Psychological Motivators in the Post-TAM Environment: Convenience and Technology Super-users

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ABSTRACT

Understanding the motivating factors for adopting and using technology has generated numerous studies the last three decades. These factors remain critical for business, governments and even society. The models which have been developed for explaining such behaviors are well known and have demonstrated considerable predictive power in myriad extant studies. This study examines the use of technology from a different perspective, exploring the factors which promote *continued use* of a technology by highly experienced users. There is evidence in the literature that the factors motivating technology usage shifts with experience and this study examines this phenomenon. Using e-payment as the technology and a sample of 417 superusers from urban China, this study finds that the traditional constructs of perceived usefulness, ease of use, social influence, perceived trust and incentives had no significant influence e-payment usage. What was significant were some station in life characteristics, such as age and work/student status. What emerges from this study is the importance of convenience as a motivator for continued technology use by highly experienced users, a construct rooted in marketing literature. Given the findings, we propose that superusers of a particular technology are in a post-Technology Acceptance Model (TAM) environment, where the factors motivating continued use have evolved from TAM constructs to convenience.

Keywords: Convenience, Technology Acceptance Model, E-Payment Usage, Perceived Usefulness, Ease of Use, Social Influence, Structural Equation Modeling.

INTRODUCTION

The quest to understand human behavior is arguably one of the most researched areas in the last fifty years. Why individuals perform certain behaviors and under what circumstances is incredibly important for individuals, businesses, communities, and society. Researchers and practitioners have examined this extremely broad issue from multiple perspectives. Unsurprisingly, this effort has resulted in a multitude of models to explain behaviors and a much clearer understanding of why humans perform certain tasks. Yet much still remains unclear. If the discussion is restricted to important human behaviors in the realm of information technology (IT), past research has yielded a rich picture of the factors and influences which impel and propel humans to learn and use technology. Many important models have been designed and tested, which provide clues to the factors which motivate individuals to adopt and use technology. Among others, these include Innovation Diffusion, Theory of Reasoned Action (TRA), and the Technology Acceptance Model (TAM). These, and other models, in a plethora of studies, help explain how and why humans adopt and use technology.

Adoption and initial use of IT systems are incredibly important for businesses, governments, and other organizations, as well as for individuals themselves. The global and connected nature of today's world make using technology essential for most everyone. This study examines the motivators of technology use from another perspective, one where acceptance is past and mature usage is prevalent. What motivates individuals to keep using a particular technology? The models mentioned are extremely useful in predicting intention and usage behaviors for novices and newer users. But do they still apply for mature, highly experienced individuals and/or for some technology environments, where usage has matured? For example, are such users still motivated by the constructs of TAM/TRA of usefulness or ease of use or social norms? Do these models still apply to mature users for specific technologies? If not, then what are the factors that motivate their continued use?

An understanding of what prompts mature users to keep using technology is perhaps as important to businesses and governments (and others) as knowing the factors for newer or less consistent users. A business that uses mobile apps to promote and sell its product clearly wants users to keep using the apps. This study examines mature users of e-payment systems in China, using an urban sample of 417 of mostly younger users who are experienced and frequent users of such systems. The study examines a variety of potential motivators to use this technology, including constructs found in TAM and TRA, other factors such as risk, trust and incentives, plus personal social and demographic factors. What emerges from this study is a picture of the "post-TAM environment," where mature users are influenced by other factors, including their station in life, rather than the standard constructs of TAM and TRA, that are the basis of so many significant and useful extant studies. In particular, this study finds that convenience may be the prime motivator of continued use. For many users and in many environments, technology use has matured and the factors that impelled newer users are no longer relevant for continued use. This study examines this phenomenon.

THEORETICAL BACKGROUND

Literature Review

In examining the forces that lead individuals to adopt and use technology, there is a rich variety of studies in the past thirty years that investigate different factors which promote such use (see Simmonds, McDonald & Campbell, 2022, for one such synopsis). Most studies that examine this rely on the seminal work of Davis and his Technology Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi & Warshaw, 1989). The model holds that perceived usefulness (PU) and perceived ease of use (PEOU) are critical factors in technology adoption and use. Perceived usefulness is the degree to which the user believes that using technology would enhance their work and daily life. Perceived ease of use is the degree to which the user believes that using technology would be relatively free of effort. Users are more likely to adopt and use technology when they perceive it easy to use and contributes to their work or lifestyle. TAM has a long and rich history of extant studies in which both PU and PEOU significantly contributed to technology adoption and use.

TAM has also undergone a number of alterations and extensions. In an early rendition, Davis (1989) found that PU and PEOU significantly influenced usage (in two studies of using email and drawing software). Behavioral intention to adopt and use the technology was added as a variable, influenced by PU (Davis et al., 1989). Venkatesh and Morris (2000) added subjective norm to the model, in their article on the role gender plays in adoption and use. In this longitudinal study, they found that men consider perceived usefulness more important in both the short and long term; women, on the other hand, considered both subjective norm and ease of use more important. Davis also added subjective norm to his model, as a direct influence on PU, which was named TAM2 (Venkatesh & Davis, 2000). Others have continued to refine and extend TAM.

The theoretical foundation provided by TAM is not the only research stream that attempts to clarify adoption/usage behaviors. TAM itself is an "adaption" of the Theory of Reasoned Action (TRA) (Davis et al., 1989, p. 985). TRA holds that attitudes and subjective norm influences an individual's rational decision to adopt (or intend to adopt) a behavior (Fishbein and Ajzen, 1975). If an individual perceives the behavior is positive, and if the individual's significant others promote the behavior (subjective norm), then the individual's intention or motivation to perform the behavior will be greater. A later modification to TRA added perceived behavioral control to the model, labeled Theory of Planned Behavior (TPB) (Ajzen, 1991). Perceived behavioral control is the degree to which an individual believes they can perform the behavior. This is closely related to self-efficacy, developed by Bandura (1986; 1997). Self-efficacy holds that a person's belief in their ability to successfully carry out a task influences what activities an individual engages in, the effort in pursuing that activity, and persistence in the face of difficulty. In the world of IT, computer self-efficacy (CSE) has been found in many studies to influence an individual's ability to carry out computing and other technology tasks (Compeau & Higgins, 1996; Downey & Smith, 2011).

While TAM, TRA, TPB and CSE are models that shed light on the influences that promote adopting and using technology, an understanding of the process of adopting and using technology emerged initially with the theory of innovation diffusion (Rogers, 1962), which holds that the rate new ideas (or technologies in this context) are accepted follows a defined process by which an innovation is communicated through various channels over time

to members of a social group. As the innovation spreads or diffuses (assuming it does, of course), the rate at which it does so divides adopters into categories, from early adopters to laggards. Rogers contended that there are several factors that influence an individual's decision to adopt, including relative advantage, complexity/simplicity, and compatibility. This process, from adoption to substantial usage behavior, provides the research question of this study. What are the differences in motivating factors of individuals early in the process—new adopters, compared to those late in the process—mature users? What motivates an individual who uses a particular technology frequently, to keep using it?

The models mentioned have been utilized in many significant studies that provide clarity in understanding how and why humans learn and then use technology. They have been quite influential. In the 1980s/1990s, most individuals were using technology for the first time, and these models demonstrated solid predictive power, using a variety of dependent variables (see Delone & McLean, 1992 for an early seminal synopsis of IT dependent variables). TAM and its predecessor models TRA/TPB have a long history where their constructs show significant relationships with other variables. Indeed, these models are still used widely today. There have been multiple literature reviews of TAM, including one that concludes TAM "… has evolved to become the key model in understanding the predictors of human behavior…" (Marangunić & Granić, 2015, p. 92). In another literature review, the same authors found 71 peer-reviewed studies using TAM published between 2003 and 2018 in an educational context alone (Granić & Marangunić, 2019). A perusal of business databases reveals literally dozens of peer-reviewed articles using TAM in the past fifteen years. Many of the studies of TAM in the last several years are used to examine adoption and use for a wide variety of newer technologies, in a variety of disciplines. For example, in education one study examines teacher's acceptance of floor-robots as teaching tools (Casey et al., 2020). Health care as a discipline has many studies, including some which examine the covid pandemic technology responses (e.g., Hashem, 2020).

The success TAM (with its many extensions) demonstrates in predicting human acceptance and use of technologies has made it a standard in studies. One of the reasons TAM continues to be used so often is that new technologies emerge frequently. This means there are always new users, and interest in judging the pace of adoption and use. Another reason is that TAM can apply to so many different industries, given that technology is now a critical component of most of them. While the constructs still significantly predict technology usage and performance behaviors in many studies, this is not always the case. In some studies, these constructs are not significant. These conflicting results suggest that the reasons or motivations for continuing to use technology may be changing, at least for certain, frequently-used technologies.

Post-Adoption TAM?

To investigate these sometimes-divergent findings, this study examines e-payment systems, a technology that in many places and for many users is considered mature, much like email technology is mature for many users. E-payment is a non-cash payment system that includes any financial transaction between a payer and a payee through an electronic medium; it includes credit cards, and any online or mobile-based third-party payment system (Chen et al., 2018). In many recent studies, the constructs of TAM/TRA have not been significant in influencing e-payment technology use or intention to use. For example,

perceived usefulness (PU) did not significantly influence use among respondents in Japan (Chen et al., 2020), in China (Nadler et al., 2019), and Indonesia (two studies: Immanuel & Dewi, 2020; Karomah et al., 2021). Perceived ease of use (PEOU) was not significant in a US study (Chopdar et al., 2018), in Japan (Chen et al., 2020), in China (Nadler et al., 2019) or in Iran (Barkhordari et al., 2017). Further, social influence, or the influence of significant others, also was insignificant in influencing e-payment usage in both India and the US (Chopdar et al., 2018).

One reason for such findings is that e-payment technologies in many locales are used so frequently, that many users are mature. Because there are super-users of this technology, the factors motivating usage is changing. There is some evidence of this in some studies of newer users, in which TAM constructs of PU and PEOU still significantly influence adoption and use. For example, perceived usefulness significantly predicted intent to use e-payment systems in developing countries of Southeast Asia (Lai, 2016), in Saudi Arabia (Alswaigh & Aloud, 2021), Cote d'Ivoire (Chen et al., 2018), and in Iran (Barkhordari et al., 2017). Perceived ease of use similarly influenced adoption/use the same first three studies, as well as a study in Indonesia (Karomah et al., 2021). But a common factor is that the respondents in these studies may not have been particularly mature users. In the Saudi Arabia study, for example, 53% of the respondents were either non-users (27%) or new users (26%). In a study of sub Saharan Africa (multiple countries), with very likely newer users, PU and PEOU strongly predicted attitudes toward adoption of mobile money (Alhassan et al., 2020). It seems that when a technology is new to users, traditional constructs still positively influence adoption and usage, but as users transition to super-user status, factors motivating continued usage change.

Noting the differences between recent or potential adopters and more experienced users is not new. In one 1995 study, the authors tested TAM/TRA on two different groups of users for a computer lab: first time users (inexperienced) and experienced users (Taylor & Todd, 1995). They found that PEOU significantly influence attitudes toward the lab but only for the inexperienced. For both groups, PU significantly influenced both attitudes and intention to use the lab. Subjective norm also significantly influenced intention for both groups. In another study, respondents of an organization were divided into two groups, those who had used the Windows operating system and those who had not (Karahanna et al., 1999). For pre-adopters (unlike post-adopters), PEOU significantly influenced attitudes toward adoption and subjective norm influenced intention to adopt. PU, on the other hand, was again significant for both groups. These two studies suggest that as users gain experience, what motivates them changes. Early on, PU, PEOU and subjective norm are important; with experience, only PU remains important. In one other article, a longitudinal study examined the differences over time as users gain experience in using a web portal (Kim & Malhotra, 2005). Using TAM, their findings differed some from the previous two. At time one, users were motivated only slightly by PEOU and not at all by PU, while several months later, the same respondents, more experienced, were highly influenced by PEOU as well as PU and by their past experience. These studies suggest that while experience plays a role in the factors which motivate technology use, additional work would be useful in clarifying this relationship.

What motivates highly experienced users to keep using such systems? Concentrating not on adoption but on continued usage, what factors promote individuals to continue using a

technology? This study examines mature users of a particular technology (e-payment systems) to determine their motivations for continuing to use it.

Factors Motivating Mature Users and Hypotheses

There is no established line separating "mature" users from others, and to a certain extent it varies with the technology. Experience with a technology is a critical factor but note that this differs from one's expertise in a technology, which has its own research stream. A mature user, or super-user is defined simply: one who uses a particular technology frequently. In this context of urban Chinese users of e-payment systems, that translates to multiple times per week. Based on government statistics, China has been the fastest-growing economy in the world since the 1980s, with an average annual growth rate of 10% from 1978 to 2005. The GDP per capita of China went from $1,753 in 2005 to $10,062 in 2019 (World Bank Group, 2021). At the end of 2020, around 86% of internet users in China had used online payment services (Lai, 2021). There are a variety of e-payment technologies in China, including AliPay, WeChat Pay, QQ Wallet, and Union Pay. Based on this setting, there are many mature e-payment users available.

This study starts with the three constructs from TAM and TRA: perceived usefulness, perceived ease of use and social influence. For this study the status quo is assumed, that is, the constructs of these models will significantly predict e-payment usage. As noted, however, none of these constructs universally do so. Every construct has studies showing significant relationships as well as non-significant ones. It is the mixed findings that support further study to help clarify the relationships.

Perceived Usefulness (PU). Perceived usefulness is the degree to which a person believes that using a particular system would enhance his or her performance (Davis, 1989). Many of the myriad studies already mentioned find that PU influences one's intention to use technology as well as actual use. This is also the case for e-payment technology (Chen et al., 2018; Ozkan et al., 2010). Therefore:

H1: Perceived usefulness (PU) is positively related to e-payment usage for mature users.

Perceived Ease of Use (PEOU). As defined above, complex technology is less likely to be adopted than a user-friendly one. This has been a relatively common finding in many studies, including many of the studies already mentioned. In just two examples, PEOU significantly influenced mobile shopping applications in India (Chopdar et al., 2018) and e-payment usage in Cote d'Ivoire (Chen et al., 2018). A variety of other studies in non-Western countries also support this relationship: in India (Kallanmarthodi & Vaithiyanathan, 2012), in Nigeria (Gholami et al., 2010), and in Vietnam/Taiwan (Lin & Nguyen, 2011). It has been noted that the relationship between PEOU and technology usage is at times not significant and can be moderated by other factors, such as age and gender, for the purpose of this study, again the status quo is assumed:

H2: Perceived ease of use (EU) is positively related to e-payment usage for mature users.

Social influence. The terms social influence and subjective norm are often used interchangeably in the literature. A keystone of the Theory of Reasoned Action, the influence

of significant others is important in motivating behaviors. Inexperienced and prospective adopters sometimes lack self-experience and tend to depend on other's counsels and information before adopting an innovation (Md Jusoh & Teng, 2019). In many studies, social influence significantly influences intention to use; for example, one study found that social influence significantly predicted intention to use e-government services for both rural and urban Chinese (Zhang & Zhu, 2021). Another longitudinal study found that multiple measures of subjective norm influenced intention to use tablets at two different time frames (Youngnyo & Magsamen-Conrad, 2022). Our model assesses social influence in terms of people who are important to and respected by the respondents. The following hypothesis is proposed:

H3: Social influence (SI) is positively related to e-payment usage for mature users.

In addition to these three potential influences from TAM/TRA, the literature has examined various other constructs that promote the use or adoption of e-payment technologies. In this study, three are included: incentives, perceived risk and perceived trust.

Incentives. Monetary benefits are sometimes used to attract and retain customers (Sierzchula et al., 2014). One study found that cashback rewards had a positive and significant impact on increasing credit card usage and spending (Argarwal et. al, 2010). Another demonstrated that financial incentives such as cashback, points, and discounts had a positive effect on promoting the use of credit (Carbó-Valverde & Liñares-Zegarra, 2011). Yet another study found that the availability of financial incentives had a significant and positive effect on the intention to adopt mobile payments, and financial incentives indirectly affected intention to use through perceived risk (Zhao et al., 2019). A recent study conducted by Chen and colleagues in Japan (2020) found that incentives from merchants were important for young Japanese consumers. This study will investigate the effect of the following financial incentives: coupons, discounts, membership points, cashback, money certificates and gifts. Given the support in the literature, the following is proposed:

H4: Incentives (INC) are positively related to e-payment usage for mature users.

Perceived risk refers to the degree of personal, financial, or transactional risk involved in an e-payment transaction. It has an extensive research stream in human behavior research. Risk has long been negatively associated with adoption and use behavior. The riskier an individual perceives the technology interaction, the less likely adoption and use will occur. Using the modified Unified Theory of Acceptance and Use of Technology (UTAUT2; Venkatesh et al., 2012), Chopdar and associates (2018) added privacy and security risk to the model, and found that both significantly influenced use of mobile shopping applications in India; the same study found that risk influenced mobile shopping applications in the US. Lower perceptions of risk have been found to be positively related to the intention to adopt e-payment systems in many locations, such as Nigeria (Omotubora & Basu, 2018), Malaysia (Teoh et al., 2013) and New Zealand (Xin et al., 2015). Another study found that perceptions of risk are a powerful explanatory factor in consumer behavior as individuals appear to be more inclined to avoid threats than to maximize purchasing benefits (Kaushal & Balaini, 2016). While increased perceived risk is predicted to negatively influence usage, in our

instrument the items were phrased so that "low" system risk is associated with increased usage. Therefore, the following hypothesis is proposed:

H5: Lower perceived risk (PR) is positively related to e-payment usage for mature users.

Perceived Trust. Perceived trust in the online payment system is defined as consumers' belief that e-payment transactions will be processed following their security expectations (Kallanmarthodi and Vaithiyanathan, 2012). Gefen et al. (2003) added trust as an extension to TAM and defined it as the willingness to depend on or to be vulnerable to another party based on their abilities, benevolence, and integrity. Past studies concluded that trust was an important predictor of user's willingness to adopt e-payment or engage in online exchanges (Barkhordari et al., 2017; Gefen, 2000; Hasley, Hester & Gregg, 2020). Still, trust is not universally significant; for example, in one study perceived trust in e-payment systems was not significant in intention to adopt the system (Ozkan et al., 2010). Despite mixed findings, the following hypothesis is proposed:

H6: Perceived trust (PT) is positively related to e-payment usage for mature users.

In addition to these six constructs, this study also includes several environmental or demographical variables. These variables relate to one's station in life and include age, work status, student status, education, and gender. While no hypotheses are offered concerning these factors, extant research has found that each of them can significantly influence adoption and use of technology. It is unclear the effect, if any, that these variables will have on a sample of respondents who are mature users of e-payment technologies. Therefore, these are posed as a research question rather than a hypothesis:

Research Question: what effect will age, work status, student status, education and gender have on e-payment usage for mature users?

This study examines the reasons for continuing using e-payment services in China among mature users. Figure 1 of Appendix B provides the research model. What are those factors which persuade or impel individuals to keep using such a service? Continued use is quantified two ways, by frequency of use and by the amount spent per month using e-payment technologies. An understanding of the motivating factors in continuing use is important to businesses and governments who wish to take advantage of e-payment efficiencies. With a goal of increasing individual participation, it will aid decision-makers in focusing efforts on those factors which are most appropriate. Given the importance of online payment services for economic growth, increasing participation in this and other technologies is an objective for many. This study sheds light on the factors which promote e-payment continued use.

METHODOLGY

Survey and Instrument

The respondents desired for this study were those that frequently used e-payment services. The survey itself was promulgated via the popular Chinese social media, WeChat. While it was impossible to prevent any WeChat users from responding to the survey, it was thought that responders would be more technically proficient and use e-payment systems. This was confirmed upon examining the sample. Almost all respondents used this technology frequently.

The constructs and questions used in this study were selected from the existing literature and are listed in Appendix A. While the survey questions were originally written in English, they were translated to Mandarin by native speaking college students, faculty, and staff. The survey instrument was then pretested by a group of fluent bilingual college students for accuracy.

The survey instrument was comprised of three sections. Section I contained the six independent constructs, which were derived from the work of Teoh et al. (2013). A few changes to the wording were judged necessary for better clarity. The constructs included perceived usefulness, perceived ease of use, social influence, risk, trust, and incentives. The most significant change from the Teoh et al. study is that this study used a 7-point Likert scale rather than a 4-point scale. Section II included two dependent variables, both assessing the extent of e-payment usage. The first was the frequency with which e-payment systems were used, per week. There were eight ordinal responses, from zero to 31+ times per week. The second dependent variable was the amount of money spent on e-payment systems per month. There were ten ordinal responses, ranging from $0 to USD $12,000+ (survey used yuan—this is the approximate exchange rate). Section III was composed of questions about the respondents' station in life, including age, gender, education level, working status, and student status. Age was an ordinal variable with ten choices (18-20, 21-25, etc.). Education level included high school, 2 years of college, 4-year degree, and Master's degree or higher. Working and student status included full-time, part-time or do not work (or attend school).

Data Analysis

A total of 421 usable surveys were collected (ten were rejected as incomplete). Of these 421, four were discarded because the respondents reported they used e-payment services zero times per week, leaving a sample of 417. This study required respondents that were mature users of this technology, so the elimination of non-users was a given. As discussed below, for the remaining 417, the mean number of times per week respondents used e-payment technology was about 21.3. After 0, the next choice for respondents in weekly frequency was 1-5 times per week; there were 44 of these (10.6%). These were left in the sample, as meeting the admittedly somewhat vague requirement of "mature." The sample of 417 was compared with that of the 373 (with the 44 respondents excluded) and there were no appreciable differences. The data were analyzed using structural equation modeling.

Respondent Station in Life Variables**.** Table 1 of Appendix C displays the demographic profiles of the study respondents. While most respondents answered all items, there were a few missing items (indicated in Table 1). The split between male and female

respondents was 273 (65.6%) to 143 (34.4%). Of the total sample, 295 (71%) were under the age of 25. In terms of education, almost 76% had a college degree or higher. About 61% worked either full or part-time, suggesting that they should have enough financial resources to engage in transactions and possibly use an e-payment system to facilitate those transactions. Of the respondents, 155 (36%) were either full-time or part-time students. In general, respondents were younger with a higher educational background.

Construct Statistics**.** Descriptive statistics of the six major independent variables are provided in Table 2 of Appendix C. Reliability for each scale is also included, but discussed in the next section. Means and standard deviations are provided. Ease of use had the highest mean of 6.39 (based on a 7-point Likert scale), followed by perceived usefulness (6.24). Social influence (5.37), incentives (5.31), perceived trust (5.25) and perceived risk (4.70) had relatively moderate means.

In this study, there were two dependent variables, both measuring some aspect of e-payment usage. The first measured frequency per week of using the technology. The second measured the approximate spending per month on e-payment purchases. Both measures were ordinal, and coded as 1-8 (frequency) or 1-10 (spending). As this study required mature users, the four non-users were eliminated (as discussed). Using the range midpoints, this meant that respondents used e-payment about 21 times per week, or thrice daily. Interestingly, 35% of respondents reported using this service 31 or more times per week.

The second way usage was measured was the amount of money respondents spent each month on e-payment systems. On average, respondents spent about 3280 yuan (about $515 USD) per month. About 61% spent between 800 and 5000 yuan (125-785 USD). Table 3 of Appendix C provides descriptive data on usage.

Relationships among Variables. The relationships between the variables in this study are presented in the correlation matrix of Table 4 of Appendix C. Looking first at the two usage dependent variables, there was a strong correlation between them (.44, $p < .01$). All of the six independent variables were also significantly related to each other, all at the $p < .01$ level. This suggests evidence of some face validity among the constructs. These relationships will be further explored in hypotheses testing.

The demographic variables provided clarifying information, which in some respects is quite revealing. Demographic variables had few significant relationships with the six constructs of interest. There were two: age was significantly related to perceived ease of use ($p < .05$) and gender was significantly related to perceived risk ($p < .01$). Younger respondents found ease of use more important than older respondents. Women valued less risk. The age finding was contrary to expectations, since the perception is that younger users of technology are more adept at meandering their way through interfaces.

The relationship between demographics and the two dependent variables of usage was also revealing. Four were significant, all at $p < .01$. Age was negatively related to frequency; younger respondents used e-payment systems more often than older. The other three were significantly related to money spent per month: work and student status, and gender. Those who worked or were not students spent more, along with women.

Testing: Measurement Model

Construct Factor Analysis. The first step in testing the measurement model was to ensure that the items measuring the latent variables actually measured them. To ensure one-

dimension constructs, factor analysis was used. This included five constructs, PU, PEOU, social influence, perceived risk and perceived trust. Perceived usefulness had eight items; on factor analyzing, two constructs emerged. Items PU2, PU3, and PU4 measured managing financial resources rather than actual usefulness, and these were eliminated. PU5 was also eliminated, as it loaded evenly on both factors. This left four items, PU1, PU6, PU7, and PU8. Perceived ease of use factored to one construct, but one item's (EU2) load was low, and so this item was eliminated. EU2 concerned mental strength, rather than ease of use. Social influence also had one item eliminated with a low load (SI3: "Most people around me should use e-payment"); this item did not focus on significant others. Perceived risk and perceived trust, both with 6 items, factored into one item with strong loadings. Therefore, six items were eliminated out of the original 30.

Confirmatory Factor Analysis-Validity Analysis. To assess convergent and discriminant validity, all five constructs were factor analyzed simultaneously to ensure that the items loaded properly on their latent constructs. Validity is indicated if each item loads higher on its own construct, rather than others. This was the case, with almost no high cross-loads. To assess discriminant validity, average variance extracted (AVE) was calculated for each latent construct, which quantifies the amount of variance captured by a construct in relation to the quantity of variance due to measurement error. AVE should be greater than .50 to justify using a construct, and its square root should be greater than other construct correlations (thus a minimum of .707) (Fornell & Larcker, 1981; Netemeyer et al., 2003). The square root of AVE is presented in Table 4 (in bold). The lowest AVE is .837, and is greater than all correlations. These suggest satisfactory validity. Table 5 of Appendix C presents the factor loadings.

Reliability. Two measures were used to test the internal consistency of the items, Cronbach's alpha and composite reliability. Both assess the extent that the items of a latent construct measure the same thing. Both alpha and composite reliability are provided in Table 2 of Appendix C. All alpha and composite reliability scores are greater than .90, except for perceived usefulness (alpha only is .855). These are well above the limit of .70 for alpha (Nunnally, 1978) and .80 for composite reliability (Netemeyer et al., 2003). This suggests that the items for each latent construct measure the construct appropriately.

Testing: Structural Model

Given an appropriate measurement model, the structural model was tested next, using the lavaan package (Rosseel, 2012) in the R statistical environment (R Core Team, 2021). Two models were run, using both dependent variables (frequency per week and spending per month). Both models were significant, with a significant X^2 (p-value at 0.00). Because X^2 values are influenced by sample size (generally above 200, Schumacker & Lomax, 2004), this study used the rule of thumb that X^2/degrees of freedom should be less than 5, which it was (Lai, 2016). Three other goodness of fit measures were used, including two that compare the proposed model with a null or independence model: comparative fit index (CFI) and Tucker-Lewis Index (TLI). Both CFI and TLI range from 0 (no fit) to 1.0 (perfect fit), and the two models, at .89 and .88 respectfully, were adequate fits. Root mean square error of approximation (RMSEA) was calculated, which should be below .08 for an adequate fit (Netemeyer et al., 2003). Both models were .078. Table 6 of Appendix C provides these measure results.

With satisfactory fit measures, the study next examined the paths in the models. This is provided in Table 7 of Appendix C. Given the exploratory nature of this study, paths at a p-value of .10 or less were included. The study recognizes that a p-value of .05 or less is the normal standard for most studies, but this is somewhat new theory—that of the motivators for mature users. Both models, for frequency of e-payment use and monthly spending, there were three significant paths. For both models, there was only one common significant variable, and that was work status. Those who worked full-time had a significantly higher frequency of use (.378, p = .041) and spent more per month (.419, p = .007). For the frequency model, age was significant (-.215, p = .002). Younger respondents used e-payment systems more. Perceived risk was also a significant influence on frequency (.276, p = .006). Those who thought the technology was less risky used the technology significantly more. For monthly spending, in addition to work status, education was a factor (.243, p = .047). Respondents who had higher amounts of education spent more per month. Finally, student status also influenced spending (-.275, p = .09). Non-students spent significantly more per month that full or part-time students. This was the only path where the p-value was above the traditional .05.

Most of the constructs or variables were not significant in influencing either frequency or spending. The three foundational constructs of TAM/TRA, perceived usefulness, perceived ease of use and social influence were not significant. Perceived trust and incentives were not significant. Interestingly, gender also did not influence either model (though it neared the .10 significance level on monthly spending at .106).

RESULTS

The purpose of this study was to examine the factors that motivate mature users of e-payment systems to continue using the technology. E-payment technology was examined because in many locations, including areas of urban China, this is commonly used and there are super-users available. From a business perspective, there are many advantages and its use is likely to enhance profitability. It is also advantageous for individuals, making it easy to conduct business online, especially e-commerce.

Historically, the Technology Acceptance Model (TAM) and the Theory of Reasoned Action (TRA) have been used to explain technology adoption and use. These two models, with their associated constructs, have a demonstrated influence on technology use in a plethora of studies (as discussed in the literature review). In particular, studies use the core constructs of perceived usefulness (PU), perceived ease of use (PEOU), and the influence of significant others, social influence (SI). There are other common factors associated with or as an extension of TAM/TRA, including perceived risk and perceived trust, that also have demonstrated influence on technology use. All of these factors, as well as financial incentives, are tested in this study to examine their influence on e-payment technology use among mature users.

While all of these factors were hypothesized to have a positive influence on e-payment usage, in reality it was proposed that the factors motivating mature users to continue using may be different than those historically used in TAM/TRA. Given the number of recent studies in which these constructs were not significant, the authors propose that one reason for such findings is that as usage matures, the factors prompting continued use shift.

There is significant evidence in this study that confirms this notion. Notably, using the two measures of e-payment usage, weekly frequency and money spent per month, none of the three core concepts of PU, PEOU, and SI significantly influenced usage. It seems respondents were not motivated to continue using e-payment systems by these factors. Yet there seems little doubt that e-payment is useful to these users and that it is easy to use. The frequency with which they are using this technology suggests this. PU and PEOU constructs had the highest means of all (6.24 and 6.39, of 7.0 respectfully), so respondents thought this technology useful and easy to use. It is suspected that PU and PEOU were a given for these mature users; that without their presence, the technology might not be used. Similarly, one's smart phone (or similar device) is also a given for e-payment usage, but probably does not influence that usage. Social influence is likely similar—once usage is commonplace, the influence of family, friends and coworkers offer little impetus to continue using the technology. Therefore, Hypotheses 1, 2, and 3 were not supported. Figure 2 of Appendix B provides model paths.

Perceived trust, added to TAM by Gefen et al. (2003), was also not significant. Trust in e-payment technologies was relatively high for these respondents (5.25 of 7.0), and therefore most had high confidence in the organizations that employ these systems. The items that measured trust concentrated on the trustworthiness of the financial institutions and businesses that offered these services. Respondents believed in them and like the previous constructs, this seems to be a given for their use. As a result, Hypothesis 6 was not supported.

The importance of incentives to these users was interesting. The survey included six different types of incentives, including discounts, coupons, cash back, membership points, gifts and money certificates. The questions asked respondents to rate their importance, from 1 (not important) to 7 (very important). Because these were not indicator items for a latent construct, the average of all six for each individual was taken, and the overall mean was 5.31 (out of 7.0). Therefore, incentives were relatively important to these users. But it is surmised that like the previous constructs, incentives were a part of the package of doing e-commerce. In hindsight it would have been useful to find out how often respondents received incentives for using these services; this could have helped clarify the impact of incentives on usage. However, Hypothesis 4 as proposed was not supported.

Only one construct significantly influenced usage, and that was perceived risk. Risk only significantly influenced the frequency of use model; it was not significant in the money spent model. The six items for this construct included the capacity of the technology involved to protect privacy and be secure. Respondents averaged 4.7 (out of 7.0) which was the lowest average of any of the six constructs, but still above the midpoint of 3.5. The standard deviation on this construct was also higher than other constructs, at 1.73. The items of this construct were phrased such that less perceived risk is associated with increased usage. This proved to be the case for frequency of use. Respondents were concerned with the risk involved in using e-payment systems and this influenced how often they used these services. On the other hand, risk did not influence how much money was spent using e-payment systems. Hypothesis 5 was partially supported. Hypothesis testing results are summarized in Table 8 of Appendix C.

Station in Life Variables. This study included one research question, which was phrased as descriptors of one's station in life. This included one's age, work status, student status, education and gender. The question asked about the effect these variables might have on frequency of use and money spent. Given that none of the hypothesized constructs

associated with TAM/TRA significantly influenced usage (except risk for frequency of use), the findings associated with this question provide a clearer picture of the factors important to super users of e-payment systems.

Gender. Of the five station in life variables, only one was not significant in either structural equation model, and that was gender. This seems rather surprising since gender has had such an influence in extant studies of technology adoption and use (Venkatesh & Morris, 2000). In terms of frequency, both men and women were similar users. On the other hand, for spending, using .10 as significant, gender approached significance at .106. To further examine this, the sample was divided into men and women, and conducted t-tests to evaluate differences in mean for both usage variables. In both models, females had a higher mean; they had a higher frequency of use and spent more. For frequency of use, the means were not significantly different, but for spending, the difference was significant at the $p < .01$ level. Although gender did not significantly influence either model, there is a significant difference between men and women in the amount spent per month. Results of this gender difference is presented in Table 9 of Appendix C.

Work Status. All of the other station in life variables significantly influenced one or the other (or both). Results are presented in 10 of Appendix C. Only one's work status influenced both models. Respondents who worked full time (about 55%) and part time (7%) used e-payment systems more frequently than those who did not work (38%). They also spent more money per month. This is probably not surprising; those who work typically have more money to spend and less time available to go to brick and mortar stores. As part of the survey, respondents were asked about the types of items purchased most, and in order, respondents reported spending the most on dining out, groceries, clothes, transportation and entertainment. Least bought were electronics, books and travel.

Age. The frequency of use model had one other significant variable, and that was age. Younger respondents used e-payment more frequently than did those older. Much has been written about the "gray divide" in technology, where in many studies older participants use technology less often than younger ones (McMurtrey et al., 2008; McMurtrey et al., 2013). This was the case for these respondents. Age was not a significant factor for spending ($p = .126$), likely because younger respondents typically have less disposable income.

Education and Student Status. Besides work status, there were two station in life variables that significantly influenced the quantity spent per month. One's education level was one of these, significant at $p < .05$. Those with more education spent more than those with less. Those with master's degree or higher (13%) and 4-year degrees (63%) made up over three-fourths of respondents, and with likely more income, spending per month increased. Like work status, how much income one has significantly influences how much is spent. The last station in life variable was student status, significant for spending but only at the $p = .09$ level. This was a negative path, meaning that those who were full time students (34%) or part time students (2%) were less likely to spend as much as those who were not students. The non-students, who were likely working, spent more. Student and work status had the highest correlation of any pair of variables in the model (-.80), which strongly suggests that non-students were working.

DISCUSSION

This study confirms that for this population of e-commerce mature users, the foundational constructs of TAM/TRA did not significantly influence mature users to keep

using e-payment systems. This includes perceived usefulness, perceived ease of use, social influence and perceived trust. Mature users are not significantly motivated by these factors. While important, this may not be all that surprising. The technology acceptance model may be more about adoption rather than continued use (Kim & Malhotra, 2005). While the constructs have demonstrated significance in a wide range of technologies and studies, even up to the present, as users mature in a technology and go beyond adoption, it was found that the constructs lose predictive power. TAM/TRA may not be appropriate in the context of experienced users.

What then, does motivate users to continue to use a particular technology? Potential risk is still an important factor, at least for the frequency of using e-payment services. Users are concerned about security, which is probably not surprising given the number of security breaches in the news. It was found that station of life traits did influence both models of usage. One common thread was the amount of income available; work status, student status and education significantly predicted one or both models, presumably at least in part because of the income factor. Age was a factor as well. But can these station in life factors be said to motivate super-users to continue using e-payment systems? It seems likely that station in life variables are an indicator, not a cause of continued use.

Convenience

What then motivates? Based on these findings, the authors believe one main reason is convenience. E-payment systems are quite convenient for mature users. Purchases may be made quickly and with minimal thought to the process. Ironically, one reason this assertion is made is the importance of usefulness and ease of use for these respondents. As the constructs with the highest means in our survey, these users valued both greatly. Yet neither significantly predicted either usage variable. Tha authors suggest that the reason they were not significant was that both usefulness and ease of use were a given for super-users. It seems apparent that for mature users, the process of using e-payment systems has become easy. Unlike new technologies, where learning may involve effort, there is nothing hard about using e-payment for mature users. Such systems are also a priori useful—ordering and paying for goods or services through technology saves time and effort from going to an actual store.

What then, is convenience? Morganosky (1986) defines it from a consumer perspective as one who seeks to accomplish a task "in the shortest amount of time with the least expenditure of energy" (p. 37). As a construct, it has a place in marketing, retailing and consumer behavior literature (Farquhar & Rowley, 2009). Brown (1990) recognized five dimensions of convenience, including time, place, acquisition, use, and execution. For example, a product may be provided at a more convenient time (e.g., more quickly) or a more convenient place (e.g., home), or is easier to acquire/buy, or more convenient to use. These dimensions appear to be very much like the TAM constructs of usefulness and ease of use. Is it not useful to buy a product at a more convenient time and place? Is it not easier to buy and use? It is proposed that for mature users, convenience is a defining factor in continued use of e-payment systems. It should be noted that convenience is different from a habit, which is a repeated behavioral pattern that occurs outside of conscious awareness (Triandis, 1977). One who uses e-payment systems typically interacts intentionally with the system.

In support of this proposal, one study is presented which examined the construct of convenience in the context of TAM, using a wireless LAN as the technology (Yoon & Kim,

2007). The authors operationalized convenience through four items that asked users if the wireless LAN made their work more convenient in time, place and in job performance. They then extended TAM by including the construct of convenience, along with PU and PEOU. They found that convenience significantly influenced PU, but not intention to use the LAN. They tested three models, and found that in one convenience was a significant predictor of intention to use. One of the models was solely TAM, in which both PU and PEOU significantly predicted intent to use (all at $p < .01$). It was not clear how mature these users were in the study; the university where the study took place had installed a wireless LAN for students to use approximately three years earlier, and so it was relatively new. Despite the mixed findings, convenience did show some significance in predicting LAN usage. Another recent study found that comfort significantly influenced behavioral intention and using e-payment services, for respondents in Taiwan (Ellis et al., 2021). Feeling "comfortable" using technology suggests there may be convenience involved.

This raises the question of the difference between PU and PEOU on one side, and convenience on the other. In using technology, convenience is after all, both useful and easy to use. The authors contend that convenience may overtake PU and PEOU as predictors as a new user develops into a mature user. During the early phase, when a user is learning a new technology, the user does yet comprehend how useful it may be (and some technologies may end up not being useful). During this learning phase, a technology may not yet be easy to use. It is during this time that PU and PEOU significantly predict usage behavior. But if the technology proves extremely useful, and therefore users transition to mature users, usefulness and ease of use are a given; that is, they are simply a necessary pre-requisite. In the 2007 study by Yoon and Kim, which found that PU and PEOU significantly predicted intent to use, when convenience was added to the model, it (convenience) did not significantly predict intent to use. It may very well be because many users were not yet mature.

Theoretical and Business Implications of the Study

Perhaps the most important finding in this study is some clarity on the progression of users from adoption to super-user and how the factors which prompt such behavior shift during the process. During the adoption and early use phase, individuals are motivated by usefulness, ease of use, risk, trust, and self-efficacy as is evident from the myriad extant studies. If the technology is worthwhile to individuals, such that a user transitions to using it repeatedly, by default it is useful and with such experience, easy to use. At that time, it becomes ingrained or routine in an individual, and becomes "convenient". If this is indeed the case, then this conceivably will generalize to any technology. This suggests that measures taken by interested organizations and businesses to promote their technology changes over time. Adoption of a business-used technology is important, but from a managerial perspective, it is continued use that is the desired outcome (Kim & Malhotra, 2005). An understanding of the factors which support continued use by super-users is critical.

FURTHER RESEARCH, LIMITATIONS AND CONCLUSION

Further research is needed in a number of areas. First, as a construct, convenience has not received much attention in studies (Yoon & Kim, 2007). While these authors operationalized it in a technology context, additional work is needed to uncover its

dimensions with respect to technology. How exactly does it compare and contrast to usefulness and ease of use? Are they construct synonyms which are distinguishable only by experience level of the responder? Another area of interest is the idea of a mature or super-user. While there are many studies of technology skill levels, usage is different than expertise. What are the characteristics of such a user and at what point does one cross over into this status? This study examined e-commerce technology, but there are clearly many other technologies on which convenience versus TAM/TRA might be tested. In fact, using e-payment technology is relatively easy to learn, and therefore might have different motivators than more complex ones. In addition, this study examined six potential constructs that influence mature usage, as well as five station in life variables. There are likely others that might be influential. In fact, if the population of interest is mature users, then convenience may be one of several other potential motivators. Culture is another potential determinant; this study was of Chinese, but other populations may different motivating factors.

There were several limitations in this study. This was a convenience sample of mostly young, urban Chinese. This study was looking for respondents who used e-commerce a lot, and this sample did that. While the sample size was not particularly small, the ability to generalize to other Chinese, much less citizens of other countries, may be limited. One study found some significant differences in the factors that motivate urban versus rural Chinese in using e-government services (Zhang & Zhu, 2021). This study did not operationalize convenience, which could have clarified the relationships. As mentioned, six potential constructs were used, but there are others that could have been included. This includes cultural impacts, as well as other known motivators such as self-efficacy. There was a presumption that this usage is voluntary, and given the types of items purchased, that is likely true. But the survey did not gather information on voluntary versus involuntary usage.

The purpose of this study was to examine the motivating factors for mature users to continue using a particular technology. Multiple factors were proposed, among them classic TAM/TRA constructs as well as extensions. It was found that these constructs, including perceived usefulness, perceived ease of use, social influence, perceived trust, and financial incentives did not predict e-payment usage, in terms of frequency or money spent. Perceived risk, as well as station in life variables, did have a significant influence on one or the other (or both) of the usage measures. But there is no known theoretical basis for suggesting that such variables as age, education, work/student status causes such behavior. Instead, the authors propose that what motivates such users is convenience. Convenience means that tasks are simplified, making them less difficult and conducting them with less effort. E-payment systems allow users to easily and quickly make purchases, with little exertion. Our study shows that for super-users both usefulness and ease of use are still very important, but it is suggested that these factors are a given in their approach to e-payment systems. They do not necessarily influence continued use, but instead are a pre-requisite for such use.

Given these findings, the authors maintain that the motivators for continuing to use a mature technology are different from those which stimulate adoption and early use behaviors. At the super-user end of the usage curve, convenience is proposed as an important stimulus. Some technologies present in the global environment are used so frequently that mature usage is present if not prevalent. Understanding the factors which inspire continued usage allows organizations to be better prepared to figure out ways to encourage and promote those critical technologies by which they do business.

REFERENCES

Agarwal, S., Amromin, G., Ben-David, I., Chomsisengphet, S., & Evanoff, D. (2010). Learning to cope: Voluntary financial education and loan performance during a housing crisis. *American Economic Review, 100*(2), 495-500.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.

Alhassan, A., Li, L., Reddy, K., & Duppati, G. (2020). Consumer acceptance and continuance of mobile money: Secondary data insights from Africa using the technology acceptance model. *Australasian Journal of Information Systems*, 24.

Alswaigh, N. & Aloud, M. (2021). Factors affecting user adoption of e-payment services available in mobile wallets in Saudi Arabia. *International Journal of Computer Science and Network Security*, 21(6), 222-230.

Bandura, A. (1986). *Social foundations of thought and actions*. Englewood Cliffs, N.J: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. N.Y.: W.H. Freeman and Company.

Barkhordari, M., Nourolla, Z., Mashayekhi, H., Mashayekhi, Y. & Ahangar, M. (2017). Factors influencing adoption of e-payment systems: An empirical study on Iranian customers. *Information Systems E-Business Management*, 15, 89-116.

Brown, L. (1990). Convenience in services marketing. *Journal of Services Marketing*, *4*(11), 53-59.

Carbó-Valverde, S., & Liñares-Zegarra, J. (2011). How effective are rewards programs in promoting payment card usage? Empirical evidence. *Journal of Banking & Finance*, *35*(12), 3275-3291.

Casey, J., Pennington, L., & Mireles, S. (2020). Technology acceptance model: Assessing preservice teachers' acceptance of floor-robots as a useful pedagogical tool. *Technology, Knowledge and Learning, 26*, 499-514.

Chen, A., Nadler, S., Griffin, K., & Derbe, J. (2018). Subjective norms and demographic background on e-payment behavior in Cote d'Ivoire. *Competition Forum*, 16(2), 150-161.

Chen, A., Zeltmann, S., Griffin, K., Ota, M., & Ozeki, R. (2020). Demographic background, perceptions, and e-payment usage among young Japanese. *Global Journal of Business Disciplines*, *4*(1), 4-20.

Chopdar, P., Korfiatis, N., Sivakumar, V., & Lytras, M. (2018). Mobile shopping aps adoption and perceived risks: A cross-country perspective utilizing the Unified Theory of Acceptance and Use of Technology. *Computers in Human Behavior*, *86*, 109-128.

Compeau D. & Higgins, C. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, *19*(2), 189-202.

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319-340

Davis, F., Bagozzi, R., & Warshaw, P. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science 35*(8), 982-1003.

Downey, J. & Smith, L. (2011). The role of computer attitudes in enhancing computer competence in training. *Journal of Organizational and End User Computing*, *23*(3), 81-100.

Ellis, M., Downey, J., Chen, A. & Lu, H. (2021). Why Taiwanese seniors use technology. *Asia Pacific Management Review, 26*, 149-159.

Farquhar, J. & Rowley, J. (2009). Convenience: A service perspective. *Marketing Theory*, *9*(4), 425-438.

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

Fornell, C. & Larker, D. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 29-50.

Gefen, D. (2000). E-Commerce: the role of familiarity and trust. *Omega: The International Journal of Management Science*, *28*(6), 725-737.

Gefen, D., Karahanna, E., & Straub, D. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, *27*(1), 51-90.

Gholami, R., Ogun, A., Koh, E., & Lim, J. (2010). Factors affecting e-payment adoption in Nigeria. *Journal of Electronic Commerce in Organizations (JECO)*, *8*(4), 51-67.

Granić, A. & Marangunić, N. (2019). Technology acceptance model in educational context: A systematic literature review. *British Journal of Educational Technology*, *50*(5), 2572-2593.

Hasley, J., Hester, A., & Gregg, D. (2020). Measuring consumer trust and perceived risk in e-commerce. *Journal of Technology Research, 9*.

Hashem, T. (2020). Examining the influence of covid 19 pandemic in changing customers' orientation towards e-shopping. *Modern Applied Science*, *14*(8), 59-76.

Immanuel, D. & Dewi, Y. (2020). Mobile payment adoption intention during pandemic covid-19 in Indonesia. *Journal of Information System and Technology Management, 5*(19), 60-76.

Kallanmarthodi, G., & Vaithiyanathan, M. (2012). Assessment of a modified technology acceptance model among e-banking customers in Coimbatore city. *International Journal of Innovation, Management and Technology, 3*(2), 181-187.

Karahanna, E., Straub, D. & Chervany, N. (1999). Information technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs. *MIS Quarterly*, *23*(2), 183-213.

Karomah, K., Suroso, A. & Novandari, W. (2021). Factors affecting e-wallet usage intention during covid-19 outbreak in Indonesia. *International Journal of Arts, Humanities, and Social Sciences Studies*, *6*(6), 39-51.

Kaushal, V., & Balaini, A. (2016). E-banking: Challenges and issues. *Hill Quest*, *3*(3-4), 69-73.

Kim, S. & Malhotra, N. (2005). A longitudinal model of continued IS use: An integrative view of four mechanisms underlying postadoption phenomena. *Management Science*, *51*(5), 741-755.

Lai, P. (2016). Design and security impact on consumers' intention to use single platform e-payment. *Interdisciplinary Information Sciences*, *22*(1), 111-122.

Lai, L. (2021). Penetration rate of online payment in China 2008-2020. Retrieved Feb 14, 2021 from https://www.statista.com/statistics/248962/penetration-rate-of-online-payment-in-china/

Lin, C., & Nguyen, C. (2011). Exploring e-payment adoption in Vietnam and Taiwan. *Journal of Computer Information Systems*, *51*(4), 41-52.

Marangunić, N. & Granić, A. (2015). Technology acceptance model: a literature review from 1986 to 2013. *Universal Access in the Information Society*, *14*, 81-95.

McMurtrey, M., McGaughey, R. & Downey, J. (2008). Seniors and information technology: Are we shrinking the digital divide? *Journal of International Technology and Information Management*, *17*(2), 1-17.

McMurtrey, M., McGaughey, R., Downey, J. & Zeltmann, S. (2013). Seniors and information technology: Lessons from the field. *International Journal of Intercultural Information Management*, *3*, 107-122.

Md Jusoh, Z. & Teng, Y. (2019). Perceived security, subjective norm, self-efficacy, intention, and actual usage towards e-payment among UPM students. *Journal of Education and Social Sciences*, *12*(2), 8-22.

Morganosky, M. (1986). Cost- versus convenience-oriented consumers: Demographic, lifestyle, and value perspectives. *Psychology & Marketing*, *3*, 35-46.

Nadler, S., Chen, A., & Lin, S. (2019). E-payment usage among urban Chinese. *Journal of Business Diversity*, *19*(3), 75-88.

Netemeyer, R., Bearden, W., & Sharma, S. (2003). *Scaling procedures*. Thousand Oaks, CA: Sage Publications, Inc.

Nunnally, J. (1978). *Psychometric theory* (2nd ed). New York: McGraw-Hill.

Omotubora, A. & Basu, S. (2018). Regulation for e-payment systems: Analytical approaches beyond private ordering. *Journal of African Law*, *6*(2), 281-313.

Ozkan, 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.

R Core Team (2021). R: A language and environment for statistical computing. *R Foundation for Statistical Computing*, Vienna, Austria. URL: https://www.R-project.org/.

Rogers, E. (1962). *Diffusion of innovations*, *1st Edition*. NY: Free Press.

Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software*, *48*(2), 1-36. URL: https://www.jstatsoft.org/v48/i02/.

Schumacker, R. & Lomax, R. (2004). *A beginner's guide to structural equation modeling*, 2nd Edition. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Sierzchula, W., Bakker, S., Maat, K., & Van Wee, B. (2014). The influence of financial incentives and other socio-economic factors on electric vehicle adoption. *Energy Policy, 68*, 183-194.

Simmonds, D., McDonald, K. & Campbell, K. (2022). Predicting SaaS virality: A diffusion model. *Journal of Technology Research, 10*.

Taylor, S. & Todd, P. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, *6*(2), 144-176.

Teoh, W., Chong, S., Lin, B., & Chua, J. (2013). Factors affecting consumers' perception of electronic payment: an empirical analysis. *Internet Research*, *23*(4), 465-485.

Triandis, H. (1977). *Interpersonal behavior*. Monterey, CA: Brooks/Cole.

Venkatesh, V., & Davis, F. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186-204.

Venkatesh, V. & Morris, M. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly*, *24*(1), 115-139.

Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, *36*(1), 157-178.

World Bank Group (n.d.). China. Retrieved February 14, 2021, from https://data.worldbank.org/country/china

Xin, H., Techatassanasoontorn, A., & Tan, F. (2015). Antecedents of consumer trust in mobile payment adoption. *Journal of Computer Information Systems*, *55*(4), 1-10.

Yoon, C. & Kim, S. (2007). Convenience and TAM in a ubiquitous computing environment: The case of wireless LAN. *Electronic Commerce Research and Applications*, *6*, 102-112.

Youngnyo, C. & Magsamen-Conrad, K. (2022). Social influence and UTAUT in predicting digital immigrants' technology use. *Behaviour and Information Technology, 41*(8), 1724-1739.

Zhang, B. & Zhu, Y. (2021). Comparing attitudes toward adoption of e-government between urban users and rural users: an empirical study in Chongqing municipality, China. *Behaviour and Information Technology, 40*(11), 1154-1168.

Zhao, H., Anong, S., & Zhang, L. (2019). Understanding the impact of financial incentives on NFC mobile payment adoption. *International Journal of Bank Marketing*, *37*(5), 1296-1312.

APPENDICES

APPENDIX A: Survey Items

Usage Measures (dependent variables):

Usage Frequency: How often do you use e-payment? Approximately____ times per week.

Eight choices: 0, 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, 31+

Usage Money Spent per Month: Approximately how much money do you spend via e-payment per month? (in RMB ¥).

Ten choices: 0, 1-200, 201-400, 401-800, 801-1200, 1201-2500, 2501-5000, 5001-8000, 8001-12000, 12001+

Motivator Constructs (independent variables) (items eliminated are crossed out)

Perceived Usefulness
PU1. E-payment makes it easier for me to conduct my financial transactions.
~~PU2. E-payment gives me greater control over my financial activities.~~
~~PU3. E-payment allows me to manage my finances more efficiently.~~
~~PU4. E-payment is a convenient way to manage my financial activities.~~
~~PU5. E-payment is more user friendly than other existing channels.~~
PU6. E-payment eliminates time constraints; thus, I can use it at any time I like.
PU7. E-payment eliminates geographic limitations and increases flexibility in mobility at any place that has internet connection.
PU8. I find e-payment is very useful in my daily life.

Perceived Ease of Use
EU1. My interactions with e-payment are smooth and understandable.
~~EU2. Interacting with e-payment does not require a lot of my mental effort.~~
EU3. I find e-payment to be easy to use.
EU4. I find it easy to get e-payment to do what I want it to do.
EU5. Learning to operate e-payment would be easy for me.
EU6. E-payment is easier than other channels.

Social Influence
SI1. People who influence my behavior think that I should use e-payment systems.
SI2. People who are important to me think that I should use e-payment system.
~~SI3. Most people around me should use e-payment.~~
SI4. The people I respect think I should use e-payment

Incentives
When deciding to use e-payment, how important are the following **incentives** to you?
INC1. Discounts
INC2. Coupons
INC3. Cashback

INC4. Membership points
INC5. Gifts
INC6. Money certificate

Perceived Risk
PR1. The risk of an unauthorized third party viewing the payment is low.
PR2. The risk of abuse of my personal information is low.
PR3. The risk of losing money is low.
PR4. I am confident about the security of e-payment.
PR5. Advances in internet security make e-payment safe.
PR6. I am confident over the security aspects of e-payment in China.

Perceived Trust
PT1. I trust financial institutions that facilitate e-payment.
PT2. I trust providers that handle the technical aspects of e-payment.
PT3. Companies that use e-payment are trustworthy.
PT4. Companies that use e-payment are honest.
PT5. Companies that use e-payment are responsible.
PT6. In general, I trust e-payment systems.

APPENDIX B: FIGURES

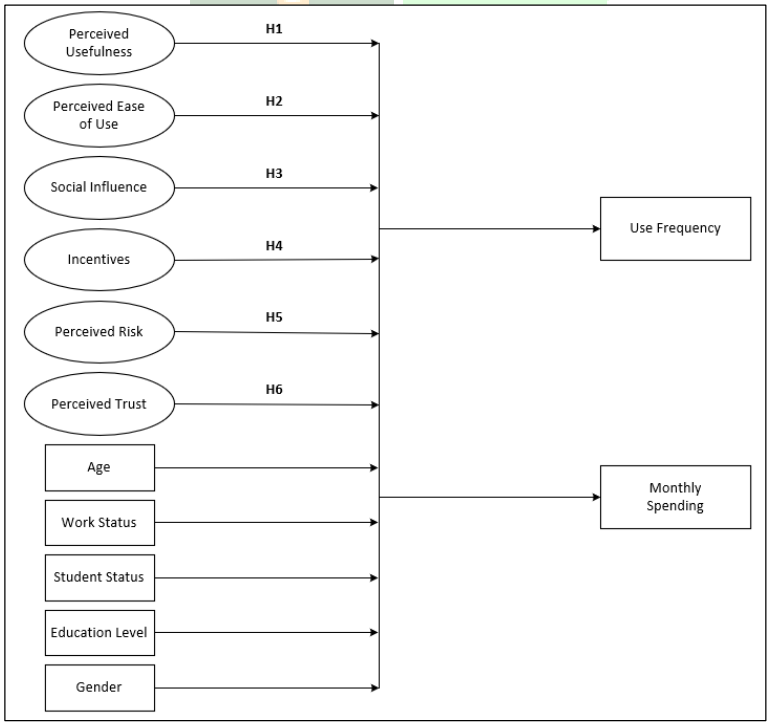

Figure 1: Research model

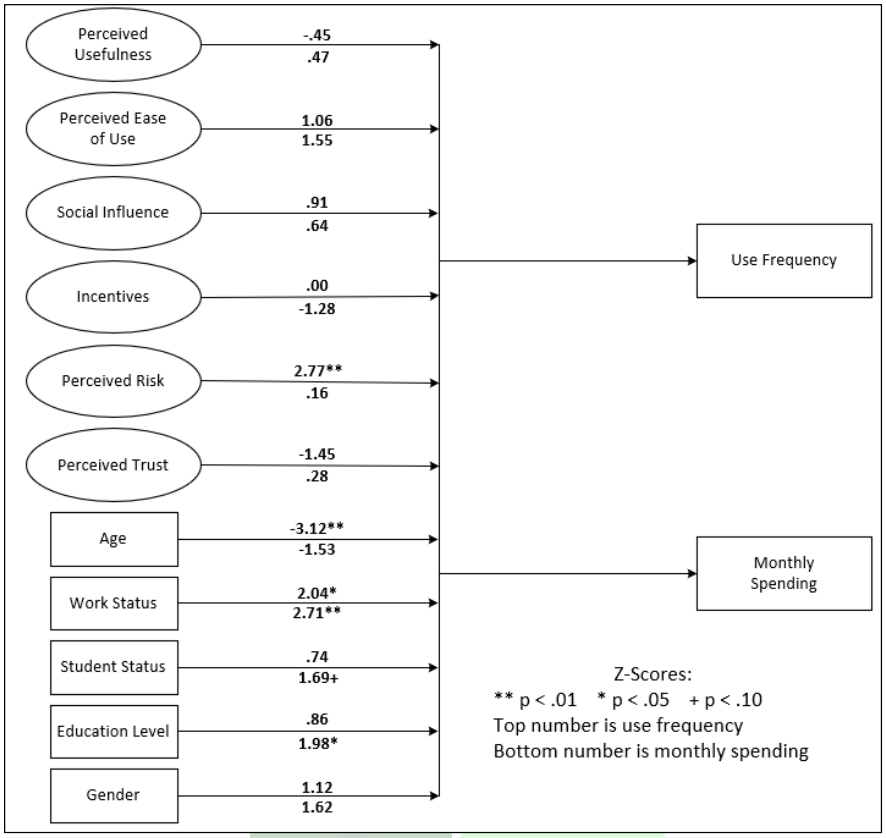

Figure 2: Model results

APPENDIX C: TABLES

Variables	Frequency	Percentage	Mean	SD.
Gender			1.66	.48
Female	143	34.3		
Male	273	65.5		
Missing	1	.2		
Total	417	100.0		
Age			26.55	4.2
18-20	36	8.6		
21-25	259	62.1		
26-30	50	12.0		
31-35	24	5.8		
36-40	7	1.7		
41-45	9	2.2		
46-50	14	3.4		
51-55	15	3.6		
56-60	1	.2		
61 and over	1	.2		
Missing	1	.2		
Total	417	100.0		

Education			2.82	.74
High School	28	6.7		
2 Year Associate Degree	73	17.5		
4 Year College Degree	261	62.6		
Master's degree or +	55	13.2		
Total	417	100.0		
Working Status			2.29	.95
Full Time	229	54.9		
Part-Time	28	6.7		
Do not work	158	37.9		
Missing	2	.5		
Total	417	100.0		
Student Status			.36	.47
Full Time	140	33.6		
Part-Time	10	2.4		
Not a student	257	61.6		
Missing	10	2.4		
Total	417	100.0		

Table 1: Station in life variables

Variables	# of Items	Alpha	CR	Mean	SD.	N
Perceived usefulness	4	.855	.905	6.24	1.15	417
Perceived ease of use	5	.933	.952	6.39	1.11	417
Incentive	6	N/A	N/A	5.31	1.71	417
Social influence	3	.913	.955	5.37	1.72	417
Perceived risk	6	.913	.931	4.70	1.73	417
Perceived trust	6	.950	.958	5.25	1.58	417
Incentive: average of six separate categories CR: Composite Reliability						

Table 2: Descriptive statistics and reliability for major constructs

Measures	Frequencies	Percentage	Mean	SD.
Frequency per week			21.35	3.87
0 (these were excluded)	[4]			
1-5	44	10.6%		
6-10	46	11.0%		
11-15	48	11.5%		
16-20	60	14.4%		
21-25	34	8.2%		
26-30	38	9.1%		
31 and over	147	35.3%		
Total	417	100.0%		

Monthly spending*			3279.1	307.7
0	2	0.5%		
1-200	28	6.7%		
201-400	26	6.2%		
401-800	47	11.3%		
801-1200	74	17.7%		
1,201-2,500	120	28.8%		
2,501-5,000	62	14.9%		
5,001-8,000	33	7.9%		
8,001-12,000	8	1.9%		
12001 and over	17	4.1%		
Total	417	100.0%		
* The Chinese currency RNB or yuan; the current exchange rate is about 1 USD = 6.38 RNB				

Table 3: Descriptive statistics for dependent variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	1.0												
2. Work	-.23**	1.0											
3. Student	.34**	-.80**	1.0										
4. Educ.	-.17**	.15**	-.22**	1.0									
5. Gender	-.10	.21**	-.17**	.09	1.0								
6. PU	-.01	-.02	.02	-.01	.03	**.839**							
7. PEOU	-.11*	.02	-.02	.01	.06	.70**	**.894**						
8. Incentive	-.10*	-.01	-.04	.03	.07	.25**	.29**	1.0					
9. SI	.05	-.03	.05	-.06	-.07	.45**	.44**	.29**	**.937**				
10. PR	.09	-.05	.08	-.07	-.14**	.36**	.31**	.15**	.44**	**.832**			
11. PT	.08	-.04	.06	-.01	-.06	.46**	.43**	.23**	.42**	.63**	**.889**		
12. Frequency	-.14**	-.09	.02	.06	-.07	.09	.12*	.05	.12*	.16**	.07	1.0	
13. Spending	-.01	.31**	-.29**	.02	-.13**	.15**	.17**	-.01	.12*	.09	.11*	.44**	1.0
Values in bold are average variance extracted (square root)													

Table 4: Correlation matrix

	1	2	3	4	5
PU1	0.130	0.411	0.089	0.104	**0.619**
PU6	0.191	0.317	0.107	0.192	**0.802**
PU7	0.174	0.291	0.110	0.175	**0.816**
PU8	0.217	0.546	0.117	0.061	**0.595**
EU1	0.108	**0.855**	0.064	0.091	0.090
EU3	0.162	**0.864**	0.057	0.078	0.169
EU4	0.226	**0.754**	0.102	0.237	0.228
EU5	0.154	**0.877**	0.086	0.184	0.080
EU6	0.161	**0.845**	0.103	0.135	0.180
SI1	0.198	0.146	0.169	**0.865**	0.160
SI2	0.195	0.212	0.222	**0.873**	0.123
SI4	0.175	0.240	0.178	**0.819**	0.117
PR1	0.204	0.057	**0.820**	0.111	-0.001
PR2	0.233	0.004	**0.822**	0.034	-0.008
PR3	0.193	0.026	**0.856**	0.074	0.075
PR4	0.325	0.160	**0.758**	0.232	0.107
PR5	0.312	0.180	**0.685**	0.233	0.192
PR6	0.376	0.203	**0.623**	0.237	0.212
PT1	**0.802**	0.168	0.298	0.090	0.099

PT2	**0.813**	0.172	0.254	0.156	0.111
PT3	**0.847**	0.198	0.286	0.149	0.094
PT4	**0.865**	0.168	0.199	0.153	0.132
PT5	**0.834**	0.130	0.241	0.158	0.120
PT6	**0.735**	0.190	0.299	0.111	0.166

Table 5: Confirmatory factor analysis

	X^2	df	p	X^2/df	CFI	TLI	RMSEA
Frequency of Use	1403.76	405	0.00	3.47	.89	.88	.078
Spending per Month	1405.32	405	0.00	3.47	.89	.88	.078

Table 6: Significance and goodness of fit measures

	Frequency of Use			Monthly Spending		
Constructs	path	Z	p-value	path	Z	p-value
Perceived usefulness	-.117	-0.45	.653	.103	0.471	.370
Perceived ease of use	.200	1.059	.289	.246	1.549	.121
Incentive	.000	0.002	.998	-.069	-1.275	.202
Social influence	.078	0.907	.364	.046	0.639	.523
Perceived risk	**.276**	**2.766**	**.006**	.013	0.160	.873
Perceived trust	-.142	-1.451	.147	.023	0.284	.777
Age	**-.215**	**-3.115**	**.002**	-.088	-1.529	.126
Work	**.378**	**2.042**	**.041**	**.419**	**2.707**	**.007**
Student	.144	0.74	.459	**-.275**	**1.693**	**.090**
Education	.125	0.858	.391	**.243**	**1.982**	**.047**
Gender	.252	1.116	.265	.305	1.615	.106

Table 7: Construct paths

	Hypothesis	Frequency	Spending
PU	1	NS	NS
PEOU	2	NS	NS
Incentives	3	NS	NS
Social Influence	4	NS	NS
Perceived risk	5	Sig. at .01	NS
Perceived trust	6	NS	NS

Table 8: Summary of hypothesis testing

	Frequency of Use				Spending			
	Male	Female	t-score	p-value	Male	Female	t-score	p-value
Mean	5.56	5.78	-1.35	.18	5.48	6.00	-2.57**	.01
sd	212	2.25			1.73	2.09		
n	273	143			273	143		

Table 9: T-tests for gender differences

	Frequency	Spending
Age	Sig. at .01	NS
Work status	Sig. at .05	Sig. at .01
Student status	NS	Sig. at .10
Education	NS	Sig. at .05
Gender	NS	NS

Table 10: Results for station in life variables