

E-payment Usage among Young Urban Chinese

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The use of e-payment by young urban Chinese has grown exponentially in recent years. The purpose of this study is to investigate factors affecting individual usage of e-payments in a government-controlled market economy. The proposed research model was based on the technology acceptance model and was tested using regression analysis based on 325 college students in China. Results suggest that perceived benefit, self-efficacy, perceived quality, age and gender are significant predictors of e-payment usage and the percent of respondents' personal monthly spend. The result provides practical implications for firms for promoting e-payment services in developed markets.

Keywords: E-payment, Technology Acceptance Model

INTRODUCTION

During the last two decades there has been an exponential growth in the use of the internet and online business transactions, otherwise known as e-commerce. This growth has had a profound impact on the way business is done around the world (Herhausen et al., 2015) and has in turn created the need for new financial payment platforms through which monies can be transferred electronically (Teoh et al, 2013). These platforms, collectively known as e-payment, enable users to transfer funds and personal information in a safe and secure manner thereby enabling users to complete transactions when and where they want (Sumanjeet, 2009).

The widespread availability of the Internet and the digitalization of payment processes has also led to the development of a variety of e-payment options such as credit and debit cards, digital and mobile wallets, electronic cash, contactless payment methods which are necessary for e-commerce to exist. Consequently, the importance of e-payment cannot be overstated as demonstrated by a recent Juniper Research Report (2018) which suggests that online sales of physical goods will account for \$3.8 trillion or 13% of global retail sales by 2020. This report was supported by a 2015 Statista study which forecasted the value of global mobile payment in 2017 to be about \$721 billion. The availability of e-payment and

mobile payment systems have benefitted consumers and merchants alike due to their convenience and speed (Pham and Ho, 2015; Teo et al., 2015; Oliveira et al., 2016).

The growth of e-payment has been largely driven by two technological advances. The first and most important is the ability to securely digitize online transactions so that business can be safely conducted in countries that may lack strong legal infrastructures (Aslam et al, 2017). The second technological advancement that has driven the growth of e-payment is the increased popularity and use of mobile computing devices such as smart phones and tablets which enable customers to conduct business when and where it is convenient for them (Arif, et al 2016).

A review of the extant literature reveals a significant body of research in this area. Some of the more commonly studied aspects of e-payment include but are not limited to: customer adoption of e-payment (Lorenzo-Romero et al., 2011; Ozkan et al., 2010), customers' intention to use (Chin and Ahmad 2015; He et al., 2006; Wang et al., 2003), customer perceptions of e-payment in general (Liao et al., 2012), customer convenience (Azmi et al., 2016; Chin and Ahmad, 2015) in addition to actual and intended usage behavior (Chan and Lu, 2004).

Other studies have focused on the factors which are believed to influence the adoption of e-payment systems. Some of the determinants which are believed to influence the adoption of e-payment include: the perceived benefits of e-payment (Teoh et al., 2013), ease of use (Chin and Ahmad, 2015; Teoh et al., 2013; Lin and Nguyen, 2011), perceived quality (Davis, 1989), perceived system security (Chaudhry et al., 2016; Tella and Abdulmumin 2015; Antoniou and Batten, 2011), user trust in e-payment systems (Teoh et al., 2013; Antoniou and Batten, 2011; Ozkan et al., 2010; Travica et al., 2007); and to a lesser degree perceptions of self-efficacy (Teoh et al., 2013). Overall, these studies appear to suggest that customer perceptions of the benefit that they receive, perceived ease of use on the e-payment systems, the customers' perception on trust and the security of the system, the customers' self-efficacy, and the perceived quality of the e-payment system are important factors influencing the adoption, use and usage rate of e-payment.

Unfortunately, few studies, to date, have attempted to study these factors in a single setting outside the United States (Haque et al., 2009; Ozkan et al., 2010; Teoh et al., 2013). The authors extend this research to include subjective norms and relate them to usage of e-payment. Specifically, whether consumers use e-payment systems, how frequently they use e-payment, how much money the respondent spends each month using e-payment platforms and the percent of their monthly spend using e-payment were selected as dependent variables while controlling for age, education, gender and the respondents' working status. Data for this study was collected via a convenience sample of college students in urban China. This sample population was selected because it is both important and interesting to study these factors in a controlled market country like China due to its sheer size and economic power. College students were chosen in the belief that they would be more technologically savvy than older respondents and because they represent the potential for future usage rather than past.

The rest of the paper is organized as follows. In the next section the literature review contains a definition of e-payment, a historical review of the theoretical foundation of the study based on the evolution of the technology acceptance model (TAM), a review of study constructs and the hypotheses that will be tested. The study methodology along with study results are then presented. The paper concludes with managerial implications, study limitations, implications for future research and conclusions. This paper contributes to the literature by being one of a limited number that study e-payment usage in present day urban China.

LITERATURE REVIEW

E-payment Defined

The origins of e-payment or mobile payment can be traced to the late 1950s in the United States where an increasingly mobile society found the need to pay for goods or services in ways that did not rely on the use of cash or checks (Wróbel-Konior, 2017). As technology improved this process evolved into e-payment or commerce as we know it and involves the sale of goods and services via electronic devices,

without time or space limitations (Kim et al., 2010; Au and Kauffman, 2008; Mallat, 2007). The ultimate premise of e-payment systems is to link customers, merchants, banks or financial institutions, payment service providers, security and authentication providers and internet providers electronically in a single unified secure network (Dahlberg et al., 2008; Jeffus et al., 2015).

Definitions for e-payment have changed greatly since its inception. For example, Shon and Swatman (1998) broadly defined e-payment as the exchange of funds transmitted via an electronic communication channel as part of the exchange process. Gans and Scheelings (1999) defined e-payment more narrowly as payments made through electronic signals linked directly to deposit or credit accounts. Later, Hord (2005) suggested that e-payment represents any kind of non-cash payment that does not involve cash or a paper check. Other authors such as Au and Kauffman (2008) focus on the transaction process and define it as an electronic device utilized to initiate, authorize, and confirm a commercial transaction. Hayashi (2015) defines e-payment as a payment system which is the set of functions, processes, rules, devices, technologies, and standards that enables its users to make a payment. Based on these definitions this study adopts a broader definition of e-payment as the transfer of funds electronically from a payer to payee through an e-payment platform which enables customers to remotely access and manage their financial transactions through an electronic network (Sumanjett, 2009; Teoh et al., 2013).

Theoretical Background

E-payment research has historically drawn on the factors believed to influence user acceptance (Zmijewska et al., 2004; Dahlberg et al., 2015). The theoretical foundation of e-payment research is therefore largely based on the work of Fishbein and Ajzen (1975) who proposed the Theory of Reasoned Action (TRA). The Theory of Reasoned Action is based on the progression of beliefs-attitudes-intention-behavior. In TRA, the attitude towards a given behavior and the consumer's subjective norm (consumers' perceptions associated with the impact that others have on their decision process) are two important explanatory variables for intention (Ajzen and Fishbein 1980; Liébana-Cabanillas et al., 2014). Later Ajzen (1991) extended TRA and proposed the Theory of Planned Behavior (TPB) which posits that specific beliefs impact behavioral perceptions and actual behaviors (Liébana-Cabanillas et al., 2014).

The theory of planned behavior was itself revised and became the Technology Acceptance Model (TAM) (Davis et al., 1989; Davis, 1989). The Technology Acceptance Model is both trusted and widely accepted as the theoretical foundation necessary for studies involving technology acceptance behavior (Davis et al., 1989; Davis, 1989; Lymperopoulos and Chaniotakis, 2005). TAM and its various revisions (TAM 2 and TAM 3) provide important theoretical support for studies on technology and innovation acceptance (Venkatesh and Davis, 2000; Venkatesh and Bala, 2008; and Renaud and Biljon, 2008). Therefore, this study adopts the Technology Acceptance Model as its theoretical foundation. The following section draws on the Technology Acceptance Model in order to provide support for the research hypotheses.

Hypothesis Development

Perceived Benefit

In developing the research hypotheses this work draws upon the extant literature. For example, Davis (1989) reported that a user's overall attitude toward a specific information technology (IT) and its application is a major factor determining whether an individual uses that system. Later Özkan et al., (2010) found that factors such as Benefit, Ease of Use, Perceived Quality, Security, Self-Efficacy and Trust are important predictors technology adoption. Teoh et al., (2013) proposed a five construct model (Benefits, Trust, Self-Efficacy, Ease of Use, and Security) of consumers' perceptions towards e-payment. Teoh's model differed from past research by replacing the widely accepted perceived usefulness construct with perceived benefit. This change was made because e-payment systems benefit consumers through their convenience and lower transaction costs. This change was supported by Chou et al., (2004) and Eastin (2002) who identified perceived benefit as a significant driver of e-payment system adoption. More specifically, Gerrard and Cunningham (2003) found perceived economic benefits, i.e., of fixed costs and transaction costs, were crucial in adopting e-payment. If users and merchants can enjoy a low cost to

their transactions, they are more likely to use e-payment system (Gerrard and Cunningham 2003; Sonia San-Martin et al., 2012; San-Martin and Lopez-Calalan, 2013).

H1a: *Perceived Benefit is positively related to whether a respondent uses the e-payment.*

H1b: *Perceived Benefit is positively related to how much money an individual spends each month via e-payment.*

H1c: *Perceived Benefit is positively related to how frequently an individual uses e-payment.*

H1d: *Perceived Benefit is positively related to higher percentages of monthly spend using e-payment.*

Ease of Use

Perceived ease of use (PEOU) can be defined as “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989). Flavian et al., (2006) argue that if consumers believe that a computer system is easy to use they are more likely to use it do to the reduced likelihood of errors. Other researchers such as Bakos (1997) reported that customers perceive a reduction in search costs if the system is easy to use. Consequently, perceived ease of use has been repeatedly tested and found to be statistically significant in many e-payment, e-banking and e-commerce adoption studies (Su et al., 2012; Schierz et al., 2010; Kim, 2010; Pikkarainen et al., 2004). Thus, the following research hypotheses are proposed.

H2a: *Perceived Ease of Use is positively related to whether a respondent uses the e-payment.*

H2b: *Perceived Ease of Use is positively related to how much money an individual spends each month via e-payment.*

H2c: *Perceived Ease of Use is positively related to how frequently an individual uses e-payment.*

H2d: *Perceived Ease of Use is positively related to higher percentages of monthly spend using e-payment.*

Perceived Quality

Perceived quality has been variously defined as the degree to which a person believes that using a particular system will require little effort on their part and that it will enable them to complete their intended task more effectively (Dastan and Gurler, 2016; Chin and Ahmad, 2015). Consequently, perceptions of the e-payment system quality has been identified one of the important constructs that affect usage of e-payment and e-banking systems (Pikkarainen, et al., 2004; Ives et al., 1983). Past research has also found that when users perceive an e-payment system to be easy to learn, operate and manage they are also more likely to perceive it to be of better quality. Increased perceptions of quality have also been linked to increased satisfaction and perceptions of reductions in the risk associated with mobile transactions mobile transactions as perceptions of quality increase (Liao et al., 2012; Zhou, 2011; Lorenzo-Romero et al., 2011). Thus, the following hypotheses are provided.

H3a: *Perceived Quality is positively related to whether an individual uses e-payment.*

H3b: *Perceived Quality is positively related to how much money an individual spends each month via e-payment.*

H3c: *Perceived Quality is positively related to how frequently an individual uses e-payment.*

H3d: *Perceived Quality is positively related to higher percentages of monthly spend using e-payment.*

Security

Using e-payment requires the ability to use digital devices and access to reliable Internet access (Teoh et al., 2013). However, some consumers (e.g. older and less educated) are reluctant to use e-payment systems due to security and privacy concerns (Raja, 2008). The purpose of online security is to guarantee the integrity and privacy of personal and financial information through a set of procedures and programs (Tsiakis and Sthephanides, 2005). In e-payment or Internet context, security refers to perceptions of secure payment means and mechanisms and the storage and transmission of said information (Lim et al., 2006). Kobsa, (2001 and 2002) found that users are increasingly demanding that the data collected and processed by e-payment systems are secure. Substantial research in the field of e-payment and e-banking also suggests that online security is a significant factor which affects whether consumers adoption these technologies (Kobsa, 2001, 2002; Abrazhevich, 2004).

H4a: *Perceived Security is positively related to whether an individual uses e-payment.*

H4b: *Perceived Security is positively related to how much money an individual spends each month via e-payment.*

H4c: *Perceived Security is positively related to how frequently an individual uses e-payment.*

H4d: *Perceived Security is positively related to higher percentages of monthly spend using e-payment.*

Self-efficacy

Self-efficacy has been variously defined as the belief in one's ability to successfully perform a given task based on their perceived level of skill (Eastin, 2002; Davis, 1989). For the purpose of this study self-efficacy refers to one's belief in their personal mastery of a technology (Bandura, 1986). Past research suggests that personal beliefs of self-efficacy are based on four criteria: past experience (failure vs. success), verbal persuasion (from significant others), vicarious experience (observations of others successes and failures) and the individual's affective or emotional state (anxiety, excitement, etc.) (Teoh et al., 2013; Wang et al., 2003). As a result, those who possess or perceive that they have higher levels of self-efficacy, in regards to technology, are more likely to adopt e-payment systems (Chan et al., 2004; Wang and Li, 2011). Thus, based on the empirical and theoretical research the following hypotheses are offered.

H5a: *Perceptions of self-efficacy (SE) are positively related to how much money an individual spends each month via e-payment.*

H5b: *Perceptions of self-efficacy (SE) are positively related to whether an individual uses e-payment.*

H5c: *Perceptions of self-efficacy (SE) are positively related to how frequently an individual uses e-payment.*

H5d: *Perceptions of self-efficacy (SE) are positively related to higher percentages of monthly spend using e-payment.*

Trust

For the purpose of this study trust is seen as an important catalyst in consumers' perceptions of the degree of risk (personal, financial, transactional, etc.) involved in online financial transactions, with lower perceptions of risk being positively related toward the intention to adopt e-payment systems (Xin et al., 2015; Teoh et al., 2013; Wang et al., 2003). Past research has found trust to be an important predictor of

consumers' willingness to adopt e-commerce transactions or engage in online exchanges (Friedman et al., 2000; Jarvenpaa et al., 2000, Gefen, 2000, 2003; Hoffman et al., 1999; Wang et al., 2003). Consequently, customers' trust in and willingness to adopt and use e-payment is predicated on the perceived level of security of the system which prevents online transaction participants from acting in an opportunistic manner (Sahin and Kitapci, 2013; Gefen, 2000). Based on this discussion the following hypothesis are presented.

H6a: Perceptions of trust are positively related to how much money an individual spends each month via e-payment.

H6b: Perceptions of trust are positively related to whether an individual uses e-payment.

H6c: Perceptions of trust are positively related to how frequently an individual uses e-payment.

H6d: Perceptions of trust are positively related to higher percentages of monthly spend using e-payment.

RESEARCH METHODOLOGY

Survey Instrument

This study targeted 315 respondents from urban China. Respondents were selected based on a convenience sample and asked to fill out the online survey which was hosted on Qualtrics. The constructs and scales used in this were selected based on a review of the literature. All of the selected scales possessed adequate reliability and validity and were translated from English to Chinese using the standard translation back translation process by native speaking college students and professors. The results of this study were confirmed by two native speaking Chinese professors that had not participated in the translation process. This process demonstrated that only minor revisions were required prior to pretesting the survey instrument. The survey instrument was then pretested with another group of native speaking college students. This process indicated that no additional changes were required.

The survey instrument was comprised of three sections. Section I contained the constructs of interest which are generally based on the work of Teoh et al, (2013). Some minor changes to wording were deemed necessary to enhance clarity. The most significant departure from the Teoh et al, (2013) study is that ours was based on a 5-point Likert scale rather than the 4-point scale that they used. Section I contained a total of 19 items. Section II contained questions related to whether the respondent used e-payment and the amount of money that the respondents typically spend each month using e-payment. Section III contained questions related to the respondents' demographics (e.g., age, gender, education level and employment status).

Respondent Demographics

Table 1 shows the demographic profiles of study respondents. The split between male and female respondents was 197 to 118 with an additional 11 missing responses which were dropped from the survey. This finding was consistent with expectation due to the current ratio of males to females in this age group. Study results also indicated that 87% were under the age of 25. These findings were reasonably consistent with expectation as younger people are more likely to utilize technology than older people.

TABLE 1
Descriptive STATISTICS FOR DEMOGRAPHIC VARIABLES

Variables	Frequencies	Percentage	Mean*	S.D.
Gender			.37	.48
Male	197	62.5%		
Female	118	37.5%		
Total	315	100.0%		
Age			20.32	4.03
19 and under	158	50.2%		
20-24	116	36.8%		
25-29	30	9.5%		
30-39	11	3.5%		
Total	315	100.0%		

*Gender was coded as Female= 1 and Male= 0; Age was originally coded by a continuous number.

Scale Validity and Reliability

Construct validity was assessed based on the Bartlett test of sphericity. This portion of the analysis indicated that the results were significant at the .000 level with the Chi Square of 2292.63 and 325 degrees of freedom even though the Kaiser-Meyer-Olkin measure of sampling adequacy was .821 which is slightly above the desired $\geq .60$. The results of this portion of the analysis indicate that the data are suitable for factor analysis. A factor analysis was then conducted. The results of this analysis indicated the presence of only four of the six proposed factors. However, total variance explained was found to be 53.239.

The scale's reliabilities were then assessed based on Cronbach's Alphas. This portion of the analysis indicated that four of the six scales exceeded the .70 minimum cutoff recommended by Nunnally (1978). The two offending constructs (Benefit and Security) were therefore dropped from the study. Based on these combined analyses the survey instrument was deemed to be both valid and reliable.

TABLE 2
CRONBACH ALPHAS, MEANS, AND STANDARD DEVIATIONS
FOR INDEPENDENT VARIABLES

	Number of Items	Cronbach's Alpha	Mean	Standard Deviation
Ease of Use	5	.71	4.24	.80
Perceived Quality	4	.70	3.89	.95
Self-efficacy	5	.76	3.60	1.05
Trust	4	.72	2.92	1.13
Benefit	3	.66	4.59	.75
Security	5	.52	3.84	.81

Table 2, contains other important findings. For example, ease of use was found to have the highest mean score 4.24 (in a Liker-scale of 1-5) among the four remaining constructs. The second important construct is perceived quality (3.89). This finding would therefore appear to imply that in China it is very important that e-payment systems have good quality and are easy to use so users perceive that they are of greater benefit to them. Interestingly, self-assessed self-efficacy was found to have relatively moderate mean of 3.60 while the mean of trust was found to be slightly below the 3.0 median score with a mean of 2.92 which was inconsistent with past research.

In terms of how much money respondents spend each month using an e-payment platform, this study found that 96.3 percent of respondents spend between 100 and 3000 yuan each month with six missing respondents. The second dependent variable is whether you use an e-payment system. The respondents would choose between 1 (yes) or 0 (no). It is found that 97.9 percent of respondents answered yes. This finding would then appear to indicate that the use of e-payment is well established among college students in China.

Multicollinearity

Multicollinearity was assessed using the correlation matrix based on the recommendations set forth by Hair et al., (1998). This portion of the analysis indicates that while there are significant positive relationships between the independent variables none of the coefficients exceed the .90 recommended cutoff indicating that the effects of multi-collinearity have been minimized.

TABLE 3
MEAN, STANDARD DEVIATION, AND PEARSON CORRELATION METRICS (N=308)

	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Gender	.37	0.49	1.00								
2. Age	20.32	4.05	-.145*	1.00							
3. EU	4.24	0.80	-0.08	.190**	1.00						
4. PQ	3.88	0.95	0.09	0.03	.450**	1.00					
5. SE	3.55	1.07	0.09	-0.10	.233**	.309**	1.00				
6. Trust	2.89	1.13	.129*	-0.09	.260**	.387**	.295**	1.00			
7. Ever_Use	0.98	0.13	0.06	-0.09	-0.10	0.01	-0.07	-.156**	1.00		
8. Freq_W	8.29	12.16	0.06	0.00	0.10	.131*	0.07	0.03	.173**	1.00	
9. Expen_M	2.00	0.86	0.02	.247**	0.07	0.04	0.02	0.05	0.00	.371**	1.00
10. %_Usage	48.39	28.56	-.189**	.209**	0.09	-0.05	-.129*	-0.08	-0.07	.337**	.512**

Note: * and **: Levels of significance at 0.05 and 0.01, respectively (two-tailed)

According to the correlation matrix, it is found that respondents were typically younger males who trust e-payment systems more (significant at the .05 level). Younger males were also found to find e-payment systems easier to use and consequently tended to use them more both in terms of monthly expenditure and percent usage. Ease of use was found to be significantly related to higher perceptions of perceived quality, trust and self-efficacy at the .01 level. This finding met with expectation as systems that are easier to use are generally perceived to be of higher quality, they lead to higher levels of trust because users are comfortable with them and because the user feels good about their ability to master the system easily. Perceptions of quality were not surprisingly then found to correlate with increased levels of trust, self-efficacy and frequency of use. The final finding of interest that met with expectation is that increased frequency of use was correlated with increased total expenditure and percent of monthly expenditure at that .01 level. Interestingly, the majority (3/24) of the research hypotheses yielded results that were contrary to expectation. A summary of the hypotheses tests are provided in table 4.

**TABLE 4
THE SUMMARY TABLE OF HYPOTHESIS TESTING**

	EU	PQ	SE	Trust
Ever Use	N.S.	N.S.	N.S.	Sig. at 0.01
Freq_W	N.S.	Sig. at 0.05	N.S.	N.S.
Expen_M	N.S.	N.S.	N.S.	N.S.
% Usage	N.S.	N.S.	Sig at 0.05	N.S.

Regression Analysis

In the following section, results of multiple regression are presented (see Table 5). The model for Ever Use was statistically significant at the .01 level and had an R2 of .062. Trust was most significant in this model as indicated by the t value of 3.292**. The model for Total Monthly Expenditure was also found to be statistically non-significant although age was found to be an important contributor to this model as indicated by the significant t value of 2.159*. The model for percent of monthly expenditures paid using e-payment was found to be significant at the .000 level. This model also indicated that younger males are the heaviest users of e-payment systems as indicated by their significant t values (-2.544 and 2.642 respectively).

**TABLE 5
REGRESSION ANALYSIS**

	Ever Use		Freq_W		Expen_M		%_Usage	
	B	t	B	t	B	t	B	t
(Constant)	0.849	14.561**	-1.238	-0.234	-1294.234	-1.328	31.598	2.609**
Gender	-0.023	-1.462	1.666	1.147	393.523	1.466	-8.472	-2.54**
Age	0.002	1.216	-0.003	-0.015	69.772	2.159*	1.067	2.642**
EU	0.018	1.655	0.899	0.895	-76.115	-0.413	4.046	1.767
PQ	-0.015	-1.621	1.176	1.359	110.826	0.701	-1.593	-0.805
SE	0.001	0.141	0.454	0.647	131.136	1.025	-2.925	-1.818
Trust	0.024	3.292**	-0.355	-0.526	160.831	1.290	-0.784	-0.500
R-SQ	0.062		0.023		0.038		0.089	
F	3.364		1.212		2.024		4.950	
Sig	0.003		0.300		0.062		0.000	

Note: * Level of significance at 0.05 and ** at 0.01

DISCUSSION

Overall, this study achieved its stated objectives through the use of a valid and reliable survey instrument which utilized subjective norms. Unfortunately, most of the stated hypotheses between subjective norms and e-payment activities were not supported. These contrary to expected findings suggest that e-payment users in China are motivated largely by factors other than those identified in the literature. Study results do provide important insights into the overall e-payment construct as it is currently used in mainland China.

One very interesting finding stemming from this study is the fact that 97.9 percent of respondents reported using e-payment and that many were younger males. While this finding was significant at the .01 level and trust was significant based on its .3292 t value, the low R2 (.062) was rather nonetheless

surprising. The second research model based on the frequency of e-payment use produced non-significant results in every regard contrary to past research and expectation. The research model using total monthly expenditure was also found to produce non-significant results contrary to expectation and the fact that the t value for age was significant 2.159. Interestingly, study findings regarding percent of monthly expenditure met with expectation and was significant at the .000 level with younger males being the heaviest users of e-payment systems.

Overall the results of this study were contrary to expectation with only 3 of the 24 hypotheses being supported despite the use of multiple methods of analysis. This finding was not expected given the support for the use of these constructs in the e-payment literature. Consequently, these findings suggest that there have been profound changes in China which are currently driving the increased use of e-payment such as government support for e-payment as a potential means of reducing corruption.

CONCLUSIONS AND IMPLICATIONS

This study examines the subjective norms which influence Chinese consumers' perceptions and use of e-payment. Study results indicate that while 97.9 percent of respondents report using e-payment, the heaviest are younger males. One of the key findings that came as a surprise to the authors was that neither benefit nor security were significant and had to be dropped from the research analysis. The lack of significance of the research findings also suggest that other measures of e-payment should be considered in future studies.

Theoretical Implications

This study provides a step in addressing the lack of e-payment research that addresses subjective norms, i.e., perceptions of ease of use, perceived quality, trust in e-payment systems and self-efficacy. Study findings support the need for ongoing research in this area given the differences that were found between Teoh et al's, (2013) study of technology adoption theory in Malaysia and ours which are culturally more closely related than either of these two countries are to the United States or Europe. These differences would then appear to indicate the need to expand the theoretical basis to consider cultural differences or the country's level of economic development as suggested by Nadler (2002).

Managerial Implications

This study provides two important implications for managers seeking to do business in China. First, particular attention needs to be paid to making sure that online platforms are easy to use and that they are perceived to be of high quality so that users are able to develop trust in the system. The second implication of managerial note is that managers need to focus their efforts on younger males who are currently the predominant users of e-payment in China. Together these findings provide important guidance to managers seeking to do business in countries with strict government controls such as China.

Limitations and Future Research

This study like all others suffers from two primary limitations. These limitations include the use of a convenience sample in an urban area and its snapshot approach. The heavy use of sample data obtained from an urban setting makes generalizability to rural areas questionable but given the sheer mass of the population in urban areas compared to rural areas this shortcoming was not deemed overly critical. The second shortcoming underlying this study, the snapshot approach, suggests the need for additional research in this area given the unexpected research findings produced by this study.

The results of this study also provide important implications for future research. These potential research topics include but are not limited to the need to study the use of e-payment systems while controlling for variables such as national culture and the level of economic development. A second potential research stream will ideally look at how this study's findings change based on the country's political structure and how its relationships with trading partners impact the use of e-payment systems.

Finally, study findings suggest the need for future research to identify other constructs which may have an even greater impact on customers' willingness to adopt e-payment systems.

REFERENCES

- Abrazhevich, D. (2004). *Electronic payment systems: a user-centered perspective and interaction design*. PhD thesis, technical university of Eindhoven, Eindhoven.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. London; Prentice Hall International.
- Antoniou, G., & Batten, L. (2011). E-commerce: protecting purchaser privacy to enforce trust. *Electronic Commerce Research*, 11(4), 421-456.
- Arif, I., Aslam, W., & Ali, M. (2016). Students' dependence on smartphones and its effect on purchasing behavior. *South Asian Journal of Global Business Research*, 5(2), 285-302.
- Aslam, W., Ham, M., & Arif, I. (2017). Consumer behavior intentions towards mobile payment services: an empirical analysis. *Market-Trziste*, 29(2), 161-176.
- Au, Y.A., & Kauffman, R.J. (2008). The economics of mobile payments: understanding stakeholder issues for an emerging financial technology application. *Electronic Commerce Research and Applications*, 7, 141-164.
- Azmi, A., Ang, Y.D., & Talib, S.A. (2016). Trust and justice in the adoption of a welfare e-payment system. *Transforming Government: People, Process and Policy*, 10(3), 391-410.
- Bakos, J. Y. (1997). Reducing buyer search costs: implications for electronic networks. *Management Science*, 43(12), 1676-1692.
- Bandura, A. (1986). *Social foundations of thought and action*. A social cognitive theory, prentice-hall, Englewood cliffs, NJ.
- Chan, S., & Lu, M. (2004). Understanding internet banking adoption and use behavior: a hong kong perspective. *Journal of Global Information Management*, 12(3), 21-43.
- Chaudhry, S.A., Farash, M.S., Naqvi, H., & Sher, M. (2016). A secure and efficient authenticated encryption for electronic payment systems using elliptic curve cryptography. *Electronic Commerce Research*, 16(1), 113-139.
- Chin, L.P., & Ahmad, Z.A. (2015). Consumers' intention to use a single platform e-payment system: a study among Malaysian internet and mobile banking users. *Journal of Internet Banking and Commerce*, 20(1), 1-13.
- Chou, Y., Lee, C., & Chung, J. (2004). Understanding m-commerce payment systems through the analytic hierarchy process. *Journal of Business Research*, 57(12), 1423-1430.
- Dahlberg, T., Guo, J., & Ondrus, J. (2015). A critical review of mobile payment research. *Electronic Commerce Research Applications*, 14(5), 265-284.
- Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A. (2008). Mobile payment market and research – past, present and future. *Association for Information Systems AIS Electronic Library*, 166.
- Dastan, I., & Gurler, C. (2016). Factors affecting the adoption of mobile payment systems: an empirical analysis. *Emerging Markets Journal*, 6(1), 17-24.
- Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35, 982-1003.
- Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-339.
- Eastin, M.J. (2002). Diffusion of e-commerce: an analysis of the adoption of four ecommerce activities. *Telematics and Informatics*, 19(3), 251-267.
- Fishbein, M., & Ajzen, I. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*, Addison-Wesley, Reading, MA, 1975.

- Flavian, B., Kahn, P.H. Jr., & Howe, D.C. (2006). Trust online. *Communications of the ACM*, 43(12), 34-40.
- Friedman, B., Kahn, P. H., & Howe, D. C. (2000). Trust online. Association for Computing Machinery. *Communications of the ACM*, 43(12), 34-40.
- Gans, J. S., & Scheelings, R. (1999). *Economic issues associated with access to electronic payment systems*. Retrieved February 23, 2018, from www.mbs.edu/home/jgans/papers/cecs.pdf
- Geffen, D. (2000). E-Commerce: the role of familiarity and trust. *Omega: The International Journal of Management Science*, 28(6), 725-737.
- Gerrard, P., & Cunningham, J. B. (2003). The diffusion of internet banking among singapore consumers. *International Journal of Bank Marketing*, 21(1), 16-28.
- Hair, J.F., Anderson, R.E., Tatham, R.L., & Black, W.C. (1998). *Multivariate Data Analysis*. Prentice-Hall, Englewood Cliffs, NJ.
- Haque, A., Tarofder, A.K., Rahman, S., & Raquib, M. A. (2009). Electronic transaction internet banking and its perception of malaysian online customers. *African Journal of Business Management*, 3(6), 248-259.
- Hayashi, F. (2015). Faster payments in the united states: how can private sector systems achieve public policy goals? *Federal Reserve Bank of Kansas City Working Paper No 15-03*.
- He, Q., Luton, Y. D., Fu, Z., & Li, D. (2010). An innovation adoption study of online e-payment in Chinese companies. *Journal of Electronic Commerce in Organizations*, 4(1), 48-69.
- Herhausen, D., Binder, J., Schoegel, M., & Herrmann, A. (2015). Integrating bricks with clicks: retailer-level and channel-level outcomes of online-offline channel integration. *Journal of Retailing*, 91(2), 309-325.
- Hoffman, D.L., Novak, T.P., & Peralta, M. (1999). Building consumer trust online. *Communications of the ACM*, 42(4), 80-85.
- Hord, J. (2005). How electronic payment works. Retrieved February 23, 2018, from www.nu.e-association.ca/cim/dbf/how_electronic_payment_works_english.pdf?im_id=68andsi_id=305
- Ives, B., Olson, M.H., & Baroudi, J.J. (1983). The measurement of use information satisfaction. *Communications of ACM*, 26(10), 785-93.
- Javenpaa, S.L., Tractinsky, J., & Vitale, M. (2000). Consumer trust in an internet store. *Information Technology and Management*, 1(1)-2, 45-71.
- Jeffus, B., Zeltmann, S., Griffin, K., & Chen, A. (2015). The future of mobile electronic payments. *Competition Forum*, 13(2), 337-342.
- Juniper Research. (2018). *Mobile and online remote payments for digital and physical goods, 2018-2022*.
- Kim, C., Mirusmonov, M., & Lee, In. (2010). An empirical examination of factors influencing the intention to use mobile payment. *Computers in Human Behavior*, 26(3), 310-322.
- Kobsa, A. (2001). Generic user modeling systems. *User Modeling and User-Adapted Interaction*, 11(1/2), 49-63.
- Kobsa, A. (2002). Personalized hypermedia and international privacy. *Communications of the ACM*, 45(5), 64-67.
- Liao, Z., Shi, X., & Wong, W.K. (2012). Consumer perceptions of the smartcard in retailing: an empirical study. *Journal of International Consumer Marketing*, 24, 252-262.
- Liébana-Cabanillas, F., Sánchez-Fernández, J., & Muñoz-Leiva, F. (2014). Antecedents of the adoption of the new mobile payment systems: the moderating effect of age. *Computers in Human Behavior*, 35, 464-478.
- Lim, B., Lee, H., & Kurnia, S. (2006). *Why did an electronic payment system fail? A case study from the system provider's perspective*. Retrieved December 14, 2009, from www.collector2006.unisa.edu.au/Paper%2011%20Benfamin%20Lim.pdf
- Lin, C., & Nguyen, C. (2011). Exploring e-payment adoption in vietnam and Taiwan. *The Journal of Computer Information Systems*, 51(4), 41-52.

- Lorenzo-Romero, C., Constantinides, E., & Alarcon-del-Amo, M.C. (2011). Consumer adoption of social networking sites: implication for theory and practice. *Journal of Research in Interactive Marketing*, 5(2/3), 170-188.
- Lymperopoulos, C., & Chaniotakis, I.E. (2005). Factors affecting acceptance of the internet as a marketing-intelligence tool among employees of Greek bank branches. *International Journal of Bank of Marketing*, 23(6), 484-505.
- Mallat, N. (2007). Exploring consumer adoption of mobile payments- a qualitative study. *Journal of Strategic Information Systems*, 16, 413-432.
- Nadler, S. S. (2002). *Business implications of national culture, religiosity, and ethical sensitivity: A multi-country investigation*. Unpublished doctoral dissertation, The University of Alabama, Alabama.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed). New York: McGraw-Hill.
- Oliveira, T., Thomas, M., Baptista, G., & Campos, F. (2016). Mobile payment: understanding the determinants of customer adoption and intention to recommend the technology. *Computers in Human Behavior*, 61, 404-414.
- Özkan, S., Bindusara, G., & Hackney, R. (2010). Facilitating the adoption of e-payment systems: theoretical constructs and empirical analysis. *Journal of Enterprise Information Management*, 23(3), 305-325.
- Pham, T.T.T., & Ho, J.C. (2015). The effects of product-related, personal-related factors and attractiveness of alternatives on consumer adoption of NFC-based mobile payments. *Technology in Society*, 43, 159-172.
- Pikkarainen, T., Pikkarainen, K., Karfaluoto, H., & Pahlila, S. (2004). Consumer acceptance of online banking: an extension of the technology acceptance model. *Internet Research*, 14(3), 224-235.
- Raja, J. (2008). E-payments: problems and prospects. *Journal of Internet Banking and Commerce*, 13(1), 1-17.
- Renaud, K., & Biljon, J.V. (2008). Predicting technology acceptance and adoption elderly: a qualitative study”, In *ACM international conference proceeding series; Proceedings of the 2008 annual research conference of the South African institute do computer scientists and information technologists on IT research in developing countries: Riding the wave technology*, 338, 210-219.
- Sahin, A., & Kitapci, H. (2013). Why customers stay: the role of switching costs on the satisfaction-trust-commitment chain. *International Review of Management and Business Research*, 2(4), 908-916.
- San-Martin, S., & Lopez-Catalan, B. (2013). How can a mobile vendor get satisfied customers? *Industrial Management and Data Systems*, 133(2), 156-170.
- Schierz, P. G., Schilke, O., & Wirtz, B. W. (2010). Understanding consumer acceptance of mobile payment systems: an empirical analysis. *Electronic Commerce Research and Applications*, 9(3), 209-216.
- Shon, T. H., & Swatmann, P. M. (1998). Identifying effectiveness criteria for internet payment systems. *Internet Research: Electronic Networking Applications and Policy*, 8(3), 202-218.
- Sonia San-Martin, S., Lopez-Catalan, B., & Ramom J., M.A. (2012). Factors determining firms’ perceived performance of mobile commerce. *Industrial Management and Data Systems*, 112(6), 946-963.
- Statista. (2015). Mobile payment transaction volume 2010-2017. The Statistics Portal. Retrieved August 16, 2018, from <http://www.statista.com/statistics/226530/mobile-payment-transaction-volume-forecast/>
- Su, S.P., Tsai, C.H., & Chen, Y.K. (2012). *Applying the technology acceptance model to explore intention to use telecare system in Taiwan*. 13th ACIS International Conference.
- Sumanjeet, S. (2009). Emergence of payment system in the age of electronic commerce: the state of the art. Retrieved February 25, 2018, from http://globip.com/pdf_pages/globalinternational-vol2-article2.pdf
- Tella, A., & Abdulmumin, I. (2015). Predictors of users' satisfaction with e-payment systems: a case study of staff at the university of ilorin, Nigeria. *Organizacija*, 48(4), 272-286.

- Teoh, W.M.Y, Chong, S.C., Lin, B., & Chua, J.W. (2013). Factors affecting consumers' perception of electronic payment: an empirical analysis. *Internet Research*, 23(4), 465-485.
- Travica, B., Josanov, B., Kajan, E., Vidas-Bubanja, M., & Vuksanovic, E. (2007). E-commerce in serbia: where roads cross electrons will flow. *Journal of Global Information Technology Management*, 10(2), 34-56.
- Tsiakis, T., & Stephanides, G. (2005). The economic approach of information security. *Computers and Security*, 24(2), 105-108.
- Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, 39(2), 273-315.
- Venkatesh, V., & Davis, F.D. (2000). A theatrical extension of the technology acceptance model: four longitudinal field studies. *Management Science*, 46(20), 186-204.
- Wang, Y.S., & Li, H.M. (2011). Factors influencing mobile services adoption: a brand-equity perspective. *Internet Research*, 22(2), 142-179.
- Wang, Y.S., Wang, Y.M., Lin, H.H., & Tang, T.I. (2003). Determinants of user acceptance of internet banking: an empirical study. *International Journal of Service Industry Management*, 14(5), 501-519.
- Wróbel-Konior, S. (2017). *What is an e-payment system?* Securion Pay. Retrieved August 16, 2018, from <https://securionpay.com/blog/e-payment-system/>
- Xin, H., Techatassanasoontorn, A.A., & Tan, F.B. (2015). Antecedents of consumer trust in mobile payment adoption. *The Journal of Computer Information Systems*, 55(4), 1-10.
- Zmijewska, A., Lawrence. E., Steele. R., Dahlberg. T., Guo. J., & Ondrus, A. (2004). Towards understanding of factors influencing user acceptance of mobile payment systems. *Proceedings of the IADIS International Conference*, 2.