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# COGNITIVE TRUST, EMOTIONAL TRUST AND THE VALUE-BASED ACCEPTANCE MODEL IN MOBILE PAYMENT ADOPTION

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## ABSTRACT

Mobile commerce has grown rapidly worldwide and become globally competitive in the last decade. Despite the fact that mobile payment is a key enabling part of mobile commerce, consumers' adoption has been lacking behind the adoption of many other mobile commerce activities. How to facilitate consumers' adoption of mobile payment remains an important open question. Drawing on the attribution theory and value-based acceptance model, this study investigates the role of consumers' trust on mobile payment adoption. In contrast to prior research, we develop a research model to examine the influence of both cognitive and emotional trust on consumers' perceived value and the subsequent usage intention. We examine four dimensions of perceived value, namely functional, emotional, price and social value in the mobile payment context. The model is empirically tested with an online survey (n=273). Our results indicate that emotional trust has a much stronger effect than cognitive trust on consumers' value perceptions. Further, functional, emotional and price value gain prominence in predicting adoption intention, while the effect of social value is insignificant. Discussions on limitations, theoretical and practical implications are provided.

*Keywords:* Mobile payment services, cognitive trust, emotional trust, perceived value, information technology adoption.

## INTRODUCTION

The proliferation of mobile devices and the advancement in wireless network have greatly facilitated the development of mobile commerce [16]. As an extension of electronic commerce (e-commerce), mobile commerce is becoming an inseparable part of today's business arena due to its capability of offering greater flexibility and mobility to online transactions [25]. A recent industrial report shows that the global mobile commerce is worth US\$230 billion, with nearly half of the market coming from Asia, and has been forecasted to hit US\$700 billion revenue by 2017 [22]. In this circumstance, mobile payment (MP), as a critical service supporting mobile business, has received great attention from enterprises. For example, Google has released its MP product: Google wallet. E-commerce companies like eBay and Alibaba have also released MP services, which allow users to conduct payments conveniently by tapping their mobile phones when checking out.

Given the significance of MP services, a large number of studies have been conducted to understand MP users' behavior and identify factors affecting their adoption of MP. Among the many factors, trust has been found to be a key predictor for consumers' usage intentions [2, 4, 5]. Most of these studies adopt a universalist approach to assume that trust is a set of cognitive beliefs regarding the positive characteristics of the trustee, and propose MP adoption as a trustor's purely cognitive decision. For example, Shin [1] contended that consumers' initial trusting beliefs is positively associated with intention to use a mobile wallet. Lu et al. [4] found that consumers' cognitive trust play a vital role in promoting their personal intention to use MP. In a similar vein, cognitive trust in MP has been found to affect behavioral intention by increasing satisfaction [42], attitude [24], perceived usefulness [3], perceived ease of use [31], performance expectancy and reducing perceived risk [25].

On the other hand, recent information systems (IS) scholars begin to question whether it is sufficient to only examine cognitive trust in online environments. For instance, Komiak and Benbasat [10], [11] argued that individuals' experience contains both cognitive and emotional aspects. It implies that consumers' emotional reactions (e.g. feeling secure or not) should not be ignored. In the context of this study, MP is a highly personalized information technology (IT) that allows users to adopt personal mobile terminals like mobile phones to conduct payment for bills, goods and services [42]. Such a unique and personalized IT further requires consumers' to make trust decisions not only based on the rational appraisal of the trustee's reliability and competence, but also based on the feelings of comfort and security [21]. In fact, some IS researchers have suggested that trust involves two dimensions: cognitive trust and emotional trust [15; 33; 41]. Merely considering cognitive trust is not adequate to account for individuals' trust decisions. Based on these concerns, this study addresses the research gap regarding the lack of MP research on the influence of emotional trust. We attempt to highlight the consequence of both cognitive and emotional trust and examining their differences in MP adoption.

We pursue our research objective by developing a trust-based research model of MP adoption. Drawing upon the attribution theory and value-based acceptance model, we argue that cognitive and emotional trust can affect consumers' perceived value, which further influences their MP adoption behavior. The attribution theory posits that a trustor's social perceptions may result from his/her attribution process [21; 28]. For instance, the trustor may positively interpret the trustee's characteristics or actions by attributing causes to the trustee's internal characteristics [10]. In the case of MP adoption, we therefore examine whether a consumer will perceive high value of a MP service after recognizing its trustworthiness. According to the value-based acceptance model developed by Turel et al. [14], we refer to perceived value as consumers perceptions regarding the benefits

from using an information technology [18]. We further delineate four dimensions of perceived value [5; 35; 37], namely functional, emotional, price and social in the MP adoption context. We expect that the four dimensions are key determinants of consumers' usage intention of MP.

The rest of the article is organized as follows. In the next section, we review the previous literature on the attribution theory and value-based acceptance model. Then, we develop our research model and the hypotheses. Next, we report the survey procedure and the results of the data analysis. Finally, we conclude this research with discussions on both research and practice implications.

## THEORETICAL BACKGROUND

### Attribution Theory

Among the possible theoretical perspectives, the attribution theory [14] has been widely used by IS researchers to explain trust-related problems, such as initial trust building in online marketplace [8; 23; 32] and the role of trust in virtual teams [10]. Attribution is the process by which individuals try to explain the causes of behaviors and actions. According to the theory, when a behavior is consistent with people's prior expectations, they tend to attribute the causes of the action to one's internal characteristics; in contrast, when the behavior is inconsistent with people's prior expectations, they are likely to attribute the causes to external situational characteristics [14]. In Teo et al.'s [26] study, they applied this theory to examine the relationship between trust and quality perceptions of e-government website services. They argued that citizens with high trusting beliefs tend to attribute positive website experience to internal characteristics like high website quality. Similarly, citizens with low trusting beliefs attribute negative website experience to internal characteristics like low website quality. Hence, citizen trusting beliefs are likely to affect their quality perceptions of e-government website services. Following this perspective, this study uses the attribution theory to understand the effects of cognitive and emotional trust on perceived value of MP services.

### Cognitive Trust and Emotional Trust

Prior research refers to trust as a consumer's perception that a trustee "can be relied upon to engage in generally acceptable business practices and will deliver the promised products or services, despite the possibility of exposure to loss during a transaction process" [2 pp.493]. Komiak and Bensabat [8] identified two different types of trust: cognitive trust and emotional trust. Cognitive trust is based on the trustor's rational perceptions that the trustee has necessary attributes to be relied upon [33]. The concept of cognitive trust is derived from the definition of trusting beliefs, which conceptualize a consumer's trust from a cognitive orientation. In contrast, emotional trust is defined as the trustor's emotional feelings about the comfort and security of relying on the trustee [20]. Emotional trust offers a new and important angle to explain the influence of consumer's emotions, such as his/her gut feeling and affections, on trust decisions [33]. While cognitive trust enables an individual to rationally trust a trustee, emotional trust helps him/her to feel secure and comfortable about relying on the trustee beyond available evidence. Thus, we expect that it will be beneficial to consider the effect of emotional trust besides cognitive trust in understanding consumers' MP adoption.

### Value-based Acceptance Model

Turel et al.'s [14] value-based acceptance model is built upon the consumption value theory [13]. The theory assumes that people's usage choice is influenced by their value perceptions. Functional, emotional, epistemic, conditional and social value are identified as the five components of perceived value in general [12]. The consumption value theory has been applied to various situations, and the effectiveness of different dimensions is often dependent on different contexts [5]. For example, Jia et al. [2] summarized four types of values which consumers can gain from self-service technologies: functional, instrumental, emotional and social value. Brown and Venkatesh [28] considered utilitarian, hedonic and social value to predict individuals' technology adoption of households.

Given the important role of perceived value, Turel et al. [14] proposed the value-based acceptance model to understand the adoption of mobile value-add services. The model identified four dimensions of perceived value: (1) functional value, which is derived from consumers' utilitarian motivations, is defined as the degree to which using a technology will help consumers to perform certain activities conveniently and efficiently; (2) emotional value, also viewed as hedonic value, refers to consumers' subjective feelings developed from using of the technology; (3) price value, also known as monetary value, captures consumers' cognitive tradeoff between the perceived monetary benefits and costs of using the technology; and (4) social value is derived from the enhancement of social gains from using the technology. The value-based acceptance model highlights that a consumer's behavioral intention to use a technology will be influenced by his/her perceptions of functional, emotional, price and social value. Research has shown that the value-based acceptance model is an effective tool for interpreting individuals' value perceptions and plays an important role in predicting adoption behavior of multiple IT applications [2; 38], including mobile services [1; 5; 17; 19; 39].

Although technology adoption models such as the unified theory of acceptance and use of technology (UTAUT), technology acceptance model (TAM) and theory of planned behavior (TPB) are often applied to analyze the behavior of IT users, these models are originally developed to explain individuals' adoption behavior in organizational settings [18; 21; 36]. An important difference between the consumer setting and organizational setting is that consumers usually bear monetary costs or benefits, whereas employees do not [38]. Therefore, factors related to usage fee or price may be considered in the consumer setting. Because the present study focuses on the adoption of ubiquitous MP services, which involve additional expenses (e.g. data

flow), as well as possibly getting some rewards or discounts for the usage [26], this research adopts the value-based acceptance model to examine consumers' initial adoption of MP. This is consistent with the assumption of UTAUT2 which is developed in the consumer usage setting [38].

### RESEARCH MODEL AND HYPOTHESES

Our conceptual model is depicted in Figure 1. Drawing upon the attribution theory and value-based acceptance model in the context of MP adoption, we propose that consumers' intention to use MP will be predicted by perceived functional, emotional, price and social value. More importantly, cognitive and emotional trust will place important impacts on such perceived value.

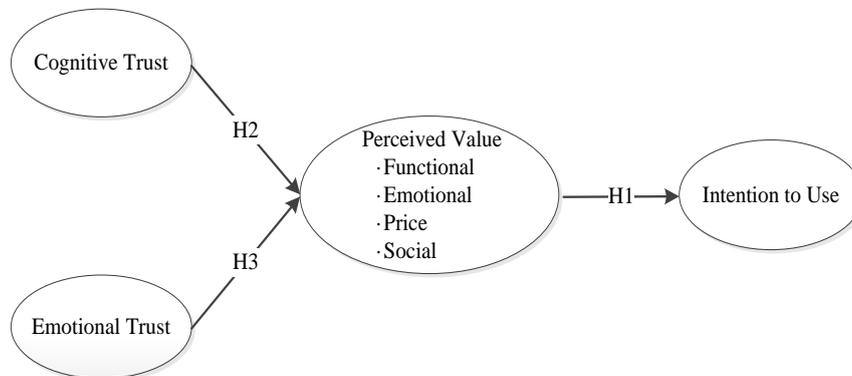


Figure1. Research Model

#### Antecedents of Intention to Use

Based on Turel et al.'s [14] value-based acceptance model, we explore the influence of four aspects of perceived value on intention to use MP services. Functional value is defined here as the degree to which using MP will provide benefits to consumers in conducting payment efficiently [38]. MP services satisfy consumers' needs of prompt transactions [40], reducing waiting time and increasing efficiency [26], which will provide utilitarian benefits to consumers. Emotional value refers to the fun or pleasure derived from using mobile payment [29]. Prior research posits that MP services increase consumers' involvement and sense of freedom, which will provide consumers with emotional rewards and hedonic experiences [12]. Price value captures consumers' cognitive tradeoff between the monetary benefits and costs of MP for using it [38]. Using ubiquitous MP services involves additional expenses, such as mobile equipment costs, access costs, and transaction fees [26]. In China, in order to enlarge market share, MP service providers employ competitive pricing strategies. For example, Alibaba provides lower fees when consumers use mobile Alipay to conduct payment rather than desktop Alipay. It implies that if perceived price value is positive, consumers are likely to get monetary benefits from using MP services. Social value means that consumers will receive social gains, such as the enhancement of social self-concept, in using MP services [36]. Previous research shows that individuals' perception of performance improvement, subjective affective state, monetary benefits and social self-concept enhancement in using mobile services will significantly influence their usage intentions [5; 39; 43]. Thus, the following hypotheses are provided:

*H1a-d: Functional, emotional, price and social dimension of perceived value are positively associated with intention to use MP.*

#### Cognitive Trust and Emotional Trust

In this study, cognitive trust is defined as consumer's rational expectations that MP services have necessary attributes to be relied upon [27; 41]. It involves the beliefs that MP services will take the responsibility to ensure reliable, safe and accurate financial services [42]. We expect that cognitive trust in MP may have a positive impact on perceived value. The attribution theory provides the conceptual foundation for this relationship [14]. According to the theory, trust may affect a trustor's social perceptions by attributing the causes of the trustee's actions to either the trustee or external situational factors [10]. This means that consumers with high trust is likely to attribute flaws and errors of a MP service to external causes, whereas s/he tends to attribute its advantages to internal characteristics [34]. For example, the responsive time of the MP service is an important factor during the transaction process. Consumers tend to seek explanations for the long awaiting time when using the MP service. A high level of cognitive trust indicates that consumers believe that the MP service has the capability to provide accurate and timely services. Consumers holding such beliefs are more likely to attribute the delay to situational factors (e.g. operational failure). In this situation, the value perceptions of MP tend to change little. On the contrary, if consumers do not trust the MP service to having the capability of providing accurate and timely services, then they tend to interpret the awaiting time as internal attributes (i.e. inconvenience), which further result in low value perceptions of MP. In short, cognitive trust is likely to be positively related to consumers' perceived value of MP. Trust acts as a type of subjective guarantee which ensures consumers to receive expected benefits from an exchange relationship [25]. Given that perceived value includes functional, emotional, price and social dimensions, the following hypotheses are provided:

*H2a-d: Cognitive trust is positively associated with functional, emotional, price and social dimensions of perceived value.*

Besides the role of cognitive trust, we further propose that emotional trust can place a positive impact on perceived value of MP. Based on prior research, emotional trust refers to a consumer's emotional feelings about the comfort and security of relying on mobile terminals to conduct their payment [33]. It captures consumers' evaluation of affective reactions and feelings toward MP services [20; 21]. Affect generalization is a common phenomenon where affect toward a component of an object can spread to the whole object and form subsequent judgments of the object [30]. This affect generalization is an important source of information processing bias in individuals' attribution process. That is, individuals are more likely to pay attention to the affect-consistent information [33]. Following this perspective, we expect that a similar process is likely to occur in the MP context. When a consumer feels secure and comfort about relying on a MP service, these positive affective feelings will direct him/her to positive information about the value of using it. Conversely, if s/he holds affective feelings of discomfort and insecurity about using the service, then s/he tends to have serious concerns about using it. Thus, it becomes difficult to perceive benefits and value of using the MP service. Therefore, we propose the following hypotheses:

*H3a-d: Emotional trust is positively associated with functional, emotional, price and social dimensions of perceived value.*

## METHODOLOGY

### Data Collection

To collect data, we used an online survey method. We targeted a convenient sample of a Chinese university students and faculties who had knowledge about MP services. To ensure this, a screening question "do you know about MP services" was asked before the questionnaire. Incentives like local supermarket coupons and prepaid calling cards were provided as lucky draw prizes to increase response rate. Given that the survey was conducted in China, we translated the original English questionnaire into Chinese and then back-translated it into English. The two versions were compared to ensure the translation quality. In total, 273 usable responses were gathered for this study. Table 1 lists the sample's demographic characteristics.

Table1. Demographics of the Respondents

Measure	Item	Percentage
Gender	Male	162(59.3%)
	Female	111(40.7%)
Age	Below 20	16(5.9%)
	21-30	225(82.4%)
	31-40	22(8.1%)
	41 or above	10(3.7%)
Education	Below college	29(10.6%)
	Junior college	49(17.9%)
	Bachelor or above	195(71.5%)
Monthly Income (US\$1=RMB6.83)	Under RMB1000	83(30.4%)
	RMB1001-3000	69(18.4%)
	RMB3001-5000	82(30.1%)
	RMB5001 or above	39(14.3%)

### Data Measures

We adapted well-validated items of constructs from prior studies [21; 26; 36; 38]. Slight wording modifications were applied to fit the MP context. A seven-point Likert scale was used for all items, from "1=strongly disagree" to "7=strongly agree". The measurement items and their sources are provided in Appendix.

Table2. Constructs and Items

Construct	Item Wording	Reference
Cognitive Trust (CT)	CT1: MP always provides accurate financial services.	[26]
	CT2: MP always provides reliable financial services.	
	CT3: MP always provides safe financial services.	
Emotional Trust (ET)	ET1: I feel secure about using MP for my payment.	[21]
	ET2: I feel comfortable about using MP for my payment.	

	ET3: I feel content about using MP for my payment.	
Functional Value (FV)	FV1: I find MP useful in my daily life.	[38]
	FV2: Using MP helps me accomplish payment more quickly.	
	FV3: Using MP increases my payment productivity.	
Emotional Value (EV)	EV1: Using MP is fun.	[38]
	EV2: Using MP is enjoyable.	
	EV3: Using MP is very entertaining.	
Price Value (PV)	PV1: Using MP is reasonably priced.	[38]
	PV2: Using MP is good value for money.	
Social Value (SV)	SV1: The use of MP helps me feel acceptable.	[36]
	SV2: The use of MP makes a good impression on other people.	
	SV3: The use of MP gives me social approval.	
Intension to Use (ITU)	ITU1: Assuming I have access to the MP, I intend to use it.	[26]
	ITU2: Given that I have access to the MP, I predict that I would use it.	

### Data Analysis and Result

We used Partial Least Squares (PLS) to analyze the research model. PLS is a component-based structural equation modeling approach that requires a relatively small sample size with no restriction on normal distribution, and is appropriate for exploratory analysis [4]. Thus, it is suitable to use PLS for the data analysis of the current study. Following the two-step analytical procedures [9], we examine the measurement model and structural model respectively.

### Testing the Measurement Model

We assessed the measurement model by examining the convergent validity and discriminant validity of the constructs. For convergent validity, the composite reliability (CR) of constructs should exceed 0.7, and the average variance extracted (AVE) should be 0.5 or above [7]. As shown in Table 3, CR values ranged from 0.93 to 0.98, and AVE values were greater than 0.83, suggesting good convergent validity of this study.

Table3. Convergent Validity of the Measures

Construct	Item	Loading
Cognitive Trust (CT) CR=0.95; AVE=0.86	CT1	0.93
	CT2	0.95
	CT3	0.89
Emotional Trust (ET) CR=0.94; AVE=0.83	ET1	0.91
	ET2	0.89
	ET3	0.93
Functional Value (UV) CR=0.98; AVE=0.93	FV1	0.96
	FV2	0.97
	FV3	0.96
Emotional Value (EV) CR=0.94; AVE=0.92	EV1	0.94
	EV2	0.97
	EV3	0.97
Price Value (PV) CR=0.95; AVE=0.90	PV1	0.95
	PV2	0.95

Social Value (SV) CR=0.95; AVE=0.87	SV1	0.94
	SV2	0.96
	SV3	0.90
Intention to Use (ITU) CR=0.97; AVE=0.94	ITU1	0.97
	ITU2	0.97

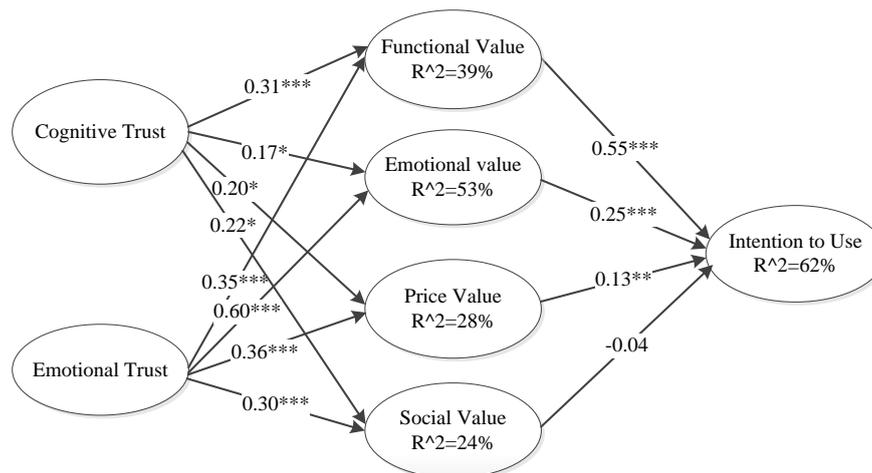
Discriminant validity was assessed by (1) item loadings on their constructs at 0.7 or above, and (2) the square root of AVE for each construct exceeding its correlations with other constructs [7]. Table 3 shows that all items had high loadings on their corresponding constructs. Table 4 confirms that the correlations between constructs were lower than corresponding square roots of AVEs. Thus, the measures also had satisfactory discriminant validity.

Table4. Correlation between Constructs

	CT	ET	FV	EV	PV	SV	ITU
CT	<b>0.93</b>						
ET	0.75	<b>0.91</b>					
FV	0.57	0.58	<b>0.96</b>				
HV	0.61	0.72	0.69	<b>0.96</b>			
EV	0.47	0.51	0.47	0.53	<b>0.95</b>		
SV	0.44	0.46	0.20	0.50	0.56	<b>0.93</b>	
ITU	0.61	0.68	0.70	0.63	0.49	0.26	<b>0.97</b>

### Testing the Structural Model

We tested the structural model by examining the  $R^2$  of endogenous variables and the significance of path coefficients in the model [4]. The results of the structural model were reported in Fig. 2. We found that functional ( $\beta=0.55$ ,  $t=10.28$ ), emotional ( $\beta=0.25$ ,  $t=4.42$ ) and price value ( $\beta=0.13$ ,  $t=2.72$ ) had significant effects on intention to use, providing support to H1a-c. In contrary, social value ( $\beta=-0.04$ ,  $t=0.82$ ) was found to have nonsignificant effect. Thus, H1d was not supported. Our results also indicated that cognitive trust was positively associated with functional ( $\beta=0.31$ ,  $t=3.67$ ), emotional ( $\beta=0.17$ ,  $t=2.32$ ), price ( $\beta=0.20$ ,  $t=2.16$ ) and social value ( $\beta=0.22$ ,  $t=2.55$ ). H2a-d were thus supported. Meanwhile, we found that emotional trust had significant and repeatedly stronger effects on functional ( $\beta=0.35$ ,  $t=4.05$ ), emotional ( $\beta=0.60$ ,  $t=9.17$ ), price ( $\beta=0.36$ ,  $t=3.98$ ) and social value ( $\beta=0.30$ ,  $t=3.58$ ). Hence, H3a-d were also supported. Overall, the variances explained in functional, emotional, price, social value and intention to use were 39%, 53%, 28%, 24%, and 62% respectively.

Figure2. Structural Model (\*= $p<0.05$ , \*\*= $p<0.01$ , \*\*\*= $p<0.001$ )

### CONCLUSION AND DISCUSSION

Drawing on the attribution theory and value-based acceptance model, this study theoretically articulates and empirically tests a research model to explicate that cognitive and emotional trust can enhance consumers' intention to use MP by increasing value perceptions. Our results demonstrate that functional, emotional and price dimension of perceived value are important in

affecting consumers' intention to use MP. The effect of social value is insignificant. This implies that consumers may prefer not to take MP usage as an important issue for improving their social images. More importantly, our findings demonstrate that, besides cognitive trust, emotional trust increases the perceptions of functional, emotional, price and social value. The effects of emotional trust are further shown to be stronger than those of cognitive trust, highlighting its critical role in the model.

### Theoretical Implications

We expect that this study can enrich our theoretical understandings in two major aspects. First, this research extends the MP literature by applying Turel et al.'s [14] value-based acceptance model to investigate the adoption of MP. Prior studies have examined different technology adoption models in the context of MP adoption. For instance, some research relies on TAM to argue that perceived usefulness and perceived ease of use are important predictors of intention to use MP [3; 16]. The UTAUT is also applied to propose that performance expectancy, effort expectancy, social influence and facilitating conditions determine MP adoption [31; 43]. IS success model, the diffusion of innovation theory and TPB have also been used to explain MP usage behavior [26; 40; 42]. These studies are usually lack of considering the role of monetary factors in predicting consumers' MP adoption behavior. In fact, monetary costs/benefits are important to determine the adoption of a technology in the consumer setting [38]. Overall, our results confirm the key roles of functional, hedonic and price value in affecting consumers' adoption decision-making process.

Second, and more importantly, this study extends the trust literature by investigating the impact of both cognitive and emotional trust in the context of MP adoption. Previous IS literature mainly conceptualizes consumer's trust as cognitive trusting beliefs (for a review, see [20]). In consistent, many researchers focus on examining the role of cognitive trust on consumers' behavioral intention, with a lack of research emphasis on the effect of emotional trust. In view of this, the present study is among the first to address the effect of emotional trust on consumers' value perceptions, which further lead to intention to use MP. We explain the underlying rationale by introducing the attribution theory [34]. Our empirical findings demonstrate that (1) emotional trust in MP posits a significant effect on perceived value; and (2) its effect is much stronger than that of cognitive trust in MP. We hope that these new findings can make useful contributions to the extant MP adoption and trust literature.

### Practical Implications

Apart from the theoretical implications, this study also provides insightful implications for practitioners. First, the findings associated with the value-based acceptance model shed some light on how to design and promote MP services effectively. For example, service providers should provide efficient and user-friendly MP services to satisfy both functional and emotional needs of users, such as designing high quality MP systems, reducing operation steps, as well as making the technological interfaces visually attractive. In the promotion campaign of MP services, besides providing functional and emotional features, providers should also consider whether consumers could get monetary benefits or rewards for their transactions. One possible way is to make competitive pricing strategies, such as a relatively lower price or discounts to promote MP adoption. Second, our result shows that consumers' value perceptions are rather dependent on their emotional trust. Thus, the traditional perspective of only enhancing cognitive trust for MP adoption appears to be insufficient. We suggest that service providers should further allocate their trust-building resources strategically to consider and improve emotional trust of consumers.

### Limitations and Future Research

This study also has several limitations and opportunities for future research. First, this study uses a convenient sample of university students and faculties to test our hypotheses. To increase the generalizability of the findings, future researchers may consider enlarging the sample size or applying the research model in different regional settings. Second, this study focuses on investigating the separate effects of cognitive and emotional trust. We show that the two factors will facilitate intention to use MP by increasing consumers' value perceptions differently. Future research is then encouraged to shed light on exploring the determinants of cognitive trust and especially emotional trust. According to McKnight [37], there are several underlying mechanism to build initial trust, including knowledge-based mechanism, trust transfer mechanism and institution-based mechanism. Future studies may consider these trust building mechanisms to develop consumers' cognitive and emotional trust in MP. It will be interesting to discern which mechanism is more appropriate for building cognitive trust and which is more suitable for building emotional trust. Finally, we recognize that the impacts of cognitive and emotional trust on value perceptions may not be totally independent from its context. Recent research posits that the outcomes of consumers' trust may vary under different online institutional structures [6; 11]. Thus, we encourage future research to consider such issue and extend our findings.

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