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Are Consumers Ready for Mobile Payment? An Examination of Consumer Acceptance of Mobile Payment Technology in Restaurant Industry

Cihan Cobanoglu
University of South Florida Sarasota-Manatee, CIHAN@CIHAN.ORG

Wan Yang
University of South Florida Sarasota-Manatee, wy.wanyang@gmail.com

Anna Shatskikh
University of South Florida Sarasota-Manatee

Anurag Agarwal
University of South Florida Sarasota-Manatee

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Abstract

As an emerging payment method, mobile payment technology is perceived to be a secure and effective substitute of traditional debit/credit card payment. Although several reports and scholars claimed that mobile payment technology would become a major future payment method, consumers rather caught on this trend slowly, and little is known about key determinants of consumers' acceptance of mobile payment. To close that gap, the current study extended the classic Technology Acceptance Model by adding four additional predictors that are relevant to hospitality industry. The study results suggested that compatibility with lifestyle was the strongest predictor of consumers' intention to adopt mobile payment technology in restaurants, followed by perceived usefulness, subjective norm, security, and previous experience with mobile payment. Important theoretical and practical implications were provided based on our findings.

Keywords
Mobile Payment, Technology Acceptance Model, Payment Security

Introduction

The rapid evolution of mobile technologies, as well as the wide network of mobile phone users, warrants Mobile Payment (MP) systems an important place in the electronic commerce industry (Au & Kauffman, 2008). MP is a type of payment that occurs through an electronic procedure, during which the consumer uses mobile communication techniques together with mobile devices for initiation, authorization, or realization of a payment (Pousttchi, 2005). MP can be defined as a separate way of electronically processing payments (Schierz at al., 2010) or "any payment where a mobile device is used in order to initiate, activate, and/or confirm a payment" (Karnouskos & Focus, 2004, p.44). The mobile device is the core differentiating characteristic of MP compared to other types of payment.

MP is perceived to be a safe, easy and effective payment method which is extremely important to hospitality industry. Cobanoglu & DeMicco (2007) argued that safety and efficiency are two major issues in hospitality industry where the majority of POS (Point-Of-Sale) security fraud incidents occur. The restaurant industry has become attractive to hackers due to its traditionally low computer and network security. For example, according to a recent report, 80 percent of security threats in restaurants come from POS systems (Clark and Zhang, 2008). In most cases, hospitality businesses are unaware of the vulnerability of their network security until they face a breach that comes with fines, penalties and forensic costs (Kang et al, 2007). However, an even bigger cost relates to damaged reputation and customer loyalty, which could result in significant business losses (Kalkan et al., 2008). Negative publicity on information security breaches has a devastating impact on guest satisfaction, revisit intention and word of mouth communications (Berezina et al., 2012).

As a contactless payment method, MP has its unique advantage to prevent identity frauds. It could reduce fraudulent POS transactions since customers would no longer need to give their personal credit/debit card information to service employees (Hayashi, 2012). Kasavana (2006) claimed that the use of contactless payment options such as MP in quick service restaurants would become popular in the next couple of years as it could benefit all parties in the payment process: consumers feel that the transaction is more secure and expedient, restaurant operators gain customer satisfaction and trust, and banks develop stronger relationships with cardholders (Kasavana, 2006).

Surprisingly, despite the advantages of MP, hospitality businesses have not taken off as fast as predicted, and they suffer from a lack of customer acceptance (Garther Group, 2009; Zmijewska et al., 2004). This fact points to the gap between the prospect and reality of mobile payment technology (Zmijewska at al., 2004). Consumers feel hesitant and doubtful when they hear about MP applications (Schierz et al., 2010). The slow adoption of MP in hospitality

industry calls for studies to examine consumers' acceptance of this new payment method. As suggested by Kim et al., (2008), more technology applications have been introduced to restaurant and hotels, but few studies have been conducted to investigate the acceptance behavior of technology in hospitality organizations (e.g., Ham, 2008; Lam et al., 2007; Lee et al., 2006; Schrier at al., 2010; Wang & Qualls, 2007; Wober & Gretzel, 2000). To close that gap, the current study aims to empirically investigate the relevant factors that influence MP adoptions in the restaurant industry. Building on the classic Technology Acceptance Model (TAM), six predictors were introduced in the current study to build a model of MP Acceptance, including perceived usefulness, ease of use, subjective norm, and compatibility with lifestyle, security, and previous experience with MP technology.

Literature Review

Mobile Payment

According to the Federal Reserve Bank of Boston, there are two kinds of MP (Becker, 2007): remote MP and proximity MP. Remote MP is extremely convenient for person-to-person payments and payments to merchants who do not have a traditional POS system (e.g. farmers market vendors). Remote MP also includes paying for purchases from a web merchant via a mobile phone (Smart Card Alliance, 2007). Proximity MP, on the other hand, is convenient for POS and vending machines. In such cases, instead of using a traditional payment method like cash or credit/debit card, consumers make a mobile payment which relies on a proximity exchange of financial information through a transportable platform. From consumers' perspectives, the proximity MP can be perceived as a contactless credit or debit card transaction without actually giving the cards to the merchants. The whole process of a proximity MP transaction happens in front of the customer. This type of payment is extremely convenient, as it takes very little time to complete and removes the security concerns of using a physical card (Ding & Unnithan, 2005; Kasavana, 2006). For the purpose of this study, the term "MP" mainly refers to proximity payments made via mobile devices at the POS (Point-Of-Sale) which is common in hospitality industry.

MP Technology Acceptance Model Development

Technology advancements can provide numerous benefits in the marketplace; however, consumers will ultimately decide whether they would like to try the new technology. Therefore, factors that can affect consumer adoption behaviors are especially important in the new technology context (Amberg at al., 2004; Severt

at al, 2010). Consumer acceptance can be defined as a "relatively enduring cognitive and affective perceptual orientation of an individual" (Schierz at al., 2010, p. 210).

There are different research models which explain technology adoption behaviors. Among the existing models, Technology Acceptance Model (TAM) is the fundamental and widely accepted model to examine customer acceptance of various information systems (Davis, 1989). TAM includes two determinants of new technology acceptance — perceived usefulness and perceived ease of use.

Perceived Usefulness

One of the main reasons behind the slow adoption of MP by consumers is the lack of a clear understanding of the benefits. A consumer's intent to use new technology is based on his or her perception of the perceived usefulness of the technology (Davis, 1989). Perceived usefulness is "the degree to which a person believes that using a particular system would enhance his or her job performance" (Mallat, 2007). Empirical evidences revealed that perceived usefulness positively influenced consumers to use MP technologies (Karnouskos & Focus, 2004; Kim et al. 2010; Pousttchi, 2005). Therefore, we propose the following hypothesis:

H1: Perceived usefulness will have a positive effect on consumer's intention to use MP in restaurants.

Perceived Ease of use

Many researchers have demonstrated that perceived ease of use is another important factor that influences a consumer's intention to utilize new technology (Agarwal & Prasad, 1999; Davis, 1989; Karnouskos & Focus, 2004; Zmijewska et al., 2004). Perceived ease of use refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). The importance of perceived ease of use for MP acceptance is demonstrated by other researchers (Dahlberg & Mallat, 2002; Pousttchi, 2005). MP technology is essentially self-service oriented, thus consumers will feel more comfortable and more likely to try the new technology if they find MP is easy-to-use and user-friendly (Dahlberg, 2002).

H2: Perceived ease of use will have a positive effect on consumer's intention to use MP in restaurants.

The advantages of classic TAM are that it is comprised of reliable instruments and its conciseness and empirical solidity (Pavlou, 2003; Wang et al., 2011). However, TAM fails to capture all important factors that may influence consumers adoptions of different technologies in different industries. For

example, TAM does not take into account social influence which may affect consumers' intentions to use mobile payment in restaurant. As consumers dine out and use mobile phones in a public context, they will have an opportunity to observe their friends' behaviors, and they may also adapt their own behaviors based on their important others' reactions (Nysveen et al., 2005). Therefore, other key factors that are relevant to MP adoption in restaurant industry are included in the current study.

Perceived Security

Along with the perceived benefits (ease of use and usefulness), new technologies usually pose some risks (Schierz at al., 2010). In the context of mobile services, the biggest concern for consumers lies in the probability of the invasion of their privacies. Security issues are especially problematic for the restaurant industry, as this industry includes a great number of small merchants. Unlike financial institutions or large telecom operators, consumers are less likely to trust small merchants and feel reluctant to disclose their personal information (Mallat & Tuunainen, 2008). With the current state of safety for electronic transactions as well as commercial information exchange, security becomes the most important concern (Kadhiwal & Zulfiquar, 2007).

Kreyer at al. (2002) claimd that the security issue could be examined from two perspectives: objective security and subjective security. Objective security is a formal technical characteristic, which could respond to confidentiality, integrity, authentication, authorization and nonrepudiation. In contrast, subjective security is considered to be the degree to which a "person believes that using a particular mobile payment procedure would be secure" (Pousttchi & Wiedemann, 2007). In general, objective and subjective security are related and interdependent. However, subjective security has a stronger effect on consumers' intention to adopt new technology. For example, Linck et al. (2006) suggested that the true reason for security concerns from a customers' viewpoint is neglecting subjective security (Linck et al., 2006). Therefore, we argue that customers' perceived security of MP technology will play an important role on MP adoption.

H3: *Perceived security will have a positive effect on the intention to use proximity MP in restaurants.*

Subjective norm

In the context of MP, subjective norm refers to the degree to which mobile payment is perceived as desirable in a social environment (Schierz et al., 2010, p. 210). Fishbein & Ajzen (1975) describe the subjective norm as "the person's perception that most people who are important to him think he should or should

not perform the behavior in question" (p. 302). The concept stresses the role of opinions of relatives, friends, peers, etc. This factor is included as a direct determinant of behavioral intention in the Theory of Reasoned Action (Fishbein & Ajzen, 1975). In an early stage of technology adoption, most consumers may feel lack of understanding of the technology and may not be knowledgeable enough to evaluate usefulness, ease of use, and security. Consequently, consumers tend to follow the social norm in their decisions of technology adoption (Nysveen et al., 2005S; Schierz et al., 2010). Accordingly,

H4: *Subjective norm will have a positive effect on consumer's intention to use MP in restaurants.*

Perceived Compatibility with Lifestyle

Another extension of the TAM is compatibility with lifestyle, which was found to be a core innovation factor driving consumer acceptance of new technology (Lu et al., 2011; Tornatzky & Klein, 1982). Compatibility with lifestyle, in the context of MP, is defined as the degree to which mobile payments are compatible with the values, experiences and behavioral patterns that consumers already have (Schierz et al., 2010; Lu et al., 2011). For example, if a consumer is technology-savvy, she will be more likely to use MP technology. On the other hand, if a consumer only believes in cash payments and doesn't trust new technologies, then MP is not compatibility with her personal belief. Consequently, she will feel reluctant to adopt MP as a new payment method. Extant studies showed that mobile services compatibility with consumers' lifestyle has a positive effect on their intentions to use new services (Kim et al., 2010; Mallat, 2007). Similarly, Schierz et al. (2010) revealed that perceived compatibility was a useful extension of the TAM and could increase the predictive power in the decision making process of using a new technology.

H5: *Perceived compatibility will have a positive effect on consumer's intention to use MP in restaurants.*

Previous experience with MP

Taking into account the popularity of mobile and smartphone devices, it is important to determine whether those who already had a chance to make remote payments via a mobile phone would be more adoptive in using proximity MP in restaurants. We argue that mobile users who have already tried proximity MP are more likely to adopt MP in restaurant compared to users who do not have such experiences (Kim et al., 2010). Figure-1 presents our conceptual model.

H6: *Previous experience with MP will have a positive effect on consumer's intention to use MP in restaurants.*

Figure 1: Conceptual Model
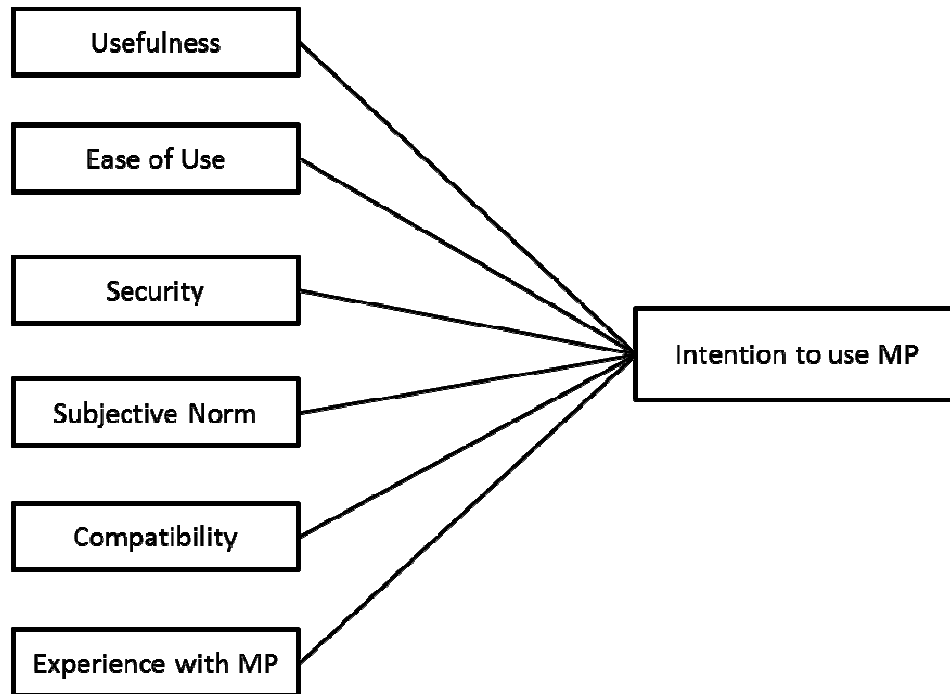
Methodology

Study Procedure

A questionnaire was developed to test our hypotheses. Respondents were recruited from an online research company and only smartphone users were qualified to participate in the study. To ensure that all respondents had a good understanding of MP technology, a definition of MP along with a 30-second video clip showing how MP works were provided in the beginning of the questionnaire. After watching the video clip, respondents were asked to answer questions regarding their previous experience with MP and other key constructs of interests. Demographics such as gender, age, educational level, occupation, and income level were captured in the end of the survey.

Respondents

Subjects were recruited through an online research company. 300 participants filled out the survey. 42 collected questionnaires were disqualified due to missing data, invalid responses, or incomplete responses. Therefore, a total of 258

respondents were used in the data analysis. There were 64.3% male respondents. The majority of participants were from 18 to 35 years old (72.1%), had some college degree or higher (84.9%), with an annual household income between $15,000 and $70,000 (68.2%).

Measurements

Perceived Usefulness was measured by four items adapted from Van der Heijden (2003), Chandra at al.(2010) and Kim at al. (2010) (e.g.: Using mobile payment would enable me to pay more quickly). Perceived ease of use was measured by four items employed from Venkatesh & Davis (2000) and Chandra at al. (2010) (e.g.: It would be easy to get a mobile payment system to do what I want it to do). Security was assessed by three items employed from Parasuraman at al. (2005) (e.g.: I find mobile payment services secure for conducting my payment transactions). Compatibility was measured by three items adapted from Moore & Benbasat (1991) and Pouffe at al. (2001) (e.g.: I think a mobile payment is compatible with my lifestyle). Subjective Norm was assessed by three items employed from Venkatesh & Davis (2000) (e.g.: People who are important to me would find using mobile services beneficial).

Intention to use MP was capture by three items such as "I am likely to use mobile payment in restaurant/cafe/bar in the near future" and "I intend to use mobile payment services in restaurant/cafe/bar when the opportunity arises." All of the above six constructs were measured on 7-point likert scales anchored on strongly disagree to strongly agree. Previous experience with MP was captured by asking respondents to indicate whether they have used MP in the past (Yes or No). Please refer to appendix for a full list of measurements.

Results

Factor Structure Testing

A confirmatory factor analysis (CFA) was first employed to confirm the factor structure in the current study including perceived usefulness, perceived ease of use, security, compatibility with lifestyle, social norm, and intention to use MP. Previous experience with MP was not included in the CFA model since it was not a latent variable. Each item was constrained to load only on one factor. The results suggested good model fit: Chi-square = 337.489 (df = 152), p<0.001, CFI=0.962, IFI=0.962, NFI=0.933, RMSEA= 0.069. All the reported model fit indices suggest the measurement model fits data well. In addition, all standardized factor loadings are significant and greater than 0.7 except for one item measuring Subject Norm was 0.603. Average Variance Extracted (AVE) values ranged from

0.679 to 0.827. All exceeded the 50 percent rule of thumb suggested by Hair (2010), indicating acceptable convergent validity. In reliability test, Cronbach's alpha values of all variables ranged from 0.85 to 0.94, suggesting high internal consistency. Please refer to Table 1 for detailed statistics.

Table 1. Confirmatory Factor Analysis Results

Factor	Item	Factor Loading	AVE	Cronbach's Alpha
Usefulness	U1	0.833	0.760	0.937
	U2	0.853		
	U3	0.890		
	U4	0.909		
Easy to Use	E1	0.746	0.679	0.900
	E2	0.845		
	E3	0.811		
	E4	0.888		
Security	S1	0.868	0.714	0.873
	S2	0.916		
	S3	0.741		
Compatibility	C1	0.913	0.801	0.933
	C2	0.874		
	C3	0.897		
Subjective Norm	N1	0.603	0.685	0.845
	N2	0.937		
	N3	0.902		
Intention to Use	I1	0.910	0.827	0.933
	I2	0.894		
	I3	0.924		

Hypotheses Testing

A multiple regression analysis was used to test the six hypotheses. Intention to use MP was regressed on usefulness, ease of use, security, compatibility with lifestyle, subjective norm, and previous experience with MP. Previous experience with MP was dummy coded as 1= Yes (the respondent had experience in MP) and 0= No (the respondent did not have experience in MP). Variance Inflation Factors (VIF) was first assessed. None of the independent variables had a VIF value greater than 10, indicating that multicollinearity was not an issue in the current study. According to the multiple regression analysis results, 77.6 % of the variances in

Intention to use MP were explained by the six predictors, indicating a strong explanatory power of the current regression model.

To test our six hypotheses, regression coefficients for each of the named factors were examined (Please refer to table 2). The results revealed that all predictors were significant except perceived ease of use. Therefore, all hypotheses are supported except H2. Among the five significant factors, compatibility with lifestyle is the strongest predictor (standardized coefficient = 0.433) followed by usefulness, subjective norm, security, and previous experience with MP. Given the coefficient of the significant independent variables, the regression equation for the MP acceptance model can be written as follows:

MP acceptance = 0.359*Usefulness + 0.162*Subjective Norm + 0.476*Compatibility + 0.120*Security + 0.264*Previous Experience with MP

Table 2. Multiple Regression Results

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Hypotheses Testing
	B	Std. Error	Beta			
(Constant)	-.057	.433		-.133	.895	
usefulness	.359	.071	.303	5.065	.000	H1 - supported
Ease of use	-.010	.059	-.006	-.162	.871	H2 -not supported
Security	.120	.038	.113	3.140	.002	H3 - supported
Subjective norm	.162	.043	.134	3.784	.000	H4 - supported
Compatibility with lifestyle	.476	.067	.433	7.072	.000	H5 - supported
MP experience	.264	.108	.081	2.448	.015	H6 - supported

Discussion

Identity frauds caused by credit/debit card usage costs American business and consumers about $21 billion in 2012 (Elliott, 2014). In fact, the hospitality industry in general is at high risk of this kind of fraud due to a variety of factors such as high usage of credit and debit cards, high turnover of employees, and failure to perform employee-background checks (Elliott, 2014). As an emerging payment method, mobile payment has its unique advantages including convenience, flexibility and security. However, despite the advantages of mobile payment over traditional payment methods, this technology has not been widely used in the hospitality industry, and little is known about consumers' acceptance of this new payment method. To the best of the authors' knowledge, the current study is among the first to examine the MP technology adoption in the restaurant industry. Extending the traditional technology acceptance model, we built a model

of MP acceptance with five significant predictors including perceived usefulness, subjective norm, compatibility with lifestyle, security, and previous experience with MP technology.

The study results suggested that compatibility with lifestyle had the greatest impact on consumers' intention to use MP in restaurants. In other words, consumers are more likely to adopt MP services if they feel using the technology fits with their beliefs and behavioral patterns. This finding is in line with the results of Lu et al. (2011) and Schierz et al. (2010). For example, Lu et al. (2011) studied student sample and found that compatibility is especially important to students as they tend to form their MP adoption intentions based on the asscoiated social images with MP technology. We demonstrate that compatibility with lifestyle is also the most important predictor of MP adoption among restaurant consumers.

Our results further suggest that the perceived usefulness of MP and perceived security positively impact customers' intention to use MP in restaurants. In other words, consumers are more likely to adopt the new payment method if they believe MP is secure and can provide significant added value. Similarly, the subjective norm has a positive effect on consumers' intentions to use MP in restaurants. The results suggest that reference groups play an important role in the diffusion of MP and consumers are influenced by their peers in their decisions regarding MP adoption. Additionally, consumers' previous experience with MP also has a positive impact on their intention to use MP, although its impact is not as strong as other predictors.

Interestingly, the current study failed to find a significant relationship between perceived ease of use and consumers' intention to use MP in restaurants. This finding is contrary to classic TAM and other studies on new technology adoptions. One possible explanation is that consumers are familiar with mobile technologies nowadays. We surveyed smart phone users in the current study, and that group of consumers may already been used to various mobile applications. Therefore, the perceived ease of use is not a major determinant of MP adoptions. Another possible explanation could due to the demographic characteristics our sample. The majority of our respondents were between the age 18 and 35. This generation is typically technology savvy and has extensive experiences with mobile technology, therefore it's possible that they don't perceive ease of use as an important factor shaping their MP adoption behaviors.

Practical Implications

Besides the theoretical contributions, this study also provides important implications to hospitality practitioners. Our results suggest that compatibility with lifestyle is the strongest predictor of consumers' intention to use MP.

Therefore, hospitality marketers and technology specialist should first understand their target segments' values and beliefs, then promote MP technology in a way that suit to their values, needs, and lifestyles. A potential marketing strategy could be employed is to design advertisements catering to a group of trendy, innovative, tech-friendly consumers (e.g. generation Y) who desire the flexibility that MP give. The campaign could highlight the uniqueness of using one's smartphone as their wallet and having everything in one device. Promoting a mobile lifestyle to business travelers who are not afraid of entering the mobile technology era could be another option to promote MP in hospitality industry.

In addition, in order for consumers to adopt the new payment method in the hospitality industry, MP should be designed and developed to provide added values and increased level of security. Consumers need to have a convincing reason to switch to MP method. Therefore, hospitality practitioners should advertise MP as a safer and securer payment method than traditional credit/debit cards. Not all MP users are aware of the fact that they have the same level of protection on mobile payment accounts if it is funded with a credit, debit or bank checking account, as with regular bank accounts (Tavilla, 2012). Without handing out the real credit/debit cards, MP can provide better protection against identity thefts. Hospitality practitioners may design educational messages to help potential MP adopters to understand that MP technology has the great potential to provide safer payment transactions than traditional payment methods. They can also encourage consumers to set up basic protection measures such as passwords, anti-virus software, and alert services for various account activities.

The positive effect of previous experience with MP on consumers' intention to use MP is also relevant to hospitality practitioners because it infers that people who have made at least one MP in their lifetime are more likely to repeat it than people who have not used MP before. Hospitality managers may encourage their customer to try out MP, or have their service employees to guide consumers to go through their first MP experiences.

Limitations and Future Research

Several limitations of this study must be recognized. First, the study was limited to a restaurant setting and these results may not be generalizable to other segments of the service industry. Second, the majority of our sample is young, well-educated and technology-savvy, and consequently, we failed to find a significant relationship between the ease of use and MP adoption intentions. Future studies may employ a more representative sample of the population and further investigate the role of perceived ease of use. Third, this study conducted an online survey and excluded non-internet users in our sample. Although the topic of this research can justify the use of internet sample, future study may

capture the MP adoption among elderly and the computer illiterate segments. Lastly, the current investigation is limited by the consumer point of view. Further research could be conducted in order to reveal the barriers for MP adoption in the restaurant industry from the practitioners' perspective.

Appendix – Measurement Items

Usefulness
U1: Using mobile payment would enable me to pay more quickly.
U2: Using mobile payment makes it easier for me to conduct transactions.
U3: By using mobile payment services, my experiences as a consumer are improved (flexibility, speed, convenience, security).
U4: Overall, I think mobile payment system is useful for making payments.

Ease of use
E1: Learning to use a mobile payment would be easy for me.
E2: It would be easy to get a mobile payment system to do what I want it to do.
E3: My interaction with system is clear and understandable.
E4: Overall, I think the mobile payment system is easy to use.

Subjective norm
N1: People who are important to me would find using mobile services beneficial.
N2: People who influence my behavior think I should use a mobile payment.
N3: People who are important to me think that I should use mobile payments.

Security
S1: The risk of abuse of usage information (e.g., names of business partners, payment amount) is low when using mobile payment services.
S2: The risk of abuse of billing information (e.g., credit card number, bank account data) is low when using mobile payment services.
S3: I find mobile payment services secure for conducting my payment transactions.

Compatibility
C1: I would appreciate using mobile payment services in restaurant/cafe/bar instead of alternative modes of payment (e.g., credit card, cash).
C2: I think a mobile payment is compatible with my lifestyle.
C3: Using a mobile payment at a restaurant/cafe/bar fits well with the way I like to purchase products and services.

Intention to use MP in future
I1: I am likely to use mobile payment in restaurant/cafe/bar in the near future.
I2: I am willing to use mobile payment in restaurant/cafe/bar in the near future.
I3: I intend to use mobile payment services in restaurant/cafe/bar when the opportunity arises.

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