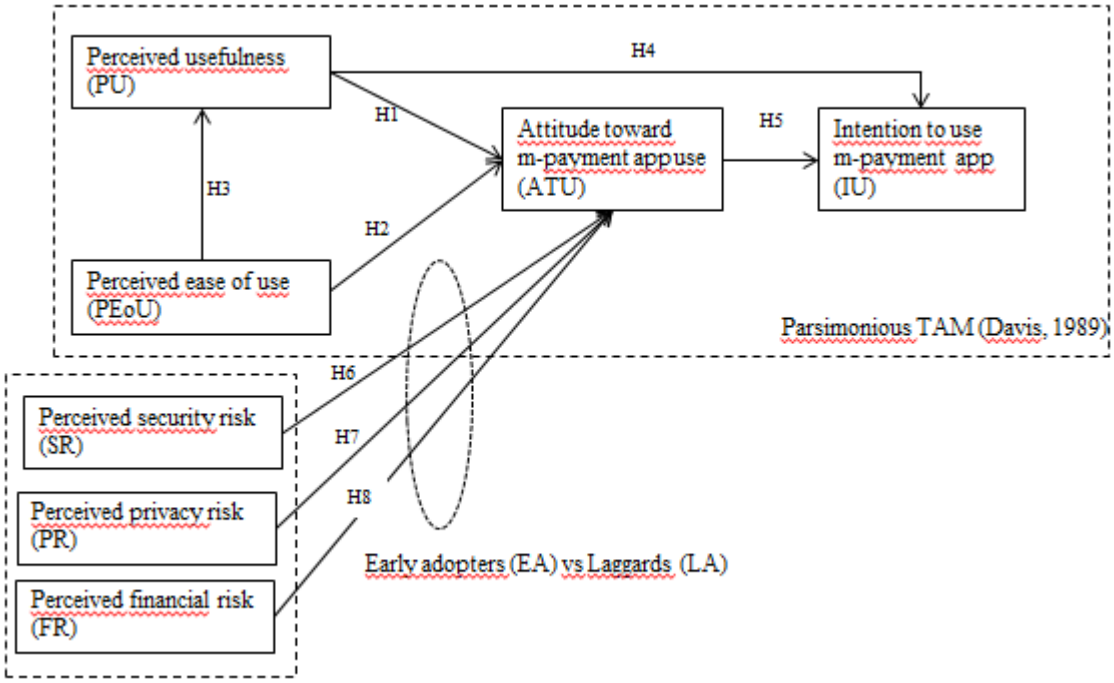

Figure 2. Proposed Research Model

2. Research Methodology

Data was collected using a structured instrument. Respondents had to show their agreement level with each measure at a five-point Likert scale, ranging from strongly disagree to strongly agree. Scales were adapted from the literature. Among the scales; EA and LA scales were adapted from Kim, Mirusmonov, and Lee (2010), PU and PEoU were adapted from Tan et al. (2014); ATU and IU were from Lee (2009); PR was adapted from Son and Kim (2008); SR was adapted from Pikkarainen et al. (2004); and FR was adapted from Stone and Gronhaug (1993). The initial version of the instrument was refined by careful scrutinizing by a few colleagues. A pilot test was conducted with 14 respondents in order to determine the correct wording of the instruments.

3. Data Analysis and Results

3.1. Sampling and Data Collection

Data was collected with the help of graduate students in a period of three weeks. Each has returned 10 questionnaires filled up by their colleagues, in return for an additional letter grade. There was a cross check question at the beginning of the survey asking whether the respondent had ever used m-payment app. If the respondent answered this question as No but classified him/herself as an early adopter, this survey was eliminated. After the elimination of

the invalid responses, the sample ended up with 238 valid responses; 133 of them turned out to be EA, while 105 of them being LA.

The demographic characteristics of the sample can be observed at Table 1.

Table 1. Sample Demographics

Measure		**EA (N1=133) (%)**	**LA (N2=105) (%)**
Gender	Male	78 (58.6)	51 (48.6)
	Female	55 (41.4)	54 (51.4)
Age	18-25	37 (27.8)	25 (23.8)
	26-32	51 (38.3)	36 (34.3)
	33-40	29 (21.8)	23 (21.9)
	40+	16 (12)	21 (20)
Education	Under high school	0 (0)	5 (0.48)
	High school graduate	9 (0.67)	12 (11.4)
	University graduate	76 (57.1)	60 (57.1)
	Postgraduate	48 (36)	28 (26.7)
Income	0-3000	31 (23.3)	29 (27.6)
	3001-6000	37 (27.8)	31 (29.5)
	6001-9000	31 (23.3)	28 (26.7)
	9001+	34 (25.6)	17 (16.2)
Times to use m-payment app	1	0	NA
	2	0	NA
	3	29 (21.8)	NA
	3+	104 (78.2)	NA

As Anderson and Gerbing (1988) recommended, I follow the two-step approach. First, the model was examined, construct reliability and validity were tested. Then the hypotheses of the structural model were tested with the help of LISREL with Structural Equation Modeling (SEM).

3.2.Reliability and Validity

Prior to the data analysis, Cronbach's α test was applied to assure the reliability of the scales. As suggested by Nunnally and Bernstein (1994), the Cronbach's α should be higher than

0.70. As shown in Table 2, the least Cronbach's α value was 0.767, proving the sufficient internal consistency of the measurement instrument.

At the second step to test convergent and discriminant validity of the constructs, factor analysis was employed. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.867 for EA sample; and 0.894 for LA sample. With these results, the application of factor analysis was proved to be appropriate. Although there are different views on acceptable factor loadings, loadings 0.5 or greater were accepted as significant in the study (See Table 2). After the analysis one item (SR3), which had the poor loading was removed from the measures. The factors accounted for 74.5% of the total variance for EA and 74.3% for LA.

By comparing the square root of AVE and its correlation coefficient with other constructs, discriminant validity was examined. In order to confirm discriminant validities of the scales; the square roots of the AVEs should be larger than all corresponding correlation coefficients. All data was proved good validities as shown in Table 3 and Table 4.

Table 2. Results of Validity and Reliability Analysis

		Early Adopters			Laggards		
Variable	**Item**	**Loading**	**Cronbach's Alpha**	**AVE**	**Loading**	**Cronbach's Alpha**	**AVE**
PU	PU1	0.742	0.893	0.577	0.599	0.936	0.512
	PU2	0.776			0.728		
	PU3	0.811			0.784		
	PU4	0.776			0.673		
	PU5	0.728			0.726		
PEoU	PEoU1	0.872	0.879	0.618	0.737	0.900	0.777
	PEoU2	0.875			0.701		
	PEoU3	0.850			0.635		
	PEoU4	0.702			0.654		
SR	SR1	0.870	0.903	0.623	0.649	0.796	0.523
	SR2	0.863			0.790		
PR	PR1	0.689	0.833	0.501	0.807	0.894	0.612
	PR2	0.647			0.776		
	PR3	0.739			0.837		
FR	FR1	0.852	0.767	0.853	0.802	0.722	0.801
	FR2	0.867			0.859		
	FR3	0.744			0.531		
	FR4	0.737			0.687		
ATU	ATU1	0.521	0.905	0.719	0.726	0.893	0.783
	ATU2	0.661			0.700		
	ATU3	0.713			0.619		
	ATU4	0.550			0.705		
IU	IU1	0.868	0.910	0.532	0.793	0.886	0.536
	IU2	0.875			0.720		
	IU3	0.586			0.724		

Table 3. Square Root of AVE vs Factor Correlation Coefficients for EA

	PU	PEoU	SR	PR	FR	ATU	IU
PU	**0.759**						
PEoU	0.044	**0.786**					
SR	-0.132	0.057	**0.789**				
PR	-0.151	0.196	0.063	**0.708**			
FR	-0.038	-0.045	-0.045	-0.025	**0.923**		
ATU	0.057	0.038	-0.025	0.077	0.013	**0.848**	
IU	0.403	0.337	-0.055	-0.231	-0.142	0.346	**0.729**

Table 4. Square Root of AVE vs Factor Correlation Coefficients for LA

	PU	PEoU	SR	PR	FR	ATU	IU
PU	**0.715**						
PEoU	0.098	**0.881**					
SR	-0.026	-0.014	**0.723**				
PR	-0.019	-0.003	0.032	**0.782**			
FR	-0.011	-0.058	0.029	0.043	**0.895**		
ATU	0.121	0.157	-0.034	-0.045	-0.107	**0.885**	
IU	0.025	0.124	-0.033	-0.101	-0.028	0.126	**0.732**

3.3.Hypothesis Testing

LISREL 8.8 was used to test the research model and corresponding hypotheses. Before evaluating the results of SEM, model fit indices were examined (Table 5). The results of the indices indicate a good fit between the model and the data both for EA and Laggards.

Table 5. Fit Indices

Fit index	X^2/df	RMSE	GFI	CFI	NFI	NNFI
Recommended	<3[a]	<0.08[b]	>0.90[a]	>0.90[b]	>0.90[c]	>0.90[c]
EA	2.48	0.076	0.92	0.95	0.92	0.94
LA	1.67	0.078	0.93	0.97	0.93	0.96

[a] Hair et al. (2010).

[b] Bagozzi and Yi (1988), Hair et al. (2010).

[c] Gefen, Straub, and Boudreau (2000)

As shown in Figure 3, for EA, path analysis results don't support all the proposed hypotheses. In terms of effects on ATU; only PU (H1a) has significant effects on ATU. The other variables, namely SR and FR and PEoU (H2a), don't have any significant effect on ATU when the EA are concerned. When the effect of PEoU on PU is investigated, the results show a significant effect, giving support to H3a. The effect of PU on IU is also significant, supporting H4a. And the last relationship of TAM, which is the effect of ATU on IU is proved to be significant, supporting H5a. Concerning the risk factors, EA has the only concern for PR, not for SR and FR (See Table 6).

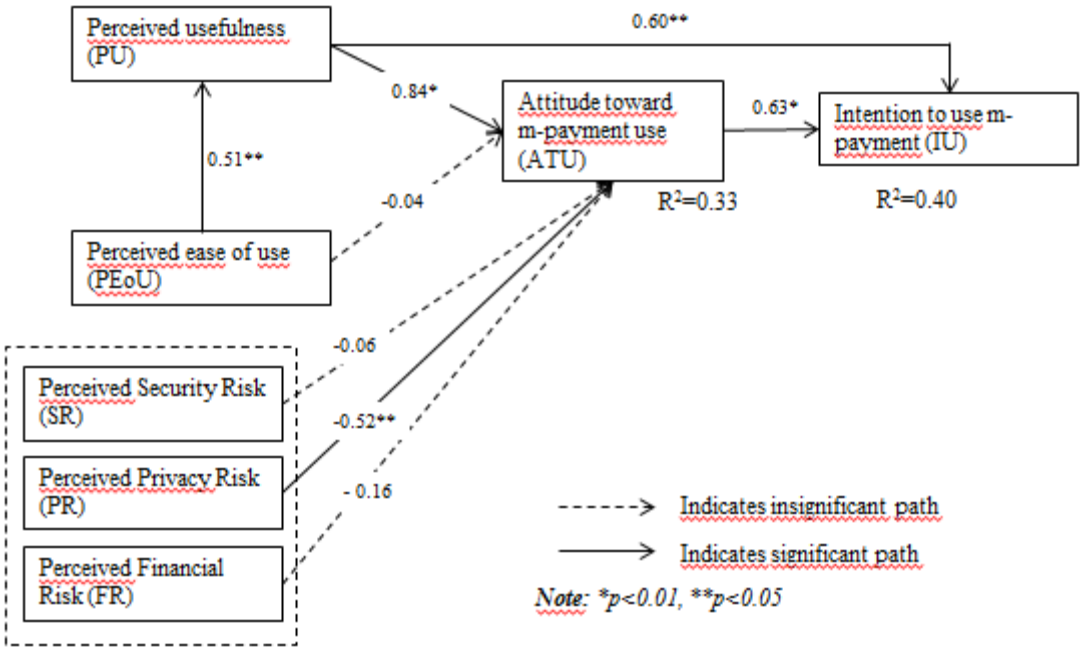

Figure 3. Test Results for EA

When the second set of hypotheses, concerning the LA, is investigated, three out of five hypotheses are accepted. According to the results; there is no effect of PEoU; on both ATU and PU, giving support to H2b and H3b. And the other supported hypothesis is H4b, which is the effect of PU on IU; showing no significance. The hypotheses; suggesting no significant effect of PU on ATU (H1b), and ATU on IU (H5b) are proved to be significant, not supporting to hypotheses. When the risk factors are investigated; LA's ATU is influenced by SR and FR, but not PR (See Table 6).

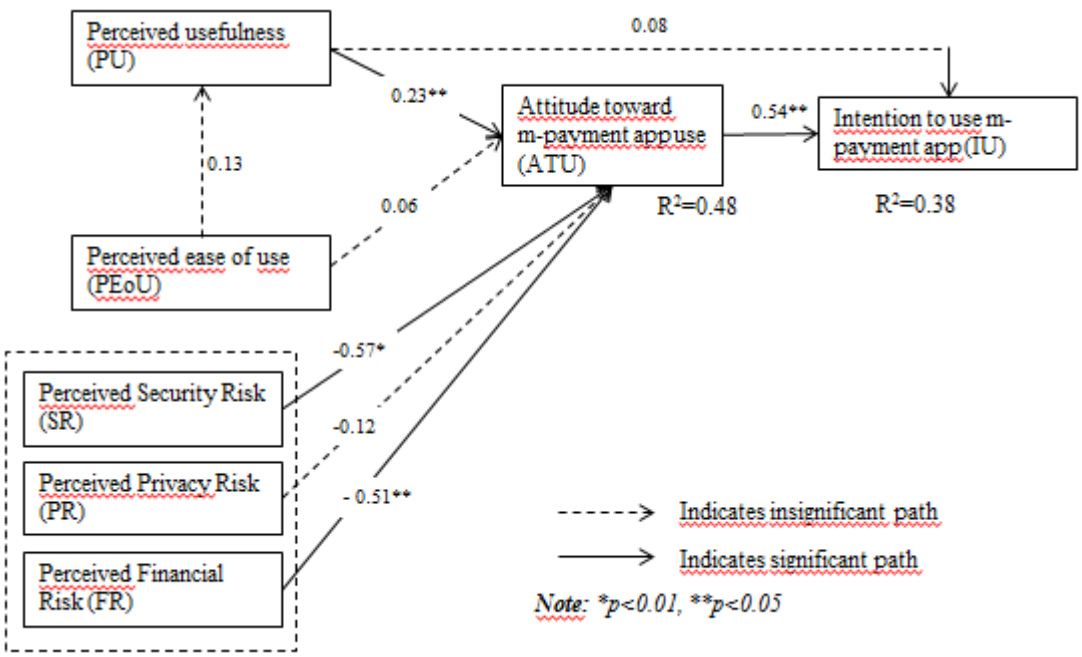

Figure 4. Test Results for LA

When comparing EA and LA in their risk perceptions; the only PR on ATU (H7) does not have support from the data. Although EA doesn't have any concern for SR and FR, LA have. The result gives support to the H6 and H8. On the other hand, although EA has concerns for PR, interestingly, LA don't have any. This result gives no support to H7. The results are summarized in Table 6.

When the squared multiple correlations (R^2) are investigated for both EA and LA; for the dependent variable ATU; it is 0.433 for EA and 0.38 for LA. In the study, variables explain 43 percent of the variability in ATU for EA and 38 percent for LA. Furthermore, for the dependent variable IU; the predictor variables explain 40 percent of the variability for EA and; 45 percent for LA.

Table 6. Results of Hypothesis Testing

Path	**Early Adopters (EA) (N1=133)**			**Laggards (LA) (N2=105)**	
	Estimate	**Support**		**Estimate**	**Support**
H1a: PU → ATU	0.841*	YES	H1b: PU → ATU	0.233**	NO
H2a: PEoU→ATU	-0.04	NO	H2b: PEoU→ATU	0.064	YES
H3a: PEoU→ PU	0.511**	YES	H3b: PEoU→ PU	0.131	YES
H4a: PU → IU	0.602**	YES	H4b: PU → IU	0.082	YES

H5a: ATU →IU	0.631*	YES	H5b: ATU →IU	0.541**	NO
Comparison results of EA and LA on risk factors					
	EA	**LA**	**Support**		
H6: SR → ATU	-0.061	-0.571*	YES		
H7: PR → ATU	-0.523**	-0.121	NO		
H8: FR → ATU	-0.164	-0.512**	YES		

*p<0.01; **p<0.05

The next section will discuss the results of the study.

4.Discussion of the Results

The main aim of the present study is to investigate risk perception; i.e. PR, SR, and FR, differences between EA and LA in the context of m-payment app utilization. Further; the study investigates the extent of TAM constructs' contribution to the m-payment app acceptance of both EA and LA.

The firsts set of results are about EA. They are the most important group of people in the adoption process since they share similarities with opinion leaders (Kotler, 1994). They are the ones that greatly influence the diffusion speed and the adoption rate (Van Eck et al., 2011). They have a following social network which they share their opinion immediately (Eastman et al., 2014).

The first findings of EA are the influence of PU and PEoU. Although EA is driven by PU ($\beta = 0.841$, $p<0.01$), they are not driven by PEoU. This is mostly because of their expertise in the subject. Since they are the one to try most of the technological products first, they are familiar with the similar type of products, such as NFC-based payment systems. So, PEoU is not a factor that determines their attitude towards m-payment app use. They more care about the usefulness of the technology which will ease their life. On the other hand, PEoU has a contribution to PU ($\beta = 0.511$, $p<0.01$) which indicates an indirect effect on IU.

Another result is the effect of PU on IU. For EA, their intention to use the technology is directly affected from PU ($\beta = 0.602$, $p<0.05$). Just like PU, ATU has a significant effect on IU ($\beta = 0.631$, $p<0.01$) which is an expected relationship and is proved on different mobile technologies in previous studies (Thakur and Srivastava, 2014; Kim and Lee, 2010).

An important empirical finding of the study is the effect of PR on ATU ($\beta=-0.523$, $p<0.05$). In his two studies, Shin (2009; 2010) has also found a similar result for m-payment acceptance. EA are not influenced by SR and FR. It's mostly because they have the information

about how to secure themselves and probably have the technical information about the security of the system. Moreover, they do not have any FR perception. This result is in line with the findings of Thakur and Srivastava (2014). It is probably not because they do not foresee any monetary problem related with the system, but because they are ready to accept them. At the end, they do know that all the new technologies come with some risks. If they want to be first to try, they have to bear the related risks.

EA have the most concern about their privacy. They care about the unofficial use (Dewan and Chen, 2005) of their information or the service providers' intention to sell (Yang et al., 2012) their data. The finding has the support from Shin (2009; 2010), Mallat (2007), and Khalilzadeh et al. (2017). They have to be assured of their privacy.

When the LA are concerned, the hypotheses related to the TAM constructs suggest no impact of any of the constructs on attitude or intention. Only two of them are not supported, being the PU on ATU, and ATU on IU. The results suggest that LA is only looking for the usefulness of the system. And if the system appears to be useful it influences their attitude and their intention to use the app positively.

When the risk perceptions of LA are evaluated, the expected result was actually the negative impact of all three risks. It is usually the observed result in the literature (Akturan and Tezcan, 2012; Thakur and Srivastava, 2014) related to the mobile technology studies. Surprisingly, the results show that PR has no impact on them. LA are negatively influenced by SR (β= -0.571, $p<0.01$) and FR (β= -0.512, $p<0.05$), but not by PR. It could stem from the fact that they have never used the app before, so they know nothing about the information they should supply to the system. On the other hand, they know that every technology comes with some security risks which they already have concerns. And since it's a payment system, they care about financial security.

When two groups are compared on risk factors, they share nothing in common. While EA is negatively influenced by PR, LA is negatively influenced by SR and PR. The results suggest that all the risk factors are in concern for some group of people, and all need to be assured that the technology is risk-free or the precautions taken should be displayed clearly.

Theoretical contributions. From a theoretical point of view, the most important contribution of the study is to shed a light by comparing risk perceptions of EA and LA. Literature review has revealed no study of the risks on the subject, so it is the first time that the risk factors are used to compare EA and LA. Another important theoretical contribution of the study is being it first to investigate m-payment app use. There are other studies in the literature on NFC-based

m-payment (Kim et al., 2010; Thakur and Srivastava, 2014; Shin, 2010), but no study is ever investigating an app use to complete the payment. In addition, the study has extended the TAM with the addition of three external variables (SR, PR, FR) which further explains the adoption process. M-payment systems are mostly studied by the engineering scholars and usually focused on the technical aspects of the system. This study is an attempt to broaden the understanding of the app use from the social sciences point of view.

Managerial implications. From the practitioners' point of view, this study came up with valuable insights to deal with risk perceptions of two different groups of people. EA are very important to the market since their experience with the m-payment apps will determine the success or failure of the technology (Van Eck et al., 2011). They have to be treated very carefully and their perceptions regarding the usefulness of the technology or the risks should be carefully examined. According to the results of the study, PU is an important driver for EA, and for LA. Therefore, merchants should stress out the usefulness of the technology in order to enhance attitude and intention of the app use. Making the apps easily understandable, and clear use information will help. EA are concerned about their privacy. When they feel their personal information is not under control, their attitude toward the system is affected (Gao et al., 2013). As Khalilzadeh et al. (2017) suggest, privacy must be clearly addressed in the systems. Having strict privacy policies and displaying them overtly could lead EA to trust to the service provider. It is not only the service itself but the service provider is also very important for the consumers (Zhang and Mao, 2008). An established brand name, or having a trustworthy company at the backstage will contribute to the protection perception. At the coming years of the technology, service providers have to deal with LA. LA are the most skeptical consumers in adoption of new technologies (Kotler, 1994). Understanding them, and targeting done correctly, will lead to the easy targeting of all the other groups under the adoption of innovations curve. Risks should be dealt very carefully, since high levels of risk perceptions might weaken the role of PEoU and PU (Gao et al, 2013; Khalilzadeh et al. 2017).

Limitations and Future Research Directions

As with any other study, the findings of this study have to be carefully approached with its limitations. First, actual usage behavior is not included in the model, since LA have never used the system yet. Second, only three risk factors are considered in the study. Although they are the most interfering ones, there is a future research direction to make a study incorporating all the risk factors. Third, the data was collected in a geographically constrained area. Extending

the findings to the other environments may lead to the elaboration of the results. Lastly, these results are displaying the risk perception and acceptance of a technology which is in its infancy. As the technology evolves, risk perception of EA and LA may change. A longitudinal study on the subject is an open area for future research.

Despite all the mentioned limitations, this paper elaborates our understanding of the risk perceptions of EA and LA, as well as driving factors of their attitude and intention to use the apps.

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