Reputation, familiarity and use intention for e-payment services: a comparison of pure-play and click-and-mortar e-payment services

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Abstract: As e-payment services gain popularity, the competition for users between third-party pure-play e-payment services (PPEPS) and click-and-mortar e-payment services (CMEPS) has become intense. Understanding of the differences between consumer motivation to use PPEPS or CMEPS will help service providers be competitive. Based on a trust-based valence framework, we studied the role of familiarity and reputation in driving user perception of benefits, risk and trust of e-payment services, which in turn affect user intention. Paired responses of 260 subjects about PPEPS and CMEPS were collected. Data analysis reveals that familiarity plays both direct and indirect roles in driving use intention, while the role of reputation is indirect. A comparison of the path coefficients indicates that PPEPS in general are in a more advantageous position in leveraging the roles of familiarity and reputation to improve user perceptions and intention. The research offers nuanced guidelines for e-payment service providers to improve service adoption.

Keywords: e-payment; use intention; reputation; familiarity; pure-play; click-and-mortar; trust-based valence framework.

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1 Introduction

As electronic payment services (EPS) gain popularity among users, competition in the e-payment provider field is becoming intense and disruptive as many players have entered the market. Two major competing forces are third-party pure-play e-payment services (PPEPS) that are offered by Internet entrepreneurial firms, such as PayPal in North America and Alipay in China, and click-and-mortar e-payment services (CMEPS) offered by traditional financial institutions. PPEPS moved early to this market and has achieved a dominant position. It has been reported that PayPal captured 82% of the American online retailing payment market share and two main PPEPS (i.e., Alipay and Wechat Payment) have achieved almost 90% of the Chinese mobile payment market share. However, traditional payment services such as China UnionPay have not given up and are still aggressively improving and promoting their e-payment services offered to end consumers.[1] Furthermore, according to a recent survey of US financial institutions' digital payment solutions (Bareisis and Ubigau, 2016), 71% of these institutions indicated that they would explore the introduction of their own brands of digital payment.

During this competition, PPEPS and CMEPS use various appeals and tactics to attract users and enhance use intention, either directly or indirectly, by enhancing the perceived benefits and risks of e-payment services for users. Two major tactics employed are enhancing user familiarity with the products by offering discounts, monetary rewards, or excellent user experience, and leveraging the reputation of the e-payment services to attract users. Familiarity can affect a user's cognitive process and cultivate user use habit (De Guinea and Markus, 2009), while reputation affects user perception of the services through signalling effects (Lange et al., 2011).

However, users value the above two tactics differently for PPEPS and CMEPS, probably because PPEPS and CMEPS each have different capabilities. PPEPSs are skilled at user-centred design and agile information technology (IT) product development, and the e-payment product is developed by closely interacting with customers. PPEPS also are skilled at promoting familiarity by providing excellent customer experience and using various cash rewards to incentivise customers. CMEPS excel at signalling through reputation that is accumulated through many years of reliable and trustworthy business operations in the traditional world (Flavián et al., 2006; Min and Wolfinbarger, 2005) while they are weak in agile IT development capability. Such a difference can also be seen from the self-introduction of the e-payment services. For example, the marketing appeal of Alipay on its homepage is 'you are the centre',[2] while UnionPay Online Pay introduces itself thusly: 'We provide users 'safe, convenient, efficient' Internet payment environment and service experience based on strict and standardised business technology standards, operational procedures, risk prevention, and control system'.[3] The differential capabilities of PPEPS and CMEPS can potentially affect user perception in choosing the e-payment services.

Based on the above observations, this paper addresses the following two research questions: How do familiarity and reputation impact e-payment use intention? Do familiarity and reputation impact user intention equally when it comes to services offered by different types of service providers – PPEPS and CMEPS? To explore the mechanisms through which familiarity and reputation impact e-payment use intention, we adopted the trust-based valence framework (Kim et al., 2008). According to Kim et al. (2008), reputation and familiarity are affective and experience-based factors that can influence consumer purchasing decisions through their impact on consumer trust and valence. A trust-based valence framework facilitates the analysis of the direct and indirect impact of familiarity and reputation on e-payment use intention.

This research makes the following contribution to the study of consumer e-payment use intention. First, it analyses the mechanisms through which familiarity and reputation have an impact on e-payment use intention. The prior literature has thoroughly studied the drivers of e-payment use intentions (Lee, 2009; Teoh et al., 2013; Özkan et al., 2010) but few researchers have studied the mechanism of familiarity and reputation on use intention. Second, few researchers have addressed the difference in use intention drivers between CMEPS and PPEPS. The e-commerce literature has addressed the unique capabilities of brick-and-mortar organisations vs. that of pure-play organisations in conducting e-commerce, but the differences between CMEPS and PPEPS have not been well studied in the e-payment literature. This research attempts to fill these gaps.

Studying the impact of familiarity and reputation on user adoption intention and the difference between CMEPS and PPEPS also offers important managerial implications. Enhancing familiarity and leveraging reputations are important tactics played by e-payment services to boost user adoption. Empirically validating their roles and mechanisms can provide guidance to e-payment service providers in selecting the correct strategies. Furthermore, the comparison can provide differential suggestions to CMEPS and PPEPS so they can be aware of their advantages over each other and act accordingly. For example, the research results can suggest whether CMEPS' decade-old strategy of leveraging reputation is still effective or whether they should de-emphasise reputation while mimicking the strategies of PPEPS.

This paper is structured as follows. First, a literature review on e-payment adoption is provided, followed by a description of the theoretical background. Second, hypotheses about the drivers of user adoption intentions are developed based on the adapted trust-based valence framework and the differences between PPEPS and CMEPS. Third, the research methodology and the data collection process are explained and analysis results are provided. The paper concludes with a discussion of its main contributions, limitations, and future research opportunities.

2 Literature review and theoretical background

2.1 E-payment adoption

E-payment refers to the process of customers making payments using fixed or mobile Internet solutions. E-payment services are normally offered by e-commerce companies, financial institutions, and financial Internet payment start-ups. These represent cost-efficient and convenient ways to make payments for product purchases (Au and Kauffman, 2008). Behavioural intention to adopt and use e-payment services has been widely studied by researchers (see Table 1).

Slade et al. (2014) conducted a thorough literature review on e-payment adoption and concluded that the technology acceptance model (TAM) (Davis, 1989), innovation diffusion theory (IDT) (Rogers, 1983), and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003) are theories that have been most commonly used to study the adoption of e-payment, Internet banking, and mobile payment services (Slade et al., 2014). Because TAM, IDT, and UTAUT are models that are suitable for studying technology adoption in general, many studies extend the core theories with constructs such as perceived risk, trust, security, and self-efficacy (Hanafizadeh et al., 2014) to achieve an understanding of unique characteristics of the focal e-payment technology. This is likely because e-payment involves financial risks, causing people to worry more about the negative side of the adoption. For example, Shin (2010) adds perceived risk and trust to TAM and UTAUT. Chen (2013) extends IDT with perceived risk, brand awareness, and image. Wang and Yi (2012) add use context and perceived risks to UTAUT. Additionally, the meta-analysis by Slade et al. (2014) reveals that risk and trust are two of the major antecedents of mobile banking intention.

Table 1 Independent variables on use intention of e-payment services

Independent variables and models				*Not significant*
Positive factors	TAM model	Perceived usefulness	Keramati et al. (2012), Lee (2009), Li et al. (2014), Lin and Nguyen (2011), Srivastava et al. (2010), Thakur and Srivastava (2014) and Zhou (2011)	
		Perceived ease of use	Arvidsson (2014), Lee (2009), Teoh et al. (2013), Srivastava et al. (2010) and Thakur and Srivastava (2014)	Keramati et al. (2012)
		Attitude	Li et al. (2014)	
	IDT model	Perceived advantage	Arvidsson (2014), Lu et al. (2011), Özkan et al. (2010) and Yang et al. (2012)	
		Compatibility	Gerrard and Cunningham (2003), Li et al. (2014), Lu et al. (2011) and Yang et al. (2012)	Arvidsson (2014) and Keramati et al. (2012)
		Complexity	Gerrard and Cunningham (2003)	
	Perceived benefit	Perceived benefit	Kim et al. (2009b), Lee (2009), Teoh et al. (2013), Shin (2010) and Yang et al. (2015)	Gerrard and Cunningham (2003)
		Usability and flow	Özkan et al. (2010) and Zhou (2013)	
		Network externality	Li et al. (2014)	Arvidsson (2014) and Keramati et al. (2012)
		Convenience	Gerrard and Cunningham (2003) and Shin (2010)	Keramati et al. (2012)
		Reachability and accessibility	Gerrard and Cunningham (2003)	
	UTAUT model	Performance expectancy	Luo et al. (2010), Oliveira et al. (2014), Thakur and Srivastava (2014) and Wang and Yi (2012)	
		Subjective norms	Keramati et al. (2012), Lee (2009), Li et al. (2014), Thakur and Srivastava (2014) and Yang et al. (2012)	Gerrard and Cunningham (2003), Oliveira et al. (2014), Shin (2010) and Wang and Yi (2012)
		Facilitating conditions	Lee (2009), Li et al. (2014), Oliveira et al. (2014) and Thakur and Srivastava (2014)	Wang and Yi (2012)
		Effort expectancy	Thakur and Srivastava (2014) and Wang and Yi (2012)	Oliveira et al. (2014)

Table 1 Independent variables on use intention of e-payment services (continued)

Independent variables and models			*Not significant*
Negative factors	Perceived risks	Arvidsson (2014), Chen (2013), Lee (2009), Lin and Nguyen (2011), Lu et al. (2011), Luo et al. (2010), Teoh et al. (2013), Özkan et al. (2010), Poon (2007), Shin (2010), Thakur and Srivastava (2014) and Yang et al. (2012, 2015)	Özkan et al. (2010) and Wang and Yi (2012)
	Perceived security	Li et al. (2014) and Özkan et al. (2010)	Keramati et al. (2012) and Teoh et al. (2013)
	Costs	Li et al. (2014), Lu et al. (2011) and Yang et al. (2012)	Arvidsson (2014) and Keramati et al. (2012)
User status and social context	Self-efficacy	Teoh et al. (2013)	
	Personal innovativeness	Gerrard and Cunningham (2003), Li et al. (2014) and Thakur and Srivastava (2014)	
	Payment information	Keramati et al. (2012)	
	Payment habits	Keramati et al. (2012)	
	Situations of use	Li et al. (2014)	
	Trust	Arvidsson (2014), Heikkinen and Iivarinen (2011), Keramati et al. (2012), Kim et al. (2009b), Li et al. (2014), Liébanacabanillas et al. (2014), Lu et al. (2011), Oliveira et al. (2014), Srivastava et al. (2010) and Zhou (2013)	Luo et al. (2010), Teoh et al. (2013) and Özkan et al. (2010)
	Reputation	Lu et al. (2011) and Oliveira et al. (2014)	Li et al. (2014)
	Familiarity	Mäenpää et al. (2008)	

However, these efforts also add to the complexity of the model. Recent researchers have attempted to achieve coherence by developing higher-order multi-faceted constructs. For example, Luo et al. (2010) develop a multi-faceted perceived risk construct that includes seven negative aspects of adoption. Lee (2009) integrates various advantages to form the construct of perceived benefit. Following this line of thought, this research integrates positive drivers of use intention into the construct of perceived benefit and negative aspects into perceived risk, to capture the major aspects of e-payment adoption drivers while avoiding being too detailed to lose focus.

The prior literature predominantly compared adoption drivers employing user-level moderators such as user demographics, personal traits, and users from different cultural, social, and economic backgrounds. A few researchers have compared different types of e-payment services. For example, Mirza and Wallstorm (2009) compare private banks with governmental banks. Curran and Meuter (2005) compare the diffusion of automated teller machines (ATMs), bank-by-phone, and online banking. Ho and See-To (2010) compare credit card and a stored-value smart card in Hong Kong. To the best of our

knowledge, no one has compared the adoption intention drivers between PPEPS and CMEPS.

To fill this gap, this research intends to help PPEPS and CMEPS determine the most favourable measures to improve user adoption based on a better understanding of the different impacts of adoption drivers. Although few studies compare PPEPS and CMEPS, the e-commerce literature has compared the unique capabilities of brick-and-mortar retailers vs. those of pure-play e-retailers. Pure-play e-retailers are considered to have the advantage of customer familiarity with their websites and trust resulting from former successful experiences while click-and-mortar retailers can boast reputation and trust already established by brick-and-mortar retailers (Flavián et al., 2006; Min and Wolfinbarger, 2005). Thus, this research focuses on the role of familiarity and reputation and adopts the trust-based valence model by Kim et al. (2008) to identify the path through which familiarity and reputation affect user intention.

2.2 Trust-based valence model

As existing e-payment-related adoption research increasingly includes the negative side of its adoption and seeks a more coherent way to study it, this research adopts and modifies the trust-based valence framework proposed by Kim et al. (2008) to identify the path through which familiarity and reputation affect user intention. The valence framework is a 'cognitive-rationale' customer decision-making model proposed by Peter and Tarpey (1975). According to this framework, a customer rationally evaluates the expected *negative utility (perceived risk)* and the *positive utility (perceived return or benefit)* associated with a purchase and tends to maximise the net valence (net perceived return). Kim et al. (2008) incorporated *trust*, an affect-embracing factor, and its antecedents into the valence model when investigating online shopping behaviour. *Trust* is defined as "a party's willingness to rely on another party based on the expectation that the other party will perform his or her obligations as understood by the trustor regardless of the ability to monitor the other party" (Mayer et al., 1995). Trust can be either *process-based trust* or *knowledge-based trust* (Gulati, 1995). In process-based trust (Zucker, 1986), two parties build an understanding that the other party will behave as expected through ongoing interactions. Knowledge-based trust is achieved through an understanding of the other party's competency, integrity, and benevolence, regardless of how the knowledge is obtained (Shapiro et al., 1992). Complementary to the rational nature of positive and negative utilities in the classic valence framework, trust has both strong cognition and emotional bases. According to Kim et al. (2008), that trust is critical in online transactions because trust can ease the uncertainty that consumers face in the impersonal online shopping environment.

Kim's trust-based valence framework provides a holistic and pithy view of online purchase intentions – not only the positive but also the negative aspects of adoption and not only cognitively comparing but also employing affect-embracing thinking. The valence framework and its extended version, the trust-based valence framework, have been adopted by researchers to study consumer purchasing intentions (Smith et al., 2011; Srinivasan and Ratchford, 1991), e-commerce purchase intention (Kim et al., 2008, 2009a), mobile commerce usage (Lin et al., 2014), and mobile payment adoption (Lu et al., 2011; Yang et al., 2012). It is considered suitable for studying e-payment because e-payment involves financial risk to users and such risk is difficult to cognitively evaluate, so both the negative side of the technology and affect-embracing factor (i.e.,

trust) must be taken into account when consumers make use decisions. This is different from most other IT adoption issues where the main concern is the benefit of technology.

2.3 Familiarity and reputation

This research focuses on the role of familiarity and reputation. The trust-based valence model created by Kim et al. (2008) identifies four categories of antecedent factors: cognition-based, affect-based, experience-based, and personality-oriented. Familiarity is considered an experience-based factor and reputation is an affective-based factor. To our best knowledge, prior research has not studied affect-based and experience-based antecedents of trust-based valences. Yang et al. (2012) studied the impact of personality-oriented antecedents such as personal innovation and social influence. Additionally, Yang et al. (2015) examined cognitive-based antecedents of perceived risk such as perceived technology and regulatory uncertainty, information asymmetry, and service intangibles. By studying reputation and familiarity, this research also contributes to the understanding of the affect-based and experience-based antecedents of trust-based valences.

The experience-based antecedents are related to the personal experiences of consumers with the vendor. Kim et al. (2008) suggest that familiarity is an experience-based factor that can change user perceptions of the product. Familiarity is defined as a consumer's degree of acquaintance with the subject, including the consumer's knowledge of the provider and understanding of that provider's operation and products (Kim et al., 2008). Familiarity can be achieved by reviewing previous transaction history, usage of the product, or ownership of the product (Park and Lessig, 1981).

Building user familiarity with products can help a firm achieve many benefits, such as engendering trust (Gulati, 1995) and decision-making efficiency (Park and Lessig, 1981). Park and Lessig (1981) also suggest that building user familiarity with products enhances user confidence in choices and reduces time to make decisions. However, they further comment that consumers with little product familiarity may simply give up on products because of low motivation to use them (Park and Lessig, 1981). Therefore, familiarity also drives the formation of user motivation and behaviour intention. The relationship between familiarity and behavioural intention has been studied in the context of e-commerce (Gefen, 2000), online recommendation agents (Komiak and Benbasat, 2006), and Internet banking (Mäenpää et al., 2008).

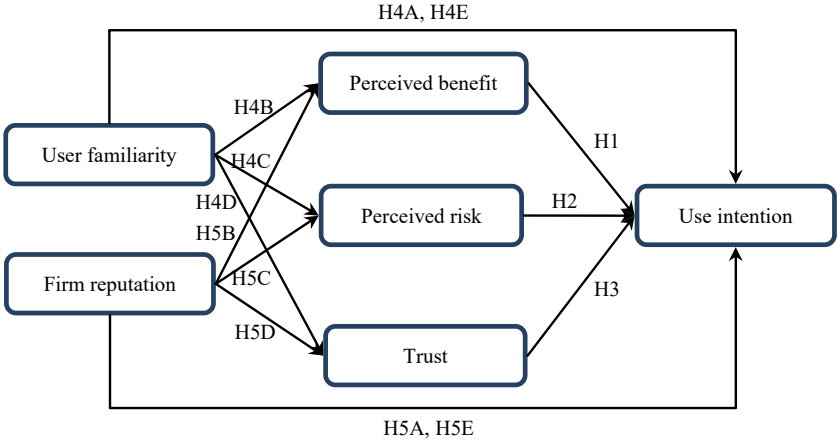
The affect-based trust antecedents are related to indirect interactions with the trustee such as inputs from others. A firm's reputation is an affect-based factor that can change users' perception and thinking because it relates to its credibility and the reliability of its engagement with users (McKnight et al., 1998). It is an overall assessment of the firm's product and service expertise, social characteristics, customer experience, and credible communications about the firm's abilities to serve customers (Barnett et al., 2006; Li, 2014). Businesses build their reputation over time with significant investment. "As long as the present value of future income exceeds the short-term profit of dishonesty, firms will be honest and invest in their reputations" (Walker, 2010). It is a message available to an organisation from its stakeholders, and its formation requires evaluation, implying judgment or assessment.

Reputation enables a firm to enjoy what is known as a 'halo effect' (Kwon and Lennon, 2009) and generalised favourability that may lead constituents to overlook product flaws (Lange et al., 2011). Reputation can credibly signal the quality of the products to uninformed consumers, and uninformed players can also use reputation as a screening strategy to determine (though often imperfectly) the reputation of others (Weigelt and Camerer, 1988). Reputation is especially important in the service industry in which service is an experiential product whose quality cannot be verified before purchases are made. Due to the large investment required to build a reputation, it is also a disciplinary device against individual conflicts of interest. Reputation can bring multiple benefits to a firm, such as price premiums and return on assets (Lange et al., 2011). Firm reputation also drives the formation of consumer behaviour, and has therefore been studied in the fields of e-commerce (Kim and Lennon, 2013; Li, 2014), e-service (De Ruyter et al., 2001), and mobile banking (Oliveira et al., 2014).

3 Research model

On the basis of the trust-based valence framework (Kim et al., 2008), we propose a conceptual framework to study e-payment service use intentions (see Figure 1). First, the trust-based valence framework was adopted because it considers both positive and negative aspects of e-payment adoption, as well as both cognitive and affect-embracing factors (e.g., trust). In the framework, consumers may adopt an e-payment service if they rationally evaluate the perceived benefit to be greater than the perceived risk. Their decisions are also affected by trust in the providers. Second, firm reputation and user familiarity affect user intention either directly or indirectly through trust, perceived benefits, and perceived risk. PPEPS and CMEPS are also compared in this section.

Figure 1 Research model (see online version for colours)



3.1 Perceived benefit and use intention

In different research contexts, the substances of positive and negative utilities may be constructed differently. For example, a focus group study by Mallat (2007) found that

relative advantages, ease of use, cost and perceived fees, network, and critical mass are important drivers of the intention to use e-payment. A survey by Teoh et al. (2013) reveals that financial benefits, convenience, and time and cost savings are significant drivers of user adoption intention. Yang et al. (2012) conclude that positive utilities, such as compatibility and relative advantage, significantly affect users' behavioural intentions. The broad categories of behavioural intention drivers in a TAM model of adoption – perceived usefulness and ease of use – were positive utilities impacting e-payment use intention (Lin and Nguyen, 2011). In this study, we integrate the positive aspects of adoption to formulate the construct of perceived benefit.

Perceived benefit is 'the belief about the extent to which he or she will become better off' (Kim et al., 2008) by using an e-payment service. In this study, the benefits of using e-payment services can include financial benefits, network-related benefits, and usability after dedicatedly examining the definitions of all of the positive factors listed in prior literature. Financial benefits are the monetary rewards a user gains by using e-payment services, such as lower transfer fees and interest paid to the user account (Mallat, 2007). Network-related benefits are derived from the nature of e-payment service as a network product: The value of a payment system increases as the number of users and compatible devices increases (Kauffman et al., 2000). Usability includes features such as easy login, time and energy savings, convenience compared to traditional payment services (Teoh et al., 2013), and user-friendliness (Özkan et al., 2010). The construct of usability is also similar with the construct of perceived ease of use (PEOU) in the technology acceptance model, complexity in the innovation diffusion theory, or effort expectancy in the UTAUT model. Perceived benefits are important drivers of e-payment service use intention because people use e-payment services mainly to complete the purchase task effectively and efficiently. An e-payment service with high perceived benefits can meet user expectations and is therefore evaluated positively. Therefore, we hypothesise:

H1 The perceived benefit of an e-payment service is positively associated with user intention to use this service.

3.2 Perceived risk and use intention

The multi-faceted *risk factors* of e-payment have also been investigated (Lin and Nguyen, 2011; Luo et al., 2010). Many researchers have included perceived risk as one of their constructs. Kim et al. (2010) studied the other side of risk – security – which safeguards users from potential risks, as a driver of e-payment use intention. Lin and Nguyen (2011) commented that, in their mobile payment application, risks of information loss and monetary loss are two important factors. Luo et al. (2010), in a thorough study of perceived risks in the adoption of mobile payment functionality in m-banking (mobile banking), found that risk factors include performance risk, financial risk, privacy risk, time risk, psychological risk, and overall risk. Perceived risks were found to have a significant negative impact on m-banking behavioural intention. The negative impacts of some of these risk factors – such as performance risk, financial risk and privacy – were further validated in a study of m-payment service adoption (Yang et al., 2015) and Internet banking adoption (Lee, 2009), while perceived psychological risk and perceived time risk were found to have no effect.

In this study, perceived risk involves user beliefs regarding the potential losses or negative consequences associated with adopting an e-payment service (Kim et al., 2008).

In using e-payment services, consumers are mainly exposed to three risks: information risk, property risk, and commodity risk. Information risk is the possibility of personal information being divulged and/or misused during and after financial transfers (Lee, 2009; Özkan et al., 2010). Property risk is the possibility of monetary loss or financial risk in a payment account, which may be caused by fraud, phishing, or hacker attack (Lee, 2009). Commodity risk is the risk of fake or defective commodities being delivered after payment (Kim et al., 2008). Perceived commodity risk decreases if a payment service can safeguard a buyer's funds before he or she verifies that the products arrive as described online. As per Bauer (1960), decision-making is a form of risk-taking behaviour. Perceived risk can have significant and negative impacts on use intention (Luo et al., 2010; Yang et al., 2015) and is considered a barrier to e-payment usage since the virtual nature of an e-payment service augments the information, commodity, and property risks. Therefore, we hypothesise:

H2 The perceived risk of an e-payment service is negatively associated with user intention to use this service.

3.3 Trust and use intention

A user's trust in an e-payment service is the user's subjective belief that his or her payment will be processed as expected (Lu et al., 2011). *Trust* is considered a major factor that drives electronic and mobile commerce and its adoption (Kim et al., 2008, 2009a) as well as the adoption and continued use of e-payments (Lu et al., 2011; Luo et al., 2010; Slade et al., 2014), because mobile commerce creates spatial and temporal separation and thus uncertainty in the exchange relationships. Trust in the service provider can positively affect consumer intention to use the service because it can enhance the user's confidence in the e-payment service provider's competency and integrity (Oliveira et al., 2014; Srivastava et al., 2010). Trust is especially crucial in adopting e-payment services because sensitive information such as personal data and financial details are provided in the process, but users usually have difficulty in monitoring how the information might be used in the future. Furthermore, the e-payment process also exposes users to the potential loss of funds, so confidence in the service provider's competence and integrity is also important. In general, consumers are more willing to use an e-payment service with a trusted supplier. Therefore, we hypothesise:

H3 A user's trust towards the e-payment service provider is positively associated with the user's intention to use this service.

3.4 Familiarity

Familiarity is a consumer's degree of acquaintance with the e-payment service and the service provider (Kim et al., 2008). User familiarity contributes to use intention of e-payment services through two mechanisms: the *habituation* and *cognition* mechanisms, which result in direct and indirect impacts on use intentions. First, familiarity is built through actual use experience, which may trigger *habituation* in user e-payment use. Habituation is the process through which users become comfortable with a product (Richard et al., 2004). In the marketing literature, consumers are considered to be

habitual and their behaviour controlled by habit to a certain extent (Wood and Neal, 2009), so habit is leveraged by marketers as a loyalty mechanism. In the information technology field, recent research has increasingly incorporated the role of experience and habit in driving user intention (De Guinea and Markus, 2009; Venkatesh et al., 2012). According to De Guinea and Markus (2009), IT is a strong enabler of user behavioural inertia because once a user becomes familiar with an IT artefact; he is less likely to switch to others that may involve account setup and learning. The digital nature of the IT artefact provides users the possibility of experiencing and trying the products at minimal cost. Familiarity can be built without incurring the ownership of products, but the trial period of familiarising users with e-payment tool functionality can help build user habits, and therefore trigger use intention. Therefore, we propose:

H4A User familiarity with an e-payment service is directly associated with the intention of using e-payment services.

Familiarity is a *cognition* process through which users experience and become familiar with an e-payment service. Generally, familiarity may either positively or negatively impact attitude, depending on whether the user's experience is positive or negative (Luhmann, 1979). In this research, we assume that familiarity may enhance attitudes towards e-payment services because more interaction with the service will help consumers find the best ways in which to use it while bypassing the limitation of the services. This assumption is likely to be valid based on prior research in which familiarity helps enhance user understanding of the benefits and risks of the e-payment tool (Komiak and Benbasat, 2006). During the familiarisation process, a user will acquire a cognitive map of the procedures involved in using the e-payment tool. Such a cognitive map provides users with the knowledge to use the e-payment tool more quickly, with greater ease, and with fewer errors (Gefen, 2000; Komiak and Benbasat, 2006). Therefore, with higher familiarity, it is likely the user will believe the e-payment tool offers higher benefits and fewer risks.

Familiarity is also a precondition of trust-building since it helps consumers understand how best to use the system based on their understanding of the capability and credibility of the e-payment service provider (Gefen et al., 2003). The process of gaining familiarity is also a process of trust-building. Based on these arguments, we hypothesise the following relationships between familiarity and perceived benefits, perceived risks, trust, and use intention:

H4B User familiarity with an e-payment service is positively associated with perceived benefits of the service.

H4C User familiarity with an e-payment service is negatively associated with perceived risks of the service.

H4D User familiarity with an e-payment service is positively associated with user trust towards the e-payment service provider.

H4E The relationship between user familiarity and use intention is mediated by perceived benefits, perceived risks, and user trust towards the e-payment service provider.

3.5 Reputation

An e-payment service provider's reputation affects use intention for its service mainly through *social influence effects*, *signalling effects* and *alignment effects*, which result in direct and indirect effects of reputation on use intention. First, reputation is a collective message that an observer receives but not necessarily experiences (Barnett et al., 2006). A good reputation can drive users to adopt an e-payment service because they are influenced by the perceptions that other users like him or her are also using this high-quality e-payment tool, and using this highly reputed service will tend to increase the social status of the user. Such a social influence may drive the use intention of an e-payment service (Venkatesh et al., 2003; Venkatesh et al., 2012). Therefore, we propose that:

H5A A firm's reputation positively affects user trust in that firm's e-payment service.

Second, reputation is built as a strategy by a firm to signal the quality of products and services to uninformed others (Lange et al., 2011; Weigelt and Camerer, 1988). The signalling effect of reputation is especially important in the case of experience products and in the service industry due to the difficulty of evaluating products before consumption. In the case of e-payment services, service provider reputation can signal the quality of service: a service that offers benefits such as convenience, ease of use, and savings of time, and has low risks of information and monetary loss. Therefore, a firm's reputation increases user perception of perceived benefits and reduces perceived risks.

Reputation also contributes to user trust towards a service provider. Reputation has an alignment effect: It serves to encourage a firm to behave as expected because reputation reveals important information about the firm, and the firm has already made significant investments to build its reputation (MacLeod and Malcomson, 1988). This alignment effect is also called the 'disciplinary mechanism of reputation' (Fang and Yasuda, 2009). It cultivates user trust towards the firm and builds user confidence that the firm will not behave against its consumers. Based on the above argument, we hypothesise that

H5B An e-payment service provider's reputation is positively associated with perceived benefits of its service.

H5C An e-payment service provider's reputation is negatively associated with perceived risks of its service.

H5D An e-payment service provider's reputation enhances user trust towards the e-payment service provider.

H5E The relationship between an e-payment service provider's reputation and use intention is mediated by perceived benefits, perceived risks, and user trust towards the e-payment service provider.

3.6 Comparison between PPEPS and CMEPS

Our research also compares the significance of use intention drivers between early-mover PPEPS and late-comer CMEPS. The difference between these services is that PPEPS providers have successfully built user e-payment habits through their early-mover strategy but CMEPS enjoy a corporate reputation established through many years of offline operations. First, an early-mover strategy is widely adopted by pure Internet firms

to leverage the benefits of network effects, economies of scale, learning effects, and high customer switching costs (Eisenmann, 2006; Lieberman, 2005; Wang et al., 2016). Building and reinforcing user familiarity with a provider's applications and systems is a strategy used to attract an initial customer base and to retain those customers. Pure internet firms are also better than traditional firms at creating a positive customer experience and attracting consumers to try or to use their applications again. In this case, PPEPS, as pure Internet-based firms, will enjoy greater benefits brought by user familiarity than CMEPS.

Second, traditional firms in general tend to adopt a wait-and-see strategy in the hope of leveraging their existing assets to achieve late-comer advantage. One related asset is the reputation built through many years of offline operations as reliable sellers or service providers (Flavián et al., 2006; Min and Wolfinbarger, 2005). Traditional firms also have more experience than pure Internet firms in building and leveraging reputations. Therefore CMEPS, as traditional firms, will enjoy more benefits as a result of their reputations than PPEPS would. Based on the above argument, we hypothesise that:

H6A The direct and indirect impact of familiarity will be stronger for PPEPS than for CMEPS.

H6B The direct and indirect impact of reputation will be stronger for CMEPS than for PPEPS.

4 Methodology

A survey method was used to test the research hypotheses. Table 2 provides an overview of the constructs, their measurements, and the sources of the measurements.

Because of the multi-faceted nature of perceived benefits and risks, they are measured as formative constructs (Luo et al., 2010; Mallat, 2007). *Perceived benefit (PerB)* measures different types of benefits (i.e., network benefit, financial benefit, and usability). *Perceived risk (PerR)* measures three types of risks: information risk, property risk, and commodity risk. *Trust*, *reputation (Repu)*, and *user familiarity (Fam)* are measured as reflective constructs. We measure use intention with a single item *(Intent)* as a holistic judgment of the likelihood of users adopting e-payment. The single-item measurement of use intention has also been adopted in several other studies (Chen, 2013; Harris et al., 2016; Kim et al., 2009b). All constructs are measured using 5-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree). We also controlled the effect of different types of e-payment tasks on user intention. Five dummy variables are added to the model, measuring whether the e-payment service is used for shopping, fund transfer, investment, utility bill payment, and others, respectively.

To compare the difference between PPEPS and CMEPS, each respondent was asked to answer each question regarding two e-payment services in China: Quick Pay (QP) and Union Pay (UP). Therefore, XXX in Table 2 refers to Quick Pay or Union Pay. Quick Pay was launched in 2010 by Alipay.com, a dominant pure-play third-party online payment platform operated by the Alibaba Group. Union Pay is a state-owned bankcard association established in 2002 and responsible for operating China's unified inter-bank clearing and settlement system. Union Pay began its online payment business in 2011. In 2014, Union Pay enjoyed a brand penetration rate of 41.9% in the online payment

market, ranked second behind Alipay's 88.2% (CNNIC, 2015). QP and UP were chosen for this research because they are major e-payment service providers in China and have similar business models and functions but are offered by PPEPS and CMEPS providers, respectively.

Table 2 Measurements

Constructs	*Codes*	*Items*	*Sources*
Perceived benefit (PerB) (formative)	PerB1	(Network related benefit) I can use XXX to make payments in many merchants or stores.	Mallat (2007)
	PerB2	(Financial benefit) I use XXX because it can save me transaction fees.	
	PerB3	(Usability) XXX is easy to use and user-friendly.	
Perceived risk (PerR) (formative)	PerR1	(Commodity risk) Using XXX protects me from receiving inoperative or defective products. (reverse coded)	Kim et al. (2008, 2009a) and Lee (2009)
	PerR2	(Information risk) XXX can protect my information very well.	
	PerR3	(Property risk) XXX can protect my property very well.	
Reputation (Repu) (reflective)	Repu1	XXX has a good reputation.	Kim et al. (2009b)
	Repu2	XXX's provider has a good reputation.	
User familiarity (Fam) (reflective)	Fam1	I am familiar with XXX.	Kim et al. (2008)
	Fam2	I am familiar with the process of XXX.	
Trust (Trust) (reflective)	Trust1	I believe that XXX is trustworthy.	Gu et al. (2009)
	Trust2	I believe that XXX has my best interests in mind.	
Use intention (Intent)	Intent	I would like to use XXX to complete financial transactions.	Kim et al. (2009b)
E-payment task (Task) (control variable)	Shop	I use e-payment tools to pay for shopping.	
	Utilities	I pay for utilities with e-payment tools.	
	Deposit	I deposit money with e-payment tools.	
	Transit	I transfer money with e-payment tools.	
	Other	I use e-payment tools for some other purposes.	

Note: XXX refers to Quick Pay or Union Pay. Quick Pay and Union Pay are the names of two e-payment services. Please refer to the text for detailed descriptions of Quick Pay and Union Pay.

To improve the validity and understandability of the instrument, a pre-test of the questionnaire was conducted based on the answers from 17 respondents, and revisions were made according to respondent feedback. We used Questionnaire Star's (an online questionnaire service, www.sojump.com) paid questionnaire service to collect 260 final responses. To achieve sample diversity, we asked Questionnaire Star to solicit respondents from different age groups, occupations, and regions. The final dataset consists of responses from a valid sample of 265 respondents. Table 3 provides the basic

sample information. The statistics in Table 3 indicate that the respondents are representative of Chinese e-payment users. Most of the respondents (87.55%) in this survey range in age from 26 to 45 years old and the largest age group (71.7%) is 26–35. This distribution coincides with the distribution of e-payment users published by the China E-payment Users Report of 2015 (iResearch, 2015).

Table 3 Sample characteristics

Variables	*Categories*	*Frequencies*	*Percentages*
Gender	Male	126	47.50%
	Female	139	52.50%
Age	15–25	28	10.56%
	26–35	190	71.70%
	36–45	42	15.85%
	46–	5	1.89%
E-payment tasks	Shopping	258	97.36%
	Fund transfer	229	86.42%
	Investment	192	72.45%
	Utility bill payment	188	70.94%
	Others	13	4.91%
Frequency of e-payment usage	Daily	63	23.77%
	3–5 times per week	137	51.70%
	Once per week	47	17.74%
	1–2 times per month	14	5.28%
	3–5 times per year	4	1.51%

Table 4 Comparisons between Quick Pay and Union Pay: paired sample t-tests

Pairs	*Differences*	*P-values*
QPerB – UPerB[1]	1.336	0.000
QPerR – UPerR	–0.355[2]	0.003
QRepu – URepu	0.336	0.000
QFam – UFam	0.574	0.000
QTrust – UTrust	0.287	0.000
QIntent – UIntent	0.430	0.000

Notes: [1]Variables coded starting with Q and U hereinafter refer to the constructs measured regarding QP (Quick Pay) and UP (Union Pay), respectively.
[2]Higher values of PerR indicate higher perceived risks.

We used a paired sample t-test to identify the differences in respondent attitudes towards the two e-payment services. The results are illustrated in Table 4. PPEPS Quick Pay performs better than CMEPS Union Pay on all of the constructs. This result is reasonable

considering that PPEPS have already gained popularity and achieved dominance by effectively challenging the position of traditional financial institutions. Based on this fact, we may infer the early-mover advantages of PPEPS Quick Pay. However, we could not confirm the differences in the importance of use intention drivers between PPEPS and CMEPS based only on the t-test analysis.

5 Results

We used partial least squares (PLS) to assess the measurement and structure of the model. PLS was chosen over covariance-based (CB) structural equation modelling (SEM) for the following reasons:

1 the research is exploratory and predictive

2 we have both formative and reflective, multiple, and single-item measurements, and PLS is more suitable for handling a complex model with both formative and reflective variables than CB-SEM

3 PLS has fewer restrictions on sample size and measurements (Gefen et al., 2011).

Based on the above reasons, PLS is a better choice than CB-SEM. In this research, PLS was implemented using SmartPLS 3.0 (Ringle et al., 2015).

5.1 Measurement model assessment

Measurement model assessment was conducted to validate the quality of the instruments. Because reflective and formative constructs have different requirements for measurement quality, their assessments were conducted and reported separately.

5.1.1 Reflective constructs

The purpose of the reflective construct quality assessment is to validate the reliability and validity of the constructs. Three reflective constructs are contained in this research: reputation, familiarity, and trust. Following the suggestion of Chin (1998) on using composite reliability (CR) and the average variance extracted (AVE) values to test reliability, we provide AVE, CR, and item loadings for both QP and UP models in Tables 5 and 6. First, to demonstrate acceptable reliability, the CR scores need to pass the 0.6 threshold value (Chin, 1998), and AVE scores should be higher than 0.50 (Fornell and Larcker, 1981). As illustrated in Table 5, all the constructs pass this criterion. Second, Table 5 indicates that for all three constructs, the square root of AVE in the diagonal of the matrix for each construct is greater than its correlation with other constructs, satisfying criteria established by Fornell and Larcker (1981) for sufficient discriminant validity. Third, as suggested by Gefen et al. (2011), each indicator should have a higher loading on its own respective construct than on any other constructs to demonstrate convergent and discriminant validity. As illustrated in Table 6, the criteria of Gefen et al. (2011) are satisfied. The above tests indicate that all reflective constructs have sufficient reliability and convergent and discriminant validity.

Table 5 The AVE matrices and composite reliabilities for reflective constructs

		AVEs	*Composite reliabilities*	*AVE matrices*		
				Fam	*Repu*	*Trust*
Quick Pay (PPEPS)	Fam	0.791	0.883	0.889		
	Repu	0.709	0.829	0.534	0.842	
	Trust	0.731	0.845	0.501	0.588	0.855
Union Pay (CMEPS)	Fam	0.692	0.818	0.832		
	Repu	0.688	0.815	0.509	0.829	
	Trust	0.682	0.811	0.506	0.493	0.826

Note: The square roots of AVE (average variance extracted) are in the diagonal of the matrix for each construct.

Table 6 Reflective construct loadings

	Quick Pay (PPEPS)				*Union Pay (CMEPS)*		
	Fam	*Repu*	*Trust*		*Fam*	*Repu*	*Trust*
QFam1	0.896	0.506	0.461	UFam1	0.841	0.430	0.425
QFam2	0.882	0.443	0.430	UFam2	0.823	0.416	0.417
QRepu1	0.536	0.913	0.583	URepu1	0.468	0.859	0.472
QRepu2	0.333	0.765	0.377	URepu2	0.370	0.798	0.335
QTrust1	0.415	0.567	0.873	UTrust1	0.330	0.372	0.810
QTrust2	0.444	0.433	0.837	UTrust2	0.499	0.439	0.842

5.1.2 Formative constructs

Perceived benefit (PerB) and *perceived risk* (PerR) were measured as formative constructs, each with three indicators. For formative construct quality assessment, Cenfetelli and Bassellier (2009) suggest that the following tests be conducted:

1 assess the bivariate correlations among the indicators and with their construct

2 test for indicator multicollinearity

3 evaluate indicator weights.

A good formative measurement should demonstrate low to medium correlations among indicators, no multicollinearity, and significant path weights.

First, the correlations among the indicators of PerB and PerR are examined. Differing from reflective constructs that require extremely high correlations among indicators [i.e., often above 0.8 according to Pavlou and El Sawy (2006)], indicators of a formative construct are not required to be highly correlated (Petter et al., 2007). In this research, the correlation coefficients among the three indicators of PerB and those of PerR range from 0.182 to 0.643 for the QP model and from 0.263 to 0.537 for the UP model, which are far below the requirements for reflective constructs. This indicates that PerB and PerR are better measured formatively than reflectively. Second, multicollinearity is tested using the variance inflation factor (VIF) index. Petter et al. (2007) suggest that a VIF of less

than 3.3 indicates no multicollinearity problems. As illustrated in Table 7, all VIF scores are below 3.3, indicating no multicollinearity among construct indicators. Third, as indicated in Table 7, all item weights are significant at the $p < 0.05$ level. The above analysis demonstrates that both PerB and PerR pass formative construct quality assessment.

Table 7 VIFs and item weights of formative constructs

Constructs	*Indicators*	*VIFs*	*Weights*	*p-values*
		Quick Pay (PPEPS)		
QPerB	QPerB1	1.216	0.434	0.000
	QPerB2	1.149	0.224	0.001
	QPerB3	1.349	0.629	0.000
QPerR	QPerR1	1.172	0.338	0.001
	QPerR2	1.737	0.258	0.015
	QPerR3	1.786	0.630	0.000
		Union Pay (CMEPS)		
UPerB	UPerB1	1.190	0.290	0.003
	UPerB2	1.229	0.377	0.000
	UPerB3	1.340	0.620	0.000
UPerR	UPerR1	1.110	0.538	0.000
	UPerR2	1.441	0.430	0.000
	UPerR3	1.442	0.356	0.001

5.2 Common method bias

The potential of common method bias is assessed using the following tests. First, the common method bias would have resulted in extremely high correlations (i.e., $r = .90$) (see Pavlou and El Sawy, 2006). The highest correlation among constructs in this research is 0.643. Second, the Herman one factor test (Podsakoff et al., 2003) was conducted by loading all of the items into an exploratory factor analysis. The test result indicates no symptom of common method bias since the highest factor explained 30.628% of the variance among all items.

5.3 Structural model assessment

5.3.1 Path coefficient analysis

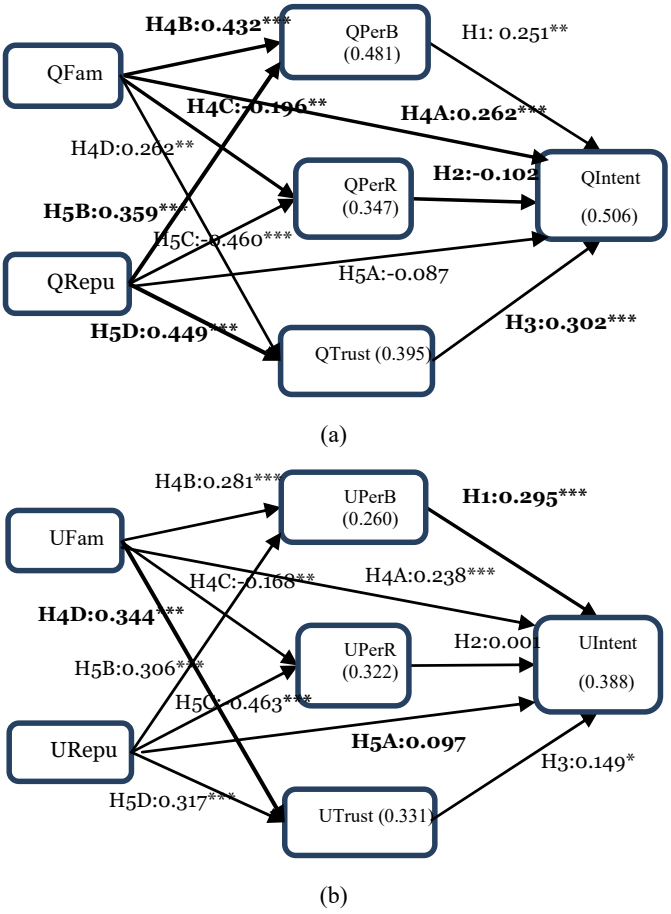
Figure 2 and Table 8 illustrate the data analysis results. The results for Union Pay and Quick Pay are shown in parallel to facilitate the comparison. H1–H3 hypothesise a positive relationship between PerB, PerR, and trust, respectively. As illustrated in Figure 2, both H1 and H3 are verified; with H2, the relationship between PerR and intent is negative but not significant. The above results are valid for both QP and UP.

Table 8 Path Coefficients and comparisons of Quick Pay (PPEPS) and Union Pay (CMEPS)

		Quick Pay (PPEPS)		*Union Pay (CMEPS)*		*Path coefficient differences*				*Hypothesised in H6A and H6B*
		Path coef.	*P-values*	*Path coef.*	*P-values*	*QP-UP*	*t values*	*P-values*	*Conclusions*	
H1	PerB-Intent	0.251*	0.002	0.295*	0.000					N/A
H2	PerR-Intent	–0.102	0.099	0.001	0.994					N/A
H3	Trust-Intent	0.302*	0.000	0.149*	0.043					N/A
H4A	Fam-Intent	0.262*	0.001	0.238*	0.001	0.024*	9.578	0.000	PPEPS > CMEPS	PPEPS > CMEPS*
H4B	Fam-PerB	0.432*	0.000	0.281*	0.000	0.151*	50.128	0.000	PPEPS > CMEPS	PPEPS > CMEPS*
H4C	Fam-PerR	–0.196*	0.007	–0.168	0.007	–0.028*	–9.654	0.000	PPEPS > CMEPS	PPEPS > CMEPS*
H4D	Fam-Trust	0.262*	0.002	0.344*	0.000	–0.083*	–26.014	0.000	CMEPS >PPEPS	PPEPS > CMEPS
H5A	Repu-Intent	–0.107	0.132	0.097	0.208					CMEPS > PPEPS
H5B	Repu-PerB	0.359*	0.000	0.306*	0.000	0.053*	14.335	0.000	PPEPS > CMEPS	CMEPS > PPEPS
H5C	Repu-PerR	–0.460*	0.000	–0.463*	0.000	0.003	1.227	0.221	not significant	CMEPS > PPEPS
H5D	Repu-Trust	0.449*	0.000	0.317*	0.000	0.131*	45.624	0.000	PPEPS > CMEPS	CMEPS > PPEPS
Control variables	Shop-Intent	–0.018	0.784	0.100	0.072					
	Utility-Intent	0.043	0.318	0.027	0.602					
	Deposit-Intent	0.082	0.125	–0.059	0.301					
	Transit-Intent	0.017	0.742	–0.011	0.850					
	Other-Intent	–0.030	0.414	–0.019	0.747					

Note: * indicates that the hypothesis is supported.

Figure 2 (a) PLS results for Quick Pay (PPEPS) (b) PLS results for Union Pay (CMEPS) (see online version for colours)



The group of H4 hypotheses (except for H4E) is about the direct impact of familiarity on PerB, PerR, Trust and Intent. As illustrated in Figure 2, all of the H4 hypotheses are verified for both QP and UP.

The group of H5 hypotheses (except for H5E) is about the direct impact of reputation on PerB, PerR, Trust, and Intent. As illustrated in Figure 2, all of the H5 hypotheses are verified except H5A about the direct relationship between reputation and intention. The results are consistent between both the QP and UP models.

Table 8 also illustrates that the control variables are not significant, implying that different types of e-payment tasks do not affect user intention.

5.3.2 Comparison of path coefficients between QP and UP models

H6A and H6B hypothesise the differences between adoption drivers' effects of PPEPS (QP) and that of CMEPS (UP). We followed the parametric approach of Sarstedt and Wilczynski (2009) to compare the path coefficients between QP and UP. Sarstedt and Wilczynski modify the parametric approach of Chin (2000) to fit the nature of paired

samples, since Chin's approach is used to compare path coefficients among independent subgroups. The modified test statistic, as exhibited in formula (1), follows a t-distribution with $K - 1$ degrees of freedom:

$$t = \frac{\overline{z^*}\sqrt{K}}{\sqrt{\frac{1}{K-1}\sum_{k=1}^{K}\left(z_k^* - \overline{z^*}\right)}}, \qquad k = 1, \ldots, K \tag{1}$$

where k depicts the number of bootstrap sample, z_k^* depicts the difference between the path coefficients of models QP and UP in bootstrap sample k, $\overline{z^*}$ depicts the average of z_k^*, and K is the total number of bootstrapping samples.

First, we judged whether bootstrapping subsamples follow a normal distribution using a Kolmogorov-Smirnov test with Lilliefors correction suggested by Mooi and Sarstedt (2011). The result reveals that bootstrap samples do not deviate from the normal distribution assumption except the path from Repu to Trust.

Then, we calculated the t statistics using formula (1) and tested the significance of each of the path coefficient differences. The results are illustrated in Table 8 and highlighted in bold in Figure 2.

In H6A, we hypothesise that the direct effects of familiarity will be stronger for PPEPS than for CMEPS. As illustrated in Table 8, most of the direct effects are verified stronger for PPEPS than for CMEPS, except for the relationship between familiarity and trust, which is stronger for CMEPS than for PPEPS.

In H6B, we hypothesise that the direct effects of reputation will be stronger for CMEPS than for PPEPS. This hypothesis is not verified. There is no significant direct relationship between reputation and use intention for both CMEPS and PPEPS. On the contrary, the associations between *reputation*, *perceived benefits*, and *trust* are significantly weaker in the CMEPS (UP) model than in the PPEPS (QP) model. There is no significant difference between PPEPS and CMEPS in terms of the association between *reputation* and *perceived risk*. This indicates that PPEPS are in a more advantageous position than CMPES in leveraging the roles of not only familiarity but also reputation to improve adoption.

5.3.3 Mediating effects

H4E and H5E hypothesise the indirect effects of familiarity and reputation on use intention through multiple mediators: perceived benefits, perceived risk, and trust, respectively. We followed the bootstrapping approach of Preacher and Hayes (2008) to test the multiple mediation effects. For each factor (i.e., familiarity or reputation), both the total indirect effect of the factor on Intent, and indirect effect through individual mediators (i.e., Trust, PerB, and PerR) were examined. Preacher and Hayes (2008) suggest the use of 95% percentile bootstrap confidence intervals (CI) to evaluate the significance of indirect relationships. As zero is not covered in 95% percentile bootstrap CI, the tested indirect effect was significant.

Table 9 Total mediation effect

			Quick Pay (PPEPS)			*Union Pay (CMEPS)*			*PPEPS-CMEPS (H6A and H6B)*		
			f	*2.5%*	*97.5%*	*f*	*2.5%*	*97.5%*	*f*	*2.5%*	*97.5%*
H4E (Fam-Intent)	Individual indirect effect	Fam-PerB-Intent	0.112*	0.043	0.195	0.084*	0.035	0.139	0.028	–0.061	0.125
		Fam-PerR-Intent	0.020*	0.001	0.159	0.002*	0.0002	0.032	0.018	–0.020	0.050
		Fam-Trust-Intent	0.078*	0.028	0.059	0.064*	0.011	0.117	0.014	–0.057	0.092
	Total indirect effect		0.210*	0.116	0.313	0.144*	0.080	0.217	0.066	–0.046	0.186
	Total effect		0.484*	0.314	0.629	0.371*	0.239	0.496	0.113	–0.087	0.303
H5E (Repu-Intent)	Individual indirect effect	Repu-PerB-Intent	0.093*	0.035	0.099	0.092*	0.045	0.159	0.001	–0.088	0.089
		Repu-PerR-Intent	0.047*	0.064	0.206	0.005*	0.001	0.071	0.042	–0.039	0.088
		Repu-Trust-Intent	0.134*	0.070	0.188	0.053*	0.010	0.116	0.081	–0.012	0.161
	Total indirect effect		0.273*	0.185	0.369	0.149*	0.080	0.237	0.124*	0.003	0.243
	Total effect		0.186*	0.070	0.297	0.234*	0.093	0.357	–0.048	–0.214	0.106

Note: f and * indicate the estimate and significance of an effect, respectively.

H4E hypothesises the indirect effects of familiarity on use intention through multiple mediators: perceived benefits, perceived risk, and trust, respectively. As illustrated in Table 9, the individual mediation effects involving PerB, PerR and Trust are all significant. Both the total indirect effect and the total effect of familiarity on use intention are all significant. The results are valid for both UP and QP.

H5E hypothesises the indirect effects of reputation on use intention through perceived benefits, perceived risk, and trust. As illustrated in Table 9, the individual mediation effects involving PerB, PerR and Trust are all significant. Both the total indirect effect and the total effect of reputation on use intention are significant. The results are valid for both UP and QP.

H6A hypothesises that the indirect effect of familiarity will be stronger for PPEPS than for CMEPS, while H6B hypothesises that the indirect effect of reputation will be stronger for CMEPS than for PPEPS. The last column of Table 9 indicates that there is no significant difference in the indirect effect of familiarity between PPEPS and CMEPS, so part of hypothesis H6A is not confirmed. For the indirect effect of reputation on use intent, although there is no significant difference in individual indirect effects, the total indirect effect of PPEPS is significantly higher than CMEPS (fQP-fUP = 0.124). This result further reinforces the conclusion that the direct associations between *reputation* and *perceived benefits* and *trust* are significantly higher in PPEPS (QP) than in CMEPS (UP). PPEPS are better than CMEPS in building online reputations and leveraging reputation to change consumer perceptions, which further affect use intention.

5.4 Explanatory power assessments

Explanatory power was examined using the coefficient of determination (R2) of the main endogenous variables (*Intent*, *PerB*, *PerR*, *Trust*) and the goodness of fit (GoF) of the overall model. According to Cohen (1988), the R2 values (see Figure 2) for both the Union Pay and Quick Pay models exceed the cutoff value for a large effect (small ≥ 0.02, medium ≥ 0.13; large ≥ 0.26), indicating that dependent variables can be strongly or moderately explained. The GoF values of both models (GoF = 0.441 for the QP model and GoF = 0.404 for the UP model) exceed the cutoff value of 0.36 for a large effect (small = 0.1, medium = 0.25, and large = 0.36), as suggested by Wetzels et al. (2009). This result indicates that both models have a high level of explanatory power.

6 Discussions

This research studies the role of familiarity and reputation in driving use intention of e-payment services based on the trust-based valence framework, and compares the differences between PPEPS and CMEPS. First, pure-play Quick Pay performs better than click-and-mortar Union Pay in terms of perceived benefits, perceived risk (lower risk), reputation, familiarity, trust, and user intention. This result is in accordance with the description in the introduction. This result confirms PPEPS' early-mover advantages and market dominance.

As for the direct drivers of use intent, perceived benefits and trust significantly affect use intention, but perceived risk is not significant. This finding is consistent with those of Wan et al. (2016) in the P2P lending context and Weir et al. (2009) in the e-banking

context. This implies that risk is a less important consideration when it comes to the formation of use intention for financial services, probably because users have already established trust in e-payment service vendors' security assurance efforts after some years of development, or because users are willing to bear some risks in exchange for such benefits as the convenience of making payments online. After all, risks are easily overlooked if they do not happen to the users in question.

For the role of familiarity in driving user adoption of e-payment services, both the direct effect of familiarity and the indirect effect of familiarity on use intention through perceived benefit, perceived risk, and trust are significant. This confirms that familiarity has both strong cognition effects (Komiak and Benbasat, 2006) and habituation effects (Wood and Neal, 2009) in driving users to adopt the use of e-payment services.

For the role of reputation in driving user adoption of e-payment services, we found that reputation does not have a direct effect on use intent, but the indirect effects are significant. The non-significant direct impact of reputation has also been confirmed in other contexts such as mobile banking. The fact that reputation does not directly drive use intention may mean that the signalling effects and alignment effects of reputation are confirmed while the social influence effect of reputation is minimal.

Different impacts of familiarity and reputation indicate that experienced-based factors can lead to users' adoption intention directly while affect-based factors have only indirect influence through perceived benefit, perceived risk, and trust. This can be caused by the nature of e-payment service involving financial risks. Familiarity comes from users' personal experience. Reputation is built by firms through investment in advertising, publicity, and customer interaction and is reinforced by word-of-mouth communication among customers and potential customers. Its formation requires evaluation, implying judgment or assessment. Due to its conceptual generality and source diversity, reputation is considered a less stable concept without unitary characteristics so that different users perceive different aspects of the firm's reputation characteristics (Chandler et al., 2013), some of which may not have a social influence on user behaviour.

The comparison between adoption drivers for CMEPS and PPEPS indicates that, in general, familiarity and reputation play more important roles in changing use perceptions of *benefit* and *risk* for PPEPS than for CMEPS. This result confirms that PPEPS has a stronger capability than CMEPS of familiarising users with early-mover advantage, providing positive user experience, and building online reputations (Eisenmann, 2006; Lieberman, 2005; Wang et al., 2016). Offline reputation of CMEPS is difficult to transfer to the online world, and online reputation-building may require different capabilities and skills that CMEPS may not have. An exception is that the relationship between *familiarity* and *trust* is stronger for CMEPS than for PPEPS. This may be because the process of familiarising CMEPS will arouse users' greater affect-embracing factors of trust on CMEPS than on PPEPS due to their prior interactions and trust towards CMEPS offline services. However, the rational evaluation of the benefits and risks still favours PPEPS due to their strong online operation capability.

7 Contributions

This research reveals several interesting implications for theory and practice. First, by comparing the adoption drivers and their impact between PPEPS and CMEPS, this study confirms the early-mover advantages of pure-play Internet firms. PPEPS are superior in

leveraging both user familiarity and firm reputation to boost adoption. It seems difficult for traditional brick-and-mortar firms to transfer their reputation and familiarity in an offline context to online business. This research is also an effort to compare path coefficients of PPEPS and CMEPS applying the approach of Sarstedt and Wilczynski (2009) for paired sample comparisons. Most previous research has compared the adoption of an e-payment service using moderator variables such as demographics and personal traits, as well as cultural, social, and economic situations (Hanafizadeh et al., 2014). Few, if any, existing studies have compared e-payment services from the perspectives of pure-play vs. click-and-mortar businesses. Curran and Meuter (2005) compare the diffusion of ATMs, bank by phone operations, and online banking. However, they used a paired sample t-test to examine the descriptive differences in each driver, rather than examining the differences among impact paths. This study has examined the differences in adoption drivers between the two types of e-payment services, as well as the paths that link drivers to use intention.

Second, our research validates and compares two adoption promotion mechanisms, the experience-based of familiarity and the affect-based of reputation. The habituation and cognition mechanisms of user familiarity, which result in direct and indirect impacts on use intention, are all confirmed. However, the direct social influence effect of firm reputation on use intention is not confirmed, while the indirect signal effect and alignment effect are validated. This expands IT adoption theory and the application of the trust-based valence model of Kim et al. (2008) in e-payment context. Although some researchers have studied the role of familiarity in adoption and purchasing intention (Gefen, 2000; Komiak and Benbasat, 2006; Mäenpää et al., 2008), and the role of reputation in driving user intention and behaviour (Kim and Lennon, 2013; Li, 2014; Oliveira et al., 2014), few have systematically studied both the direct and indirect effects of familiarity on use intention, and the mechanism of such effects. The trust-based valence model of Kim et al. (2008) identifies four types of antecedents: cognition-based, affect-based, experience-based, and personality-oriented. E-payment research studies that apply a valence model seldom examine these antecedents thoroughly.

We also validate the trust-based valence model in the e-payment context. Among all three factors, perceived risk is the least important, which differs from the results of some prior studies. Yang et al. (2015) validate the negative effect of perceived financial risk, privacy risk, and performance risk on perceived value and acceptance intention of m-payment service. Lu et al. (2011) validate the negative effect of perceived risk and perceived fee (cost) on m-payment use intention. However, when they compare the worker group with the student group, the effects of perceived risk and perceived cost on the use intention are no longer significant. This may imply that perceived risk seems to be easily overlooked when people are more and more accustomed to use e-payment and few encounter those risks.

This research offers managerial implications for both PPEPS and CMEPS providers. First, this research confirms the invalidity of CMEPS' former strategy of leveraging reputation accumulated through offline business to boost online adoption. Offline familiarity and reputation cannot be readily transferred to the online world. CMEPS should switch to mimic the strategies of PPEPS and catch up by enhancing their capability to build familiarity and reputation. Second, this research identifies important drivers that promote the formation of user e-payment adoption intentions. E-payment service providers can focus on improving these drivers, such as increasing users'

perceived benefits (i.e., increasing the usability of the e-payment tools, reducing the transaction fee, and connecting more stores into the payment network), trust, and familiarity with the e-payment services and taking measures to assure the security of the services.

8 Limitations and future research

This research has several limitations. First, this study selected only familiarity and reputation to compare the difference in e-payment service use intention between PPEPS and CMEPS. It did not consider other factors that can highlight the difference between PPEPS and CMEPS, such as their omni-channel capability and e-payment service novelty in driving use intention. Second, this research did not thoroughly test the perceived benefits and risks of e-payment services but focused on major ones because the doubled number of questions in the paired responses constrained us to conduct such a study, and our focus was to test the difference between PPEPS and CMEPS. Thus, some unexamined risks that users could encounter could be the alternative reason for the insignificant effect of perceived risk on use intention. Third, the empirical findings are from a study in China. It is possible that the adoption-driving effects vary in different countries and regions, so the generalisability of the research is limited in this regard.

The above limitations suggest future research opportunities. First, future research can consider studying more factors to compare the differences between CMEPS and PPEPS. A thorough study of the perceived benefits and risks of e-payment services will add value to the existing literature, and grounded research is a suitable methodology that can help generate a rich set of items related to the perceived benefits and risks that are unique to each type of services. Second, this research did not find a significant relationship between *perceived risk* and *use intention* in the UP (CMEPS) model. The underlying psychological mechanism that causes users to ignore risks when making e-payment decisions needs further study. Third, future research can apply our framework to more types of e-payment services in more geographic regions to unveil the differences among them and extend the generalisability of this research.

9 Conclusions

The competition between PPEPS and CMEPS for acquiring and retaining more customers has become intense due to the disruptive nature of e-payment technology. To facilitate a better understanding of the differences between PPEPS and CMEPS user adoption mechanisms, this research studied the factors that drive the adoption of e-payment services, and compared PPEPS and CMEPS. The findings suggest that *perceived benefit* and *trust* are the most important drivers of adoption, and *perceived risk* seems to be a less important consideration by consumers when making e-payment adoption decisions. *Familiarity* was found to play both direct and indirect roles in driving use intention, while the role of *reputation* is indirect. PPEPS was found to be in a more advantageous position than CMEPS to benefit from user familiarity and reputation. This research is still a preliminary comparison of the differences between PPEPS and CMEPS. We hope this will inspire more research to facilitate our understanding of the differences

between PPEPS and CMEPS by addressing the unique issues faced by different types of e-payment services.

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Notes

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