RESEARCH ARTICLE

Cashless society, e-wallets and continuous adoption

Hassanudin Mohd Thas Thaker[1] | Niviethan Rao Subramaniam[2] | Abdul Qoyum[3] | Hafezali Iqbal Hussain[4,5]

[1]Department of Economics and Finance, Sunway University, Petaling Jaya, Selangor, Malaysia

[2]International Data Corporation (IDC), Kuala Lumpur, Malaysia

[3]Faculty of Islamic Economics and Business, State Islamic University Sunan Kalijaga, Yogyakarta, Indonesia

[4]Taylor's Business School, Faculty of Business and Law, Taylor's University, Subang Jaya, Selangor Darul Ehsan, Malaysia

[5]University of Economics and Human Science, Warsaw, Poland

Correspondence

Hassanudin Mohd Thas Thaker, Department of Economics and Finance, Sunway University, 5, Jalan Universiti, Bandar Sunway, 47500 Petaling Jaya, Selangor, Malaysia.
Email: hassanudint@sunway.edu.my

Abstract

This study attempts to investigate the factors affecting e-wallet adoption intention in Malaysia, which considered a central pushforward in imagining a cashless society. A theoretical framework adapting an extended Unified Theory of Acceptance and Use of Technology (UTAUT2) with two additional constructs, trust and perceived security was applied to investigate the effects on behavioural intention to adopt e-wallet electronic payment system, and the data was collected using questionnaires which correlates to 171 respondents. Partial lest squares equation structural modelling (PLS-SEM) was employed for data analysis. The result revealed that performance expectancy, social influence, hedonic motivation, trust, facilitating condition and habit constructs influence the behavioural intention to continuously adopt 'e-wallet' electronic payment system. On other hand, remarkably the perceived security construct portrays to have no significant influence which suggested that users are seemingly well inclined in policies that were executed by financial institutions which govern information's security. The finding should lead some practically and theoretically implications, chiefly elucidating some sustenance in achieving the cashless society imaginary.

KEYWORDS

cashless, continuous adoption, digital money, e-wallets, UTAUT2

1 | INTRODUCTION

1.1 | Introspective between cashless society and electronic payment systems (e-wallet)

When scouring the pages of history on technologies innovation starting from the age of industrial revolution, one will be never be contemplating the lexicon of 'e-wallet' as an antecedent of innovation. As e-wallet reflects in the way of becoming a General-Purpose Technology (GPT)[1] in this day and age; the next pertaining thing to ask where the society is moving towards in tandem. Society over its existence tends to debate with oneself as means to ease how a society function. Somewhat technology has provided the answer, this mutual assurance is referred as sociotechnical imaginaries. Jasanoff and Kim (2015) articulated it as 'collectively held and performed visions of desirable futures...animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology' (p. 25). Naturally, most technological tools have its own history own origin (Arthur, 2011). The term of 'cashless society' is considered an ambiguity nevertheless the general accepted definition the term in question can be held as 'decashing' in which the paper notes, checks and coin are ceased to exist as whole within an economy system (2018). The term came to limelight during

the 1960s period when the transaction method was evolving due to injection new of technological innovation (Mitchell, 1966; Ward, 1967) but the origin of the idea cashless society was started during 1900s (Bàtiz-Lazo & Efthymiou, 2016). It is currently becoming a ubiquitous, and in some sense, experiencing a renaissance due to its majorly contribution in terms of socio-cultural development during the times of acme technology advancement and improvement. Figure 1 illustrate the google trend data for new search quires for the topic 'cashless society' from 11th November 2015 to 10th October 2020 which can be taken as gist of society sentiment; in which the longitudinal trends dictate an uptrend.

Capitalistically, cashlessness reduces cost of business and increase efficiency in the market economy. Even though there is substantial effort in shifting the economy (*individual choice*)[2] in adapting cashless payment through the usage of electronic payment system, prerequisites of a cashless society are somewhat unattainable wholeheartedly, as shifts generally depends on the society, where different society adopts cashless payment. It is generally perpetuated due to absence of trust in the system (Kim et al., 2010; Oney et al., 2017). Besides, Garcia-Swartz et al. (2006) pointed that not all parties benefited from the shift even though it improves economic welfare. Segue to that, in spearheading of achieving a cashless economy or society, its where digital wallet also knows as 'e-wallet' comes into the picture as a key enabler; normalizes as part electronic payment systems (Hassan et al., 2020; Peterson & Wezel, 2016). Electronic payment systems are essentially where the transactions of electronic value currency/money are done through an electronic interface mechanism (e.g., mobile)[3] (Kim

et al., 2010). This underlying reason can be corresponded due to high penetration of smartphone usage. For instance, in the Asia pacific region smart adoption is aimed to surpassed to 80% in the year 2025 (GSMA, 2020). Overall, the lentiform of cashless society and e-wallet can be (re)constructed through Granter's Hype Cycle,[4] which represent the dynamics evolution of a specific technology through its adoption, maturity, fall and recovery of expectations (Dedehayir & Steinert, 2016), alternating the google trend data as proxy for expectations (see Figure 1), it shows that it currently experiencing a somewhat of 'technology trigger'. As such, investigating the early adopters' behaviours will enhance the longevity of the digital wallet technology. Lew et al. (2020) pointed out that the disruptive nature of e-wallet adoption streams even through mixt industries settings, of which has shown a significant variance in behaviour intention to adopt e-wallet payment system.

It should be specially noted that the usage of the term 'cashless society' differs from 'electronic payment system' because it variegates from its contextual usage between optimistic and reality connotation. For example, it can be said that 'There is ideal possibility of achieving a new social order in where physical cash is abolish as whole whereas in the current realistic sense the usage of electronic payment provides pathway of achieving a cashless society'.
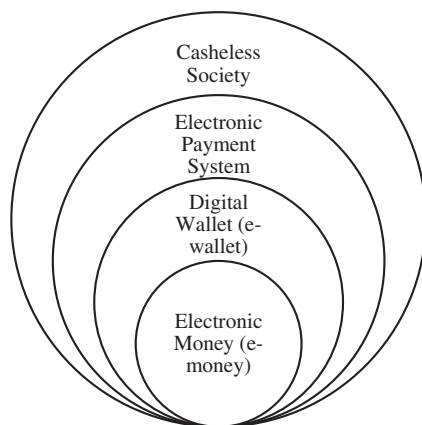
In that notional perspective this study will adopt a localize definition to eliminate lax narrative; Where e-wallet is a digital payment system where money is store in a digital currency unit (e-money) and it's stored in server in which it functions as an application through a mobile device in facilitating commercial transaction. Figure 2 demonstrate the logical relationships.
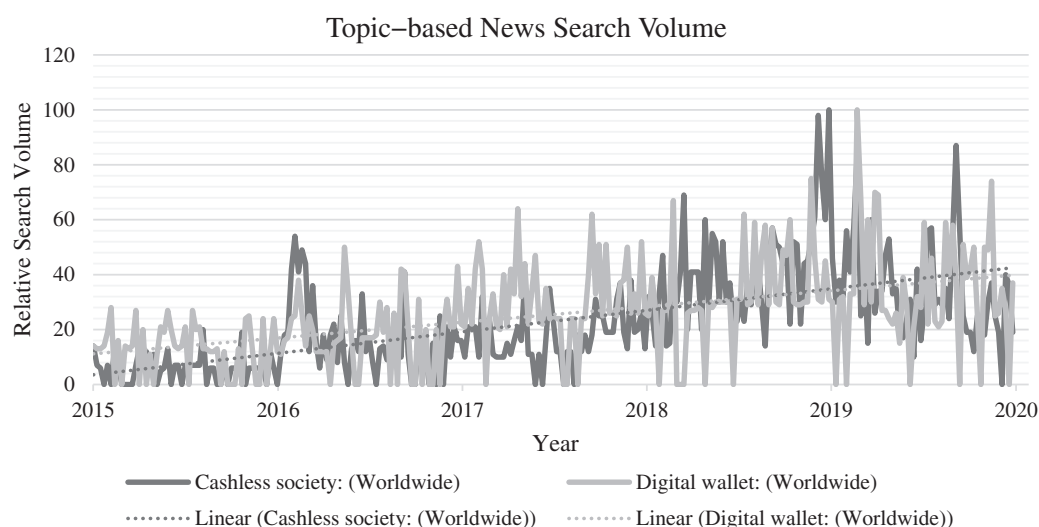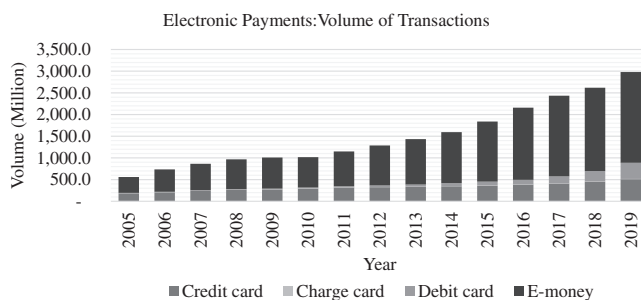

FIGURE 1 Worldwide relative news search volume based on topic-specific keywords of 'cashless society' and 'digital wallet' between 2015 and 2020

1.2 | Digitalization process with reference to electronic payment (e-wallets) in Malaysia

Extracting from Lee et al. (2013), Malaysia consumers is having been and will be a prevalently user of electronic payment has mean of transaction, this progress is due to the spill over effect of technological innovations and globalization to the specific stakeholder's, which are consumers, business and institutions. Moving forward to current times, the usage of e-wallet as noted to become the main electronic payment among the consuming society, according to the study conducted by Mastercard (2020), Malaysia leads among its contemporary neighbours in term of e-wallet usage. Figure 3 illustrates the transaction volume in term of electronic payment system, relatedness to the Malaysia landscape; Since the year of 2005 the usage of e-money has been experiencing exponential rise as in term of preferred payment choices compared to card based payment instruments. This is possible mainly due to the well thought long term policies and sufficient allocated resources that aimed in providing supporting ecosystem of service communication infrastructure and has
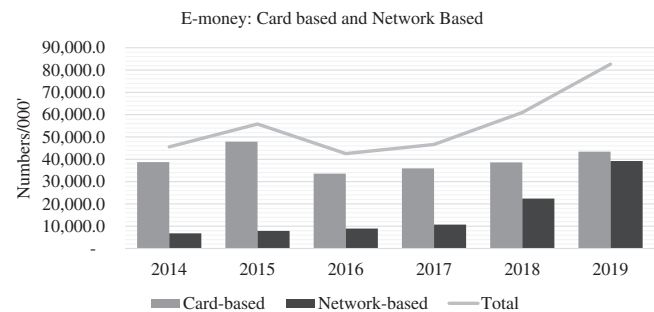
led to a matured internet and connectivity penetration which stood at 90.1% (Department of Statistics Malaysia, 2019)—one of the highest in Southeast Asia Pacific region (The Inclusive Internet Index, 2020). From Figure 4, it is observed that network-server (*virtual*) based that use internet as mean of medium is seen a catching-up trend among Malaysian consumer contrastingly to card-based usage (*physically virtual*). Externalizing, this affirms that payment digitalization occurs parallelly with the economic growth and its complement each other virtuously. (Aad & Young, 2020). This push to go cash-less transaction has been more significant now and ever as seen in the recently announce annual government budget,[5] where approximately RM450 million were allocated to enhance the usage of e-wallet. Such polices targeting e-wallet usage has provided incentivize remittances in term of uprising e-wallet provides, for example, GrabPay, Touch n' Go eWallet, Boost, BigPay and FavePay. As well, the topical introduction of Real-time Retail Payments Platform (RPP) by Central Bank of Malaysia (Bank Negara Malaysia) has been considered a pivotal push for the usage and adopting e-wallets payment system (Lee & Khaw, 2018).

In light of the above discussion, not everything is rosy in terms of Malaysia e-wallet adoption in a comprehensive perspective. Digital Adoption Index published by the World Bank (2018), ranks Malaysia at 41 out of 180 countries, it categorically implies that the thrust of social participation is lacking when comes to of e-wallet adoption. Figure 5 illustrated in a contradicting viewpoint where steady gradient trajectory of cash circulation in the country even though there is some mark of lower growth in term of currency in circulation (Yusof, 2020), of which physical currency still hold it standing within the Malaysian society in term of means of purchase or commerce, and conversely also portrays uptick in economy growth. Regionally, much of Asia still perceived as a cash-based society, albeit Malaysia government effort in reducing cashless-ness, it is still considered laggard in term of its effectiveness (UBS, 2018).

FIGURE 2 Logical relationships of payment system. *Source*: Authors illustration

FIGURE 3 Electronic payments: Volume of transactions

FIGURE 4 Number of cards and users of payment instruments
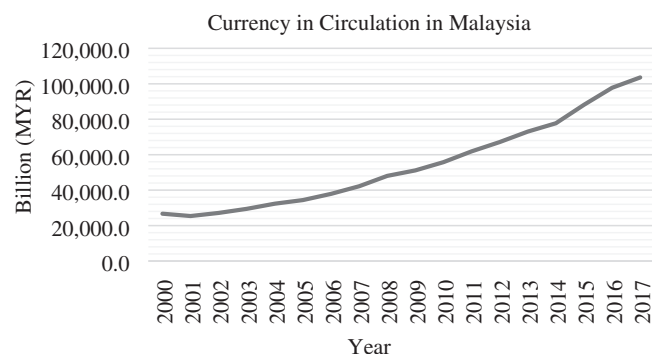
Currency in Circulation in Malaysia

FIGURE 5 Currency in circulation in Malaysia 2000–2017

These inexplicable oddities are somewhat bewildering, therefore, latching to the subtleties and evolution of electronic payment in the context of Malaysia, this study is essential in broadening the literature in which the investigation of usage and acceptance of e-wallet with added construct will permit in clearly elucidating the individual (*Malaysian*) intention to use e-wallet as method of payment. Henceforth findings from this study will provide rejoinder in achieving a whole cashless society as it can be considered that it is in early impetus of introductory of e-wallet in term of acceptance and use by the public. Davis (1989) noted that evaluating user acceptance at early stage will liberate any inefficient irrationalities. The purpose of this study is to asses and investigate the drivers of consumer acceptance and use of 'e-wallet' in Malaysia, by applying the extended unified theory of acceptance and use of technology (UTAUT2), as the focus of this study is generally related to technology application[6] and the model ability to weighed, measured and identify pertinent factors that prosper from complex multimodality of cultural, ages groups and new technology milieu (Venkatesh et al., 2012); in which Malaysia a developing country of which has aspiration to have an innovative economy, tick all the right boxes. The variables are as such, performance expectancy, social influence, facilitating conditions, hedonic motivation and habit, behavioural intention and adoption/usage of technology were suggested by Venkatesh et al. (2003). This study makes two important contributions to the existing literature. First, in distinguishing this study with existing literature, we have incorporated two theoretical additional constructs called 'trust' and 'perceived security' plus 'continuous adoption' as dependent variable; to best of our knowledge, none have applied this scheme of construct variables in addressing the intention of use when comes to e-wallet application. Second, from the review of past literature, limited studies in the context of Malaysia have been done in investigating 'e-wallet' intention of usage and adaptation specially by applying UTAUT2 model; this presents an opportunity in applying a comprehensive theoretical framework in which will provide a better understanding[7] in assessing 'e-wallet' intention behaviour and adoption among Malaysian consumers. Consequently, in an entire perspective, this will provide an exploration of the barrier in achieving the illusory cashless society.

The paper is structured as follows. Section 2 provides the literature review and motivation for the study and followed by propose the theoretical framework and hypotheses development. Section 3 describe the research methodology. Section 4 present the discussion of the findings. Section 5 outlines some policy implication, followed by concluding remarks, limitation and future research recommendation in Section 6.

2 | REVIEW OF LITERATURE AND MOTIVATION

The review covers two broad leitmotifs: (i) previous studies on the adoption of e-wallet electronic payment system in the context of developing countries (ii) research gap; electronic payment (e-wallets) in context of Malaysia. It is presented under the following sub-headings:

2.1 | Previous studies on the adoption of electronic payment system in the context of developing countries through remit of UTAUT2

In the study of electronic payment systems intention of use and adoption there has been a continual custom of applying mostly of TAM (Davis, 1989), UTAUT (Venkatesh et al., 2003), and UTAUT2 (Venkatesh et al., 2012) models on technology acceptance use and adoption. Where most of the budding literature is aimed at the developing countries as they are in the early stage of adoption and alternatively has the low adoption rate; which for the reason that the usage of UTAUT2 is prevalent among researchers. Moreover, developing countries has been portraying a high urged of consumerism due to newfound prosperity, this in term as altered and incentivize a bigger share global purchasing power from the 'global south' countries (Katharina Buchholz, 2019). For instance, several of existing study on adoption and intention to use of e-wallet in developing countries have been focusing on India. Singh et al. (2020) is their study explicated the determining factors in the adoption of e-wallet in India in which they found that that ease of use, usefulness, perceived risk, attitude had significant effect on user's intention to use a e-wallet. Additionally, they have developed a conceptual model based on UTAUT2 model

in which recommendation of use and perceived satisfaction is added as a dependent construct, and its significantly effect to intention to use. Similarly, Madan and Yadav (2016) in analysing the factors that affect consumers' adoption of e-wallet, it's been found that performance expectancy, social influence, facilitating conditions, perceived risk and perceived value to be significant factors in affecting behavioural intentions whereas effort expectancy is insignificant. They also found substantial effect on behavioural intentions. in by extending the UTAUT2 model with two additional construct which are perceived regulatory support and promotional benefits. Adopting a somewhat similar model approach, Soodan and Rana (2020) observe that by basing UTAUT2 model with three additional constructs, namely perceived security, general privacy and perceived savings, the finding shows that habit and effort expectancy construct is insignificant in the adoption of e-wallets, whereas other applied constructs depict a significant positive impact on intention to use e-wallet. Subsequently, Liébana-Cabanillas et al. (2020) through an inclusive model, found that perceived satisfaction, perceived usefulness, perceived risk and perceived trust affect intention to use e-wallet payment systems. Contrastingly, there also been a greater attention on research studies focusing on Southeast Asian region, varying from several neighbouring countries of Malaysia; Chaveesuk et al. (2019) ideated that UTAUT2 model is well suited in understanding the determinants of the continued use of cashless societies appliance in Thailand. Whereas in Vietnam, Nguyen and Huynh (2017) revealed that perceived risk and trust are important construct in electronic payment system adoption. In the study by Tun (2020) on Myanmar, trust and perceived usefulness factor had exudes significant effect on the behavioural intention to use mobile wallet, in similar area of study, Lwin and Thanabordeekij (2019) using UTAUT2 model ascertain performance expectancy, social influence, facilitating conditions, and habit factors influences behaviour intention. Additionally, Widodo et al. (2019) adopted an extended UTAUT2 model with two added new construct *(trust and perceived risk)* and found that habit, performance expectancy, trust, and facilitating conditions has significant influence on behavioural intention to adopt the digital wallet in Indonesia, while effort expectancy, social influence, hedonic motivation, and perceived risk shows insignificancy. Overall, this portrays an equivocal stance in term of result comparison, which iteratively develops from widely set of different socially binding consumer behaviour (Hamann & Omar, 2007). Thereby in accruing this enlightenment, a combination of different framework model should shed a new clarity in the context of Malaysia e-wallet adaption intention.

2.2 | Research gap; electronic payment system (e-wallets) in context of Malaysia

Notably there have been a strand of nascent research studies conducted particularly on Malaysia, in exploring the adoption of digital wallet electronic payment system using varied of technology adoption model and myriad of explanatory constructs.

Mun et al. (2021) explored the adoption of e-wallet using an extended TAM model; the study found that all casted construct (*perceived usefulness*, *perceived ease-of-use*, *perceived credibility and social influence*) to have a significant effect on of behavioural intention, case in point the most significant predictor was perceived usefulness. Following the same narrative, Karim et al. (2020) found that perceived usefulness and perceived ease of use, with addition of privacy and security has significant effect on behavioural intention which positively support e-wallet use; a similar result was attain by Alaeddin et al. (2018). Likewise, Jin et al. (2020) added in marketing framed factors in an extended TAM model (*social influence*, *price value*, *social media and brand image*), and found that a significant relationship between perceived usefulness, perceived ease of use, social influence, brand image and behavioural intention. In contradiction, Altounjy et al. (2020) found that perceived usefulness is the only significant construct, where perceived ease of use is insignificant when comes to effecting mobile payment Leong et al. (2020) also pointed through the positioning an extended TAM model, perceived usefulness and perceived ease of use are main the construct in dictating the intention to use the mobile payment in the Borneo state of Sarawak, East Malaysia. Importantly, the perceived compatibility affirms as an interacting construct compared to perceived security, user mobility, and personal innovativeness. Tang et al. (2014) is considered one of the first study to apply UTAUT2 model in exploring behaviour intention of e-wallet adoption in the context of Malaysia. The finding of the study ascertains that while performance expectancy, effort expectancy, facilitating conditions, hedonic motivation, and habit were positively associated with the intention to use displays a significant relationship with behavioural intention construct, it is contrary for the price value and social influence. In another study, Tenk et al. (2020) found perceived risk and perceived value were insignificant to the construct of behavioural Intention, through the application of UTAUT model. A closely related substantiated study, Moorthy et al. (2019) using unpretentious UTAUT2 model was able to conclude that effort expectancy and social influence insignificant relationship towards behavioural intention to adopt mobile payment.

Among the sums of concoction equivocal finding, it can be ascribed that in the research application of

Malaysia e-wallet adoption of variegated constructs and technology acceptance models, 'trust' and 'continuous adoption' constructs through the UTAUT2 model where more or less discarded (see Table 1 for summarization outlook). As such this study will apparently incentivize in filling the existing research gap so that an accurate and apposite heterogenous result is obtained.

2.3 | Theoretical framework and hypotheses development

As this study is based on the user intention basis on the adoption of specific technologies which is the mobile allied electronic payment acronym known as 'e-wallet', several models and theories of acceptance have been used in understanding the intentions and usage of technologies; technology acceptance method (TAM) (Davis, 1989), innovation diffusion theory (IDT) (Rogers, 1995), unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003), theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), theory of perceived risk (TRP) (Featherman & Pavlou, 2003), technology readiness index (TRI) (Parasuraman, 2000) and lastly is the extended version of UTAUT called unified theory of acceptance and use of technology 2 (UTAUT2) (Venkatesh et al., 2012).

In conjunction of that, UTAUT2 model will be utilized for this study compared to the model stated above. The reason because UTAUT2 incorporates three additional constructs, which are hedonic motivation (HM), price value (PV) and habit (HB). Aside to that UTAUT2 is embedded with the context of consumption in order to explain the intention behaviour of adopting new technology compared to the UTAUT which developed for organizational context. UTAUT2 was affirm by Rondan-Cataluña et al. (2015) of having more effectiveness in analysing consumer construct compared to other technology acceptance models. Also, the construct of price value (PV) will be discarded due to lack of application in this study as electronic payment (e-wallet) does not demand any cost of usage in Malaysia. Moreover, effort expectancy construct was excluded as it be found to be nonweighty constructs as outcome of the pilot test. As to that, Figure 6 illustrate proposed conceptual model deriving from hypothesized relationship.

2.3.1 | Performance expectancy

Performance expectancy refers as the benefits receive to an individual by extent of usage of a technology for a certain activity; this construct is the strongest predicator of

TABLE 1 Summary of studies of electronic payment (e-wallets) in context of Malaysia as for the area of study

Studies	Basis applied model	PEX/PU	EE/PEOU	SI	HM	PV	HB	TS	FC	PR	PS	PC	BI	UB/CAPD
Leong et al. (2020)	TAM	✓	✓								✓		✓	
Mun et al. (2017)	TAM	✓	✓	✓								✓	✓	
Karim et al., 2020	TAM	✓	✓								✓		✓	✓
Tang et al. (2014)	UTAUT2	✓	✓	✓	✓	✓	✓		✓				✓	
Jin et al. (2020)	TRA/TAM	✓	✓	✓			✓				✓		✓	✓
Tenk et al. (2020)	UTAUT	✓	✓	✓					✓			✓	✓	
Moorthy et al. (2019)	UTAUT2	✓	✓	✓	✓						✓		✓	
Alaeddin et al. (2018)	TAM	✓	✓							✓			✓	
Altounjy et al. (2020)	TAM	✓	✓							✓			✓	
Our study	UTAUT2	✓		✓	✓		✓	✓	✓		✓		✓	✓

Abbreviations: BI, behavioural intention; CADP, continuous adoption; EE, effort expectancy; FC, facilitating conditions; HB, habit; HM, hedonic motivation; PEOU, perceived ease of use; PEX, performance expectancy; PR, perceived risk; PS, perceived security; PU, perceived usefulness; PV, price value; SI, social influence; TS, trust; UB, user behaviour.
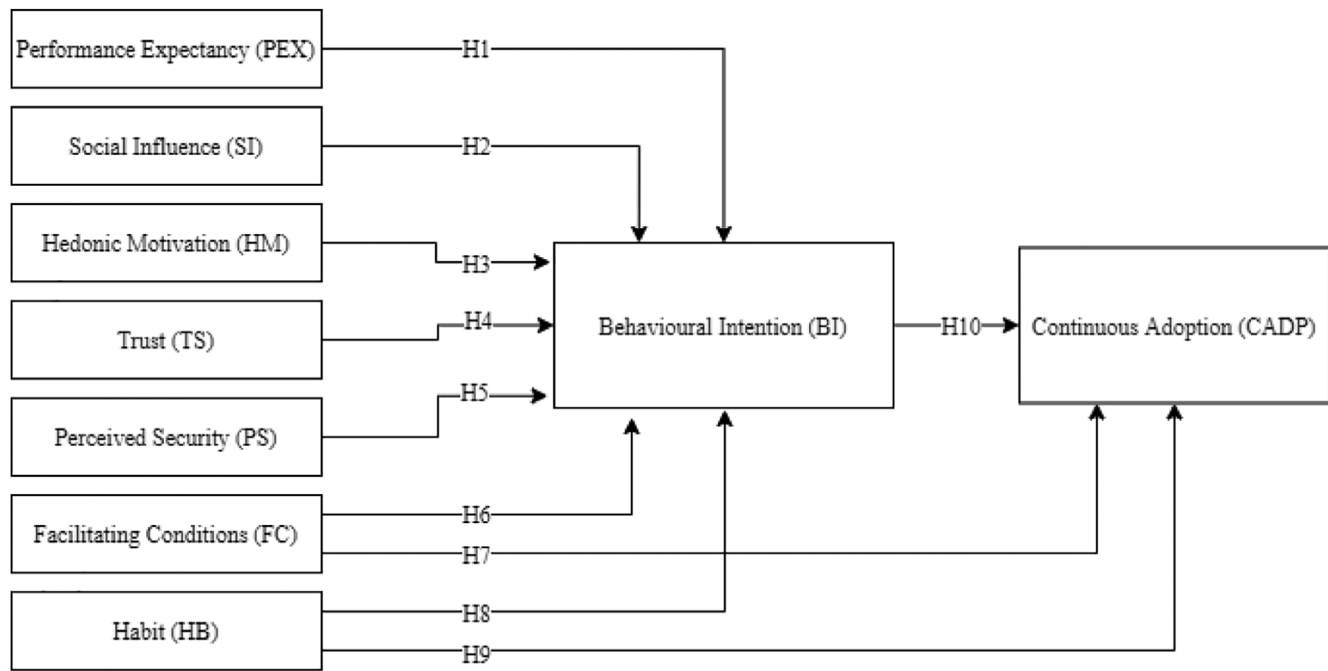
FIGURE 6 Conceptual model and hypotheses

behavioural intention (Venkatesh et al., 2003, 2012). It has been considered a core determinates of new technology acceptance, especially when come to capturing the effects of user behavioural intention (Beh et al., 2019; Maruping et al., 2016; Venkatesh et al., 2003). In the context of digital wallet electronic payment system, commerce transaction occurrence between two parties in is efficacy when technology *(electronic payment)* usage is adopted. Hence, the following hypothesis is proposed:

> **H1.** *Performance expectancy has positive effect on individual behavioural intention to adopt e-wallet payment system.*

2.3.2 | Social influence

Social influence is referred as 'the extent to which an individual perceives that important other believe he or she should apply the new system' (Venkatesh et al., 2003, p. 451); it can be close relatives, spouse, or employed firms. As for technology acceptance studies, social influence construct has been applied frequently and have largely provide a positive impact on behaviour intention (Chen et al., 2019; Jain & Singhal, 2019; Khalilzadeh et al., 2017; Qasim & Abu-Shanab, 2015). For illustration, social influence were articulated as the primary agent in the use of new system, it is because that the individual is specifically influenced by positive

reassurance and motivation to conform (Brata & Amalia, 2018; Fishbein, 1979). Therefore, the following hypothesis is proposed:

> **H2.** *Social Influence has positive effect on individual behavioural intention to adopt e-wallet payment system.*

2.3.3 | Hedonic motivation

Hedonic motivation is defined as the inherent enthusiasm of an individual to relate fun and enjoyment from using a designated technology (Brown & Venkatesh, 2005). Van Der Heijden (2004) postulated that adding the construct of enjoyment through TAM can contribute to high frequency of use. Van der Heijden (2004, p. 696) states, 'in its purest form, interacting with a hedonic system is designed to be an end in itself'. Going forward, Venkatesh et al., 2012 embeds hedonic motivation to UTAUT2 as because they propagate that is provides robust predicator of behavioural intention; Previous studies have been done through UTAUT2 adoption of hedonic motivation in relating with behavioural intention provides mixed result due to the difference in study variables (Baabdullah et al., 2019; Beh et al., 2019; Shaw & Sergueeva, 2019; Tseng et al., 2019). Therefore, it is sensible to add hedonic motivation to understand behavioural intention as different scenario provide different relationships. Hence, the following hypothesis is proposed:

H3. *Hedonic motivation has positive effect on individual behavioural intention to e-wallet payment system.*

2.3.4 | Trust

Construct of trust can be defined as 'outcome of repeated interaction between rational self-interested players who maximize their long-run material payoff' (Reiersen, 2017, p. 17). It one of an important amalgamating factor between individual and business (Humphries & Wilding, 2004; Utz et al., 2012; Dwyer et al., 1987). As to that failure of trust during a specific transaction of good and service through technology will have a severe negative consequence to a business (Gefen & Straub, 2004; Kim et al., 2011; Malaquias & Hwang, 2016), this in term contributes to an economic inaction (Fehr & Rockenbach, 2003; La Porta et al., 1997). In the context of electronic payment technology, the question of user trust plays a pinnacle role of weighing intention to use and adopt (Arvidsson, 2014; Dinh et al., 2018; Indrawati & Putri, 2018; Park et al., 2018; Williams et al., 2017; Zhou, 2013); it is normally because question of the risk and vulnerability due to spatial separation. Thus, the construct of trust can be and one of important construct influencing behavioural intention (Beldad et al., 2010; Merhi et al., 2019). For example, Nguyen and Huynh (2017) unearthed that trust plays an important role on the adoption of electronic payment[8] in Vietnam, which situated the same region of Malaysia. In applying the same narrative, Tun (2020) for instance found that the trust construct significantly affects behaviour intention to use e-wallet in Myanmar. Additionally, as e-wallet applies through mobile, Zhou (2014) succinctly put it 'high perceived risk associated with using mobile payment, building users' initial trust is critical to their adoption and usage' (p. 1528). Hence, the following hypothesis is proposed:

H4. *Trust has positive effect on individual behavioural intention to adopt e-wallet payment system.*

2.3.5 | Perceived security

Perceived security is defined as 'the extent to which a user believes that the channel or platform for transaction will be secure' (Chawla & Joshi, 2020, p. 3). In e-wallet payment context, payment transaction is done digitally through the internet-based, this commonly tends to attribute vulnerability when comes to fraudulent activities (e.g., phishing or hacking personal data and payment account). Security concern is the major barrier in achieving high e-wallet adoption rate, and lack of standards for security constitute the major hurdle (Caldwell, 2012; Hassan & Shukur, 2019). The changes of security breach are considered to be high in the developing countries, as the security requirement and monitoring is still in its infancy stage. Merhi et al. (2019) reported perceived security factor has an influence on intention to adopt mobile banking. Studies shows perceived security constructs positively affect behaviour intention when comes to electronic payment adoption (Moorthy et al., 2019). Whereas, for both these constructs, Morosan and Defranco (2016) found no significant influence between them. Therefore, it is pertinent to test the following hypothesis:

H5. *Perceived security has positive effect on individual behavioural intention to adopt e-wallet payment system.*

2.3.6 | Facilitating condition

Facilitating conditions refers to an individual perceive degree of conceptualization to the availability of organization and technical infrastructure that can facilitate the use of certain technology or system (Venkatesh et al., 2003). In connotation to UTAUT2 framework, Venkatesh et al. (2012) shows that there is a direct relationship when comes to the construct of facilitating condition and behavioural intention. As to that, several studies have been applied using the construct of facilities condition through UTAUT2 framework in unravelling its relationship with behavioural intention to accept specific technology(e.g., mobile apps, mobile health, wi-fi, massive open online courses, social network sites, animation); some have led to a positive relation (Aswani et al., 2018; Nisha et al., 2019; Palau-Saumell et al., 2019; Tseng et al., 2019) while some negatively (Dajani & Hegleh, 2019; Herrero et al., 2017). In the context of electronic payment, electronic machinery that is mobile phone is needed as a medium in providing the technology to the customer, with that skill and knowledge is needed for a smooth usage. Therefore, the following hypothesis is suggested:

H6. *Facilitating Condition has positive effect on individual behavioural intention to e-wallet payment system.*

H7. *Facilitating Condition has positive effect on continuous adoption of e-wallet payment system.*

2.3.7 | Habit

Habit is 'the extent to which people tend to perform a behaviour automatically because of learning' (Ramírez-

Correa et al., 2019, p. 87). The construct habit was included in UTAUT2 framework because it was contended that insentient action influential factor in understanding behaviour intention (Venkatesh et al., 2012). Notion of habit can be considered a strong stimulus for an individual's decision, to the point that it overtakes strategies and information (Gefen, 2003); by that it is considered as main factor for future technology use (Kim & Malhotra, 2005). Erstwhile relevant studies found that habit as an important construct in predicating behavioural intention to use technology (Alajmi, 2018; Eneizan et al., 2019) and concurrently influence on continuous adoption. Therefore, the following hypothesis is proposed:

> **H8.** *Habit has positive effect on individual behavioural intention to adopt e-wallet payment system.*

> **H9.** *Habit has positive effect on continuous adoption of e-wallet payment method.*

2.3.8 | Behavioural intention

Armitage and Christian (2003) defined behavioural intention as 'a choice a person makes in order to take a certain course of action' (p. 188). The construct of behaviour intention according to Venkatesh et al. (2003) posit as a determining factor for the dependent variable of use behaviour/continuous adoption, which generally has positive relationship. Thus, the following hypothesis is proposed:

> **H10.** *Behavioural intention has positive effect on continuous adoption of e-wallet payment system.*

3 | METHODOLOGY

3.1 | Measurement

We used questionnaire-based survey to collect the information required to test research objective for this study. The questionnaire follows five-point Likert scale style to measure user's intention and continuous adoption of e-wallets and these styles was adapted from Bhatti and Qureshi (2007) ranking as 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree). Likert-scale approach, the respondents are expected to select a better choice to measure their stand on question being asked in the question.

3.2 | Data collection and sampling procedure

As mentioned in earlier section, the data collection was done via self-administered questionnaire. Questionnaires were distributed to users of e-wallets and to make sure that our respondents really use the e-wallets or not, we just observe in each groceries shop such as 99 Speed mart, Tesco, 7-Eleven, KK Mart and many others and see how many customers are using e-wallets for transaction purpose. We target those customers as our target respondents. We selected two most economically developed states for this research, namely Selangor and Kuala Lumpur and there are greater number of shops in these two states using e-wallets system for transaction purpose as compared to other states. The sampling we opted was judgemental sampling method and employed using the following approaches:

1. distributing the questionnaire to respondents on the spot after they have done with their transaction.
2. directly approach the respondents and,
3. approach working colleagues and universities students who utilize e-wallets system.

A total of 200 respondents participated in the survey. However, only 171 (85.5%) out of the 200 questionnaires were used for analysis purpose. The reason for dropping 29 questionnaires is mainly caused by the incomplete response by respondents and in some cases, they used internet banking, not e-wallets.

The questionnaire included two sections, namely (i) demographic profiles of the respondents and, (ii) factors influencing the behavioural intention and continuous adoption of e-wallets. The demographic profiles such as: sought were gender, age, marital status, educational level, occupation, monthly income, race and are thy using e-wallets or not. Behavioural intention was measured by the seven factors as mentioned in the research framework while the adoption of internet banking was measured by behavioural intention. Since the medium of instruction in Malaysia is Malay language (Bahasa Melayu), but we have opted to use English as the language for our questionnaire due to the fact where a majority of Malaysian can speak English as their second language. The Malay version is provided upon, in case if they needed due to language problem.

We have carried out pilot test for validation of questions in the questionnaire by distributing to 30 users of e-wallets system. They are required to answer the questions and feel free to comment either positive or

negative pertaining to validity of questions being asked. A total of 28 questionnaires were collected during this process and respondents are happy with the questions and provided feedbacks where the questions are clear in terms quality and clarity. Once done with pilot test, we have started progressively to distribute questionnaires to the respondents. SmartPLS software were used to analyse the result. We opted this software is due to the facts where the PLS can be used examine the constructs' reliability and validity from a particular theoretical framework and also allow the constructs are estimated simultaneously (Thakur & Srivastava, 2014). Furthermore, the measurement of parameters and structural path coefficients are also tested using this approach. It is also important to emphasize that the PLS approach is getting popular and mostly used in information science research. According to Bock et al. (2005) and Chin et al. (2003), PLS has many advantages particularly related to sample size, minimal restrictions on measurement scales and residual distributions. We have also carried out the Cronbach Alpha examination. It is very clear that most of constructs are scores the value above 0.70 which reflects that all constructs' items have achieved the required level of internal consistency and acceptable satisfied reliability criteria (Nunnally, 1978).

4 | DISCUSSION OF FINDINGS

4.1 | Demographic profiles

The summary statistics of respondent's characteristics involved in this survey setup is shown in Table 2. The respondents sample consisted of male (47.4%) and female (52.6%). Of the respondent age category, the majority age group were between under 25 years old and followed by 26–49 years old, which were consistent with several prior studies as the designated consumer age groups extubate is precision validity in term of the behaviours (Andrews & Herzog, 1986). In itself, collected sample of respondents represent a comprehensive representation. As for the martial status, the majority respondent was married (57.3%). In term of education level, the dominant group were bachelor's degree holder (68.4%). Regarding income level, the majority respondent group are the RM1000-RM2999 and RM3000-RM4999 earners.

Items' loadings, average variance extracted (AVE), and composite reliability (CR) were critically analysed (see Table 3), for the purpose of testing convergent validity. It shows that the items' loadings were more than 0.6, which fulfilled the value counselled by Hair et al. (2017).

Providing other items have high scores of ladings to complement AVE and CR, the computed indicator loadings (0.7, 0.6, 0.5 and 0.4) are considered well adequate. Additionally, few listed items that derived less than expected indicator loadings value have been dropped due to evade fitness of model issue. In the same way, AVE were place in the range of 0.537 and 0.727, which Hair et al. (2017) noted as acceptable (AVE > 0.5). Correspondingly, the value of CR ranged from 0.725 to 0.812 is also satisfied with Hair et al. (2009), which pointed it should be in between 0.7 and 0.9.

4.2 | Measurement models

In continuation, discriminant validity was tested through Fornell–Larcker (1981) analysis, even though the method has criticized of not having the means to detect the nonexistence of discriminant validity (Henseler et al., 2015), it will be employed in this study for the purpose of reference and assessment. Table 4 illustrate the result of the analysis, which shows all construct attributes sufficient discriminant validity (Fornell & Larcker, 1981).

Another method to enhance the Fornell and Lacker criterion, will be the Heterotrait–Monotrait (HTMT) ratio of correlations, which can be said a robust technique as shown in Monte Carlo simulation study. Table 5 present the results of the HTMT test, where the values of $HTMT_{0.85}$ and $HTMT_{0.90}$ satisfy the requirements (see Gold et al., 2001; Kline, 2011). Consequently, the measurement model possessed discriminant and acceptable validity.

Analysis of collinearity through the Variance Inflation Factor (VIF) is illustrated in Table 6. Based on broadly practice, if the value of VIF is lesser than 10, there is no existence of multicollinearity issue, which correspond that the designated variables are fitted with the prerequisite (Gujarati, 2014). The equation of VIF calculation as follows:

$$VIF_j = \frac{1}{1 - R^2 j}$$

where, $R^2 j$ represents the multicollinearity coefficient.

4.3 | Assessment of structural model

The R^2 indicate the overall goodness of the structural model. As per highlighted by Hair et al. (2011), R^2 measure coefficient of determination and significance level of path coefficients (beta). The R^2 obtained for this

TABLE 2 Demographic profiles

Group		Frequency	Percentage (%)
Gender	Male	81	47.4
	Female	90	52.6
Age	Under 25	75	43.9
	26–49	58	33.9
	Above 50	38	22.2
Marital status	Single	64	37.4
	Married	98	57.3
	Divorced	9	5.3
Educational level	Higher school certificate	26	15.2
	Degree	117	68.4
	Postgraduate	28	16.4
Occupation	Public sector	54	31.6
	Private sector	62	36.3
	Self-employed	19	11.1
	Others	36	21.0
Monthly income	RM1000 – RM2999	84	49.1
	RM3000 – RM 4999	75	43.9
	Above RM5000	12	7.0
Race	Muslim	51	29.9
	Chinese	87	50.9
	Indian	26	15.2
	Others	7	4.0
Are you using e-wallets	Yes	148	86.6
	No	23	13.4

Note: This table shows the measurement model test which was carried out in the initial stage. Most of the values are consistent with the rule of thumb as suggested by Hair et al. (2009). The measurement tests for items' loadings, average variance extracted (AVE), and composite reliability (CR) accordingly. The number of sample size used are 171.

study were: for behavioural intention to use e-wallets is 0.74 (74%) while for continuous adoption of e-wallets is 0.63 (63%). Meaning, 74% of the variance of behavioural intention in using e-wallets is explained by PEX, SI, HM, TS, PS, FC, and HB while 63% of continuous adoption can be explained by behavioural intention. For further confirm validity of the model, we have also performed path coefficient of the structural model and bootstrap analysis and the results shown in Table 7, which also showing that nine hypotheses out of 10 are having a statistically significant relationship. Further discussion on the statistical relationship are given below.

4.4 | Discussion of results

This research successfully tested a model to measure behavioural intention and continuous adoption of

e-wallets in Malaysia using UTAUT2. The UTAUT2 seems to be well explained these two factors and we have also slightly changed the model of UTAUT2. For example, we did not incorporate effort expectancy and price value as: (i) need to drop as there are multicollinearity issue and (ii) unable to explain the behavioural such as price value, is not relevant in the context of Malaysia as e wallets are freely available without any monetary costs. Although, three factors have been dropped, we have incorporated other two significant factors such as trust (TS) and perceived security (PS) which could have more explanatory power in explaining adoption of e-wallets. This study is believed as one of the first empirical dealing with such matter especially on continuous adoption of e-wallet together with behavioural intention.

Firstly, PEX is positively significant to behavioural intention to use e-wallets in Malaysia ($\beta = 0.304$). As highlighted in literature review section, this variable capture individual perception towards facilitation of

Constructs	Items	Loadings	AVE	CR
Performance expectancy (PEX)	PEX4	0.640	0.681	0.803
	PEX6	0.975		
Social influence (SI)	SI17	0.610	0.620	0.725
	SI18	0.881		
Hedonic motivation (HM)	HM20	0.632	0.590	0.812
	HM22	0.958		
	HM24	0.689		
Trust (TS)	TS26	0.695	0.727	0.808
	TS29	0.626		
Perceived security (PS)	PS31	0.624	0.603	0.746
	PS32	0.904		
	PS35	0.912		
Facilitating conditions (FC)	FC38	0.613	0.537	0.741
	FC40	0.605		
	FC42	0.864		
Habit (HB)	HB45	0.742	0.652	0.787
	HB46	0.709		
	HB48	0.895		
Behavioural intention (BI)	BI50	0.825	0.557	0.790
	BI52	0.718		
	BI54	0.690		
Continuous adoption (CADP)	CADP56	0.774	0.664	0.790
	CADP55	0.967		
	CADP57	0.626		

Note: This table shows the measurement model test which was carried out in the initial stage. Most of the values are consistent with the rule of thumb as suggested by Hair et al. (2009). The measurement tests for items' loadings, average variance extracted (AVE), and composite reliability (CR) accordingly. The number of sample size used are 171.

TABLE 4 Discriminant validity using Fornell and Lacker criterion

	CADP	BI	FC	HB	HM	PEX	PS	SI	TS
CADP	0.815								
BI	−0.297	0.746							
FC	−0.104	0.225	0.704						
HB	−0.096	0.541	0.292	0.807					
HM	−0.065	0.210	−0.086	0.136	0.773				
PEX	−0.054	−0.210	−0.060	−0.067	−0.078	0.825			
PS	−0.056	0.098	−0.048	0.029	−0.012	−0.019	0.776		
SI	−0.010	0.164	0.031	−0.025	0.024	−0.123	0.003	0.694	
TS	−0.101	0.201	0.132	0.166	0.098	0.059	0.186	−0.013	0.662

Note: This table reported the test of discriminant validity using the method called Fornell and Lacker Criterion. As for the fitness of discriminant validity based on this technique, the square root of AVE of a construct should be larger than the correlations between the construct and other constructs in the model. The number of sample size used are 171.

TABLE 5 HTMT criterion

	CADP	BI	FC	HB	HM	PEX	PS	SI	TS
CADP									
BI	0.477								
FC	0.195	0.387							
HB	0.250	0.487	0.655						
HM	0.129	0.267	0.227	0.224					
PEX	0.109	0.304	0.174	0.116	0.118				
PS	0.303	0.192	0.291	0.159	0.100	0.224			
SI	0.134	0.736	0.499	0.363	0.591	0.601	0.423		
TS	0.236	0.473	0.474	0.470	0.349	0.185	0.821	0.648	

Note: This table shows the result of the heterotrait–monotrait (HTMT) test. This test is used mainly to determine whether there is discriminant validity in the model. The rule of thumb for this test is based on Kline (2011) and Gold et al. (2001). The sample size used are 171.

TABLE 6 Collinearity statistics VIF values

Constructs	PEX	SI	HM	TS	PS	FC	HB	BI	CADP
VIF	1.262	1.002	1.443	1.016	1.055	1.172	1.114	1.219	1.199

Note: This table reports the analysis of VIF. The VIF testing is used to check for multicollinearity problem in the model. If the values are less than 10, there is no existence of multicollinearity issues in the model and vice versa. The number of samples is 171.

TABLE 7 Results of structural model

Hypothesis	R/ship	Path coefficient	Std. error	*t*-value	Significance (yes/no)
H1	PEX –> BI	0.304	0.084	3.603***	Yes
H2	SI –> BI	0.153	0.068	2.246**	Yes
H3	HM –> BI	0.126	0.068	1.857**	Yes
H4	TS –> BI	0.098	0.058	1.685*	Yes
H5	PS –> BI	0.068	0.074	0.913	No
H6	FC –> BI	0.387	0.125	3.101**	Yes
H7	HB –> BI	0.479	0.066	7.305***	Yes
H8	FC –> CADP	0.195	0.112	1.741*	Yes
H9	HB –> CADP	0.250	0.114	2.197**	Yes
H10	BI –> CADP	0.477	0.122	3.893***	Yes

Note: This table shows the results of the structural model using Partial Least Square (PLS) version 3.
*The sign denotes significance at 10%;
**The sign denotes significance at 5%;
***The sign denotes significance at 1%.

information system in zenith of tasks. The significant result shows utilitarian worth which linked with intention to use e-wallets (Macedo, 2017). Furthermore, PEX has been considered as one of eminent factors that influencing public to use technology or information system relate matters (Dwivedi et al., 2017). Similarly, the existing literature support the view where PEX has positive impact on the use of technology especially mobile payment for specific transactions (Alalwan et al., 2017; Alalwan et al., 2018; Martins et al., 2014; Taiwo &

Downe, 2013; Zhou et al., 2010). Similarly, SI is also significant towards BI of E-Wallets ($\beta = 0.153$). This is very common whereby social influence will influence an individual to try out the specific products as well. The encouragement given by a group of people, opinion leaders, friends, colleagues, and the family members will definitely add to interest to an individual to try out the application or products (Alalwan et al., 2016; Zhou et al., 2010). The role of SI in enhancing the customer intentions and the use of internet banking has been

widely supported in prior studies (Ali et al., 2015; Hong et al., 2008; Kaabachi & Obeid, 2014; Shih & Fang, 2004 & Thaker et al., 2020). In addition, we also notice that HM is having direct relationship with the BI with path coefficient of $\beta = 0.126$. Meaning that, feeling or emotion while use e-wallets plays an important role in capturing user's intention to use this system. Users also find comfort in using the system as it can relax and make their life easy especially when involve in transaction. In addition, some e-wallets also offer games, coupon vouchers, rebates, advertisements which believe to offers pleasure to users. This tends to increase the intention of using the system. These views are also consistent with existing literature such as Alalwan et al. (2016) and Alalwan et al. (2017) where authors confirmed that HM is considered as one of the strong influencers of users' intention.

Furthermore, TS is positively influence BI ($\beta = 0.098$) indicates the users are trust with the system and feel safe in providing personal and financial information although this information may create in their minds with regard to security level of that particular system (Zhou, 2013). However, the issue aside, previous literature argued that trust is significantly plays an important role in measuring adoption and continuous usage of the information system (Gao et al., 2015; Khalilzadeh et al., 2017). In Malaysia, government of Malaysia had assured the e-wallets is safe for transaction purpose and the Sun Newspaper (Jan 17, 2020) reported that Malaysian spend RM10 million on launch day of E- cash. This fact revealed that users are conveniently used the system and they trust the system which can lessen their transaction jobs. We also notice that PS is positively significant to the behavioural intention to use e-wallets. The path coefficient indicates direct association where ($\beta = 0.068$) where users of this system believes that by using such system is secure from any scam issues and any other equivalent matters. This is very common in digital transaction when it is very important for the service provider to make sure the system is secure and can operate nicely (Shin, 2009; Rakhi & Mala, 2014). Security risk is considered as one of important factors contributing to unfavourable and medium growth of users' intention to use e-commerce (Siau & Shen, 2003). In the study by Patel and Brown (2016), author argued that because of some issue in security part in e-commerce, the intention to use digital service drop significantly in Ahmedabad, India. This literature shows the importance of this variable and how security can play an important role from users' perspective. In the context Malaysia, although this variable is having positive association, but it is not significant. This could be due to fact where e-wallets service providers assure that digital transaction is free from security issues, and it is governed

by Bank Negara Malaysia (Central Bank of Malaysia). Users also feel confident in performing transaction because their transaction is protected, and refund is available for any unauthorized transaction given a valid reason.

In addition, FC seem to be significant at both sides where FC is having direct relationship with BI ($\beta = 0.387$) and CADP ($\beta = 0.195$). This result prevails an advance network infrastructure that is in placed at Malaysia through conducive government policy and investment, which provides a facilitating condition for a user intention (BI) to continuous adopt e-wallet (CAPD). Basically, this element focuses into technical assistance or supports available during the usage of any particular digital application (Venkatesh et al., 2003). Looking into e-wallets application, users in any circumstances, need assistance in terms of skills to use, facilities description, security related, FAQ, and so forth. If there are better FC supports are available, the user's willingness to use and continuously adopt the system will be higher. This is also consistent with Akour and Dwairi (2011), Alwahaishi and Snásel (2013), Yu (2012) and Zhou et al. (2010) where they are argued that FC has positive impact on behavioural intention and continuous usage or adoption of technology.

We found HB is positively affecting BI ($\beta = 0.479$) and CADP ($\beta = 0.250$) and it is significant at 5% and 1%. Increased in familiarization of the usage tends to have an advantage to habitual technology usage, which can be observed through the result of HB having direct and indirect relation with BI to continuously adopt e-wallet (CAPD). According to Venkatesh et al. (2012); Limayem et al. (2007); Kolodinsky et al. (2004), habit found to be positively influenced the intention to use and adoption of actual usage of technology. This is because habit confirmed as a predictor of human behaviour (Pavlou & Fygenson, 2006); Finally, BI has positive significant relationship with CADP of e-wallets with path coefficient ($\beta = 0.477$) in Malaysia. This variable is considered as one of the important strong variables which forecast individual behaviour towards adoption of technology (Ajzen, 1985; Venkatesh et al., 2003, 2012). The existing literature confirms that that user's intention found to be a pivotal driver of the adoption or continuous usage of technology (Raza & Hanif, 2013; Shih & Fang, 2004 & Zhou et al., 2010). The validated model is shown in Figure 7.

5 | POLICY IMPLICATIONS

We claim two implications. Firstly, on theoretical perspective. The status of research on e-wallets in Malaysia
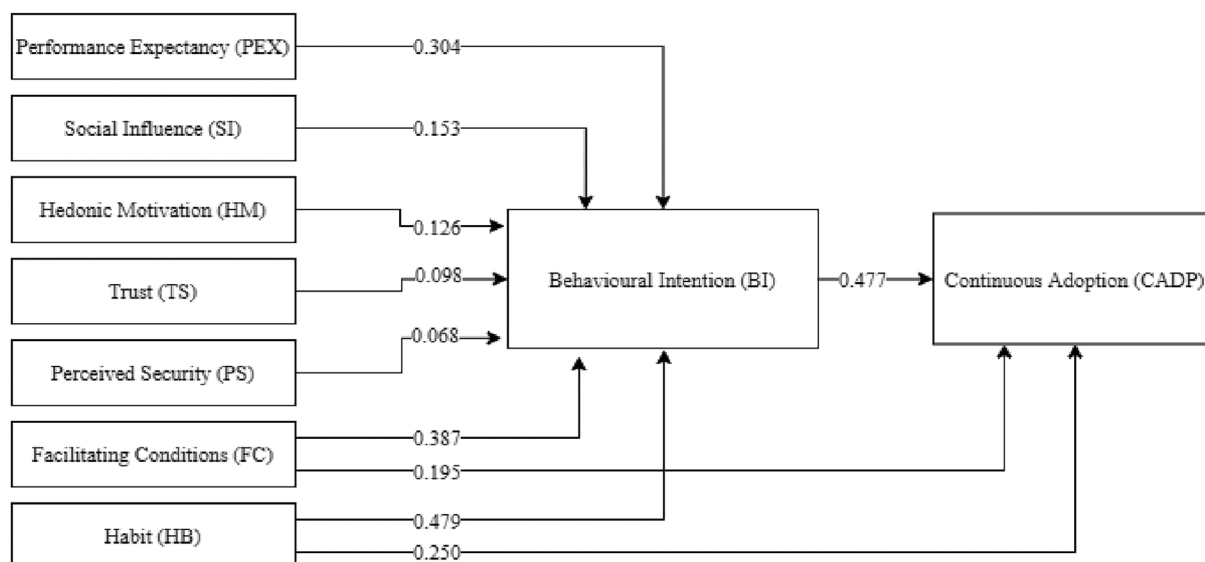
FIGURE 7 Validated model

is limited as most of the studies tend to focus on internet banking, mobile banking and e-commerce. The recent studies by Jin et al. (2020) and Dawi (2019) focuses on e-wallets, but the framework fairly look at the behavioural intention and proposed framework. We intend to extend it the by zooming into what cause users to continuously adopting in their transaction using e-wallets in Malaysia as none of existing studies (to the best knowledge of authors) analyse from this dimension. This study is expected to contribute to the body of knowledge especially in enriching literature on digital transaction and cash less society. To differentiate our study with existing literature, we have also included robust elements in the UTAUT2 framework such as trust and perceived security which were rarely evident in the literature. The findings from this study will pinpoint some important key elements to the policymaker/government with regard to policy implementation considering cash less society and enhancing digital transaction. This kind of analysis will yield key findings to the Malaysian government especially when it comes to policy implementation, which in indirectly decipher the government motivation of achieving cashless society.

Secondly, on managerial implication, there are several recommendations: firstly, e-wallets service providers need to make sure their platform able to serve efficiently, securely and operate within minimal time (to gather information and transaction is done successfully) as required by users in order to users to continuously use the system (Chiu et al., 2010; Rana et al., 2014). The expansion of various range of product coverage that can accept digital transaction is also required because the ultimate objective of digital transaction is to ease the

user's life. Right now, in Malaysia, the product coverages are limited and only can be use in certain shops and with this kind of arrangement, it is expected user's perception towards e-wallets will improve further and support the role pf performance expectancy (Zhou, 2012; Zhou et al., 2010). Secondly, on social influence and habit, one common recommendation would be in the form of more campaign needed pertaining to digital world. This must be promoted in rural area as their level of financial literacy is relatively low compared or urban resident. One way to promote aggressively the usage through: (i) provide a very good internet connection to rural area, (ii) when the internet is good, the promotion can be done via cost effective such as YouTube, Facebook, Twitter and any other equivalent platforms to explain the importance of this system and breaking new ground. As society become more knowledgeable, the more impact could have been improved especially in terms of adoption and also their habit to use it continuously (Chen et al., 2014).

Furthermore, the needs for more customization, high quality and creative interface design based on users' taste and preferences required which later will be an attractive point to users to adopt the e-wallets system given the facts of innovation and uniqueness (Dwivedi et al., 2013; Dwivedi & Irani, 2009). This is fruitful recommendations is under hedonic motivation. In terms of facilitating condition, the level of easiness to use need to further enhance. Explaining to them the benefits of e-wallets especially those who are from a rural area and 24/7 call centre to deal with the problems such as failed transaction, system was hacked, system down etc. of digital transaction must also be enhanced. This is because not all call services available especially after midnight and

some are not even connected to the line (Simintiras et al., 2014; Yousafzai et al., 2005). This will somehow influence users trust on the system and convince them to use it given proper assistance are provided.

Finally, in terms of perceived security, although this factor is not significant in our finding, but it is an important item. To increase security while users are involving in transaction, perhaps service providers may incorporate biometric validation when users confirming their transaction. Right now, most of the e-wallets system using pin code validation, we suggest, together with pin code and biometric validations such as fingerprint or iris validation, would be add more value to the system and increase users trust and confidence level in using the system (Poon, 2008). To increase further the level of trust and perceived security from user's perspective, we also would like to recommend service providers to come out a plan called money -back- guarantee policy if any fraud or scam activities involved. Given the accuracy of case and terms and conditions, service provider could consider this plan (Alalwan et al., 2018; Gan et al., 2006; Martins et al., 2014).

6 | CONCLUSION, LIMITATIONS AND FUTURE RESEARCH RECOMMENDATIONS

The primary objective of this study is to measure behavioural intention and continuous adoption of e-wallets payment system in Malaysia. We use two major states in Malaysia to measure research objective, Kuala Lumpur and Selangor. The UTAUT2 has been adopted and used in this study for analysis purpose. The variables are: PEX, SI, HM, TS, PS, FC, HB, BI and CADP. The questionnaire data was collected from 171 sample of respondents and analysed using the Partial Least Square (PLS). Out of 10 hypothesis, nine hypotheses were supported and the R^2 value for BI is 74% and for CADP is 63%. The significance variables are PEX, SI, HM, TS, FC and HB. One insignificant variable was noticed, namely, PS. These values show the model are predicted reasonably good using the selected UTAUT2 variables. The elastic results have been described in the light of rational explanation with literature support and the study also offers some implications from theoretical and practical perspectives. This study has provided in a veneer sense of the ambiguities of an imagined cashless society in Malaysia, which subversively done through explaining the adoption of e-wallet electronic payment system. Future research may look at following dimensions which are also limitation for this study: (i) increase sample size and comparing with urban and rural area users, (ii) use developed and developing states in Malaysia to get more views with regard to e-wallets adoption, and (iii) demographic profiles analysis and the usage of digital transactions.

ORCID
Hassanudin Mohd Thas Thaker https://orcid.org/0000-0002-6182-9045

ENDNOTES

[1] Bekar et al. (2017) defined GPT as 'a single technology, or closely related group of technologies, that is widely used across most of the economy, is technologically dynamic in the sense that it evolves in efficiency and range of use in its own right, and complementary with many downstream sectors where those uses enable a cascade of further inventions and innovations' (p. 1012).

[2] Parasuraman (2000) capitulated where 'people's propensity to embrace and use new technologies for accomplishing goals in home life and at work' (p. 38).

[3] Dubbed as mobile payment; interchangeable terminology in the milieu of Malaysian society.

[4] Five key phases in ascending order: (1) Technology Trigger; (2) Peak of Inflated Expectation; (3) Trough of Disillusionment; (4) Slope of Enlightenment; (5) Plateau of Productivity.

[5] Norlin, N. (n.d.). Annual Budget 2020. Retrieved September 12, 2020, from https://www1.treasury.gov.my/index.php/en/budget/annual-budget.html.

[6] Several studies have used UTAUT2 to examine the customer use or adoption of internet banking (e.g., Liao et al., 1999; Martins et al., 2014).

[7] Venkatesh et al. (2012) established that UTAUT2 model has sufficiently high ability in explaining behaviour intention (56%–74%).

[8] 'The e-payment systems cover the variety of e-channels (e.g., debit/credit card, online banking, m-banking, e-wallet, e-cash, e-check, online storage value)' (Nguyen & Huynh, 2017, p. 926).

REFERENCES

Aad, E., & Young, S. (2020). *Cashing Out: Economic Growth through Payment Digitisation (Rep.)*. Retrieved September 10, 2020, from Mastercard website: https://newsroom.mastercard.com/mea/files/2020/05/Mastercard-White-Paper-Cashing-Out-Economic-Growth-through-Payment-Digitisation1.pdf.

Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In *Action control* (pp. 11–39). Springer.

Akour, I. A., & Dwairi, M. A. (2011). Testing technology acceptance model in developing countries: The case of Jordan. *International Journal of Business and Social Science*, *2*(14), 278–284.

Alaeddin, O., Altounjy, R., Zainudin, Z., & Kamarudin, F. (2018). From physical to digital: Investigating consumer behaviour of switching to mobile wallet. *Polish Journal of Management Studies*, *17*(2), 18–30. https://doi.org/10.17512/pjms.2018.17.2.02

Alajmi, M. A. (2018). The acceptance and use of electronic information resources among faculty of selected Gulf Cooperation Council States universities. *Information Development*, *35*(3), 447–466. https://doi.org/10.1177/0266666918755535

Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, *37*(3), 99–110.

Alalwan, A. A., Dwivedi, Y. K., Rana, N. P., & Algharabat, R. (2018). Examining factors influencing Jordanian customers' intentions and adoption of internet banking: Extending UTAUT2 with risk. *Journal of Retailing and Consumer Services*, *40*, 125–138.

Alalwan, A. A., Dwivedi, Y. K., & Williams, M. D. (2016). Customers' intention and adoption of telebanking in Jordan. *Information Systems Management*, *33*(2), 154–178.

Ali, M., Raza, S. A., & Puah, C. H. (2015). Factors affecting to select Islamic credit cards in Pakistan: The TRA model. *Journal of Islamic Marketing*, *8*(3), 330–344.

Altounjy, R., Alaeddin, O., Hussain, H. I., & Kot, S. (2020). Moving from bricks to clicks: Merchants' acceptance of the mobile payment in Malaysia. *International Journal of EBusiness and EGovernment Studies*, *12*(2), 136–150. https://doi.org/10.34111/ijebeg.202012204

Alwahaishi, S., & Snásel, V. (2013). Acceptance and use of information and communications technology: A UTAUT and flow based theoretical model. *Journal of Technology Management & Innovation*, *8*(2), 61–73.

Andrews, F. M., & Herzog, A. R. (1986). The quality of survey data as related to age of respondent. *Journal of the American Statistical Association*, *81*(394), 403–410. https://doi.org/10.1080/01621459.1986.10478284

Armitage, C. J., & Christian, J. (2003). From attitudes to behaviour: Basic and applied research on the theory of planned behaviour. *Current Psychology*, *22*(3), 187–195. https://doi.org/10.1007/s12144-003-1015-5

Arthur, W. B. (2011). *The nature of technology: What it is and how it evolves*. Free Press.

Arvidsson, N. (2014). Consumer attitudes on mobile payment services – Results from a proof of concept test. *International Journal of Bank Marketing*, *32*(2), 150–170. https://doi.org/10.1108/ijbm-05-2013-0048

Aswani, R., Ilavarasan, P. V., Kar, A. K., & Vijayan, S. (2018). Adoption of public WiFi using UTAUT2: An exploration in an emerging economy. *Procedia Computer Science*, *132*, 297–306. https://doi.org/10.1016/j.procs.2018.05.180

Baabdullah, A. M., Alalwan, A. A., Rana, N. P., Kizgin, H., & Patil, P. (2019). Consumer use of mobile banking (M-Banking) in Saudi Arabia: Towards an integrated model. *International Journal of Information Management*, *44*, 38–52. https://doi.org/10.1016/j.ijinfomgt.2018.09.002

Bàtiz-Lazo, B., & Efthymiou, L. (2016). *The book of payments: Historical and contemporary views on the cashless society*. Palgrave Macmillan.

Beh, P. K., Ganesan, Y., Iranmanesh, M., & Foroughi, B. (2019). Using smartwatches for fitness and health monitoring: The UTAUT2 combined with threat appraisal as moderators. *Behaviour & Information Technology*, *1–18*, 282–299. https://doi.org/10.1080/0144929x.2019.1685597

Bekar, C., Carlaw, K., & Lipsey, R. (2017). General purpose technologies in theory, application and controversy: A review. *Journal of Evolutionary Economics*, *28*(5), 1005–1033. https://doi.org/10.1007/s00191-017-0546-0

Beldad, A., Jong, M. D., & Steehouder, M. (2010). How shall I trust the faceless and the intangible? A literature review on the antecedents of online trust. *Computers in Human Behavior*, *26*(5), 857–869. https://doi.org/10.1016/j.chb.2010.03.013

Bhatti, K. K., & Qureshi, T. M. (2007). Impact of employee participation on job satisfaction, employee commitment and employee productivity. *International Review of Business Research Papers*, *3*(2), 54–68.

Bock, G. W., Zmud, R. W., Kim, Y. G., & Lee, J. N. (2005). Behavioral intention formation in knowledge sharing: Examining the roles of extrinsic motivators, social-psychological factors, and organizational climate. *MIS Quarterly*, *29*(1), 87–111.

Brata, A. H., & Amalia, F. (2018). Impact analysis of social influence factor on using free blogs as learning media for driving teaching motivational factor. In *Proceedings of the 4th International Conference on Frontiers of Educational Technologies – ICFET '18*. Association of Computer Machinery. https://doi.org/10.1145/3233347.3233360

Brown, S., & Venkatesh, V. (2005). Model of adoption of technology in households: A baseline model test and extension incorporating household life cycle. *MIS Quarterly*, *29*(3), 399. https://doi.org/10.2307/25148690

Buchholz, K. (2019). *This chart shows the shift in global purchasing power*. World Economic Forum. Retrieved October 27, 2020, from https://www.weforum.org/agenda/2019/04/global-purchasing-power-is-moving-south/.

Caldwell, T. (2012). Locking down the e-wallet. *Computer Fraud & Security*, *2012*(4), 5–8. https://doi.org/10.1016/s1361-3723(12)70028-3

Chaveesuk, S., Vanitchatchavan, P., Wutthirong, P., Nakwari, P., Jaikua, M., & Chaiyasoonthorn, W. (2019). The acceptance model toward cashless society in Thailand. In *Proceedings of the 9th International Conference on Information Communication and Management – ICICM 2019*. Association of Computer Machinery. https://doi.org/10.1145/3357419.3357457

Chawla, D., & Joshi, H. (2020). Role of mediator in examining the influence of antecedents of mobile wallet adoption on attitude and intention. *Global Business Review*, 097215092092450. https://doi.org/10.1177/0972150920924506

Chen, H., Papazafeiropoulou, A., Chen, T. K., Duan, Y., & Liu, H. W. (2014). Exploring the commercial value of social networks: Enhancing consumers' brand experience through Facebook pages. *Journal of Enterprise Information Management*, *27*(5), 576–598.

Chen, W.-C., Chen, C.-W., & Chen, W.-K. (2019). Drivers of mobile payment acceptance in China: An empirical investigation. *Information*, *10*(12), 384. https://doi.org/10.3390/info10120384

Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A partial least square latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Information Systems Research*, *14*(2), 189–217.

Chiu, Y. T. H., Fang, S. C., & Tseng, C. C. (2010). Early versus potential adopters. *International Journal of Retail & Distribution Management*, *38*(6), 443–459.

Dajani, D., & Hegleh, A. S. A. (2019). Behavior intention of animation usage among university students. *Heliyon*, *5*(10), e02536. https://doi.org/10.1016/j.heliyon.2019.e02536

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319. https://doi.org/10.2307/249008

Dawi, N. M. (2019). Factors influencing consumers intention to use QR code mobile payment—A proposed framework. *International Journal of Recent Technology and Engineering*, *8*(2S), 1–7.

Dedehayir, O., & Steinert, M. (2016). The hype cycle model: A review and future directions. *Technological Forecasting and Social Change*, *108*, 28–41.

Department of Statistics Malaysia. (2019). *ICT Use and Access by Individuals and Households Survey Report, Malaysia, 2018 [Press release]*. Department of Statistics Malaysia. Retrieved September 10, 2020, from https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=U3VCWU95MFNZK2kxbHd6cnBYZDY5dz09.

Dinh, V. S., Nguyen, H. V., & Nguyen, T. N. (2018). Cash or cashless? *Strategic Direction*, *34*(1), 1–4. https://doi.org/10.1108/sd-08-2017-0126

Dwivedi, Y. K., & Irani, Z. (2009). Understanding the adopters and non-adopters of broadband. *Communications of the ACM*, *52*(1), 122–125.

Dwivedi, Y. K., Kapoor, K. K., Williams, M. D., & Williams, J. (2013). RFID systems in libraries: An empirical examination of factors affecting system use and user satisfaction. *International Journal of Information Management*, *33*(2), 367–377.

Dwivedi, Y. K., Rana, N. P., Janssen, M., Lal, B., Williams, M. D., & Clement, M. (2017). An empirical validation of a unified model of electronic government adoption (UMEGA). *Government Information Quarterly*, *34*(2), 211–230.

Dwyer, F. R., Schurr, P. H., & Oh, S. (1987). Developing buyer-seller relationships. *Journal of Marketing*, *51*(2), 11. https://doi.org/10.2307/1251126

Eneizan, B., Mohammed, A. G., Alnoor, A., Alabboodi, A. S., & Enaizan, O. (2019). Customer acceptance of mobile marketing in Jordan: An extended UTAUT2 model with trust and risk factors. *International Journal of Engineering Business Management*, *11*, 184797901988948. https://doi.org/10.1177/1847979019889484

Featherman, M. S., & Pavlou, P. A. (2003). Predicting e-services adoption: a perceived risk facets perspective. *International Journal of Human-Computer Studies*, *59*(4), 451–474.

Fehr, E., & Rockenbach, B. (2003). Detrimental effects of sanctions on human altruism. *Nature*, *422*(6928), 137–140. https://doi.org/10.1038/nature01474

Fishbein, M. (1979). A theory of reasoned action: Some applications and implications. *Nebraska Symposium on Motivation*, *27*, 65–116.

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

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, *1*(1), 382–388.

Gan, C., Clemes, M., Limsombunchai, V., & Weng, A. (2006). A logit analysis of electronic banking in New Zealand. *The International Journal of Bank Marketing*, *24*(6), 360–383.

Gao, L., Waechter, K. A., & Bai, X. (2015). Understanding consumers' continuance intention towards mobile purchase: A theoretical framework and empirical study–A case of China. *Computers in Human Behavior*, *53*, 249–262.

Garcia-Swartz, D. D., Hahn, R. W., & Layne-Farrar, A. (2006). The move toward a cashless society: A closer look at payment instrument economics. *Review of Network Economics*, *5*(2), 175–198. https://doi.org/10.2202/1446-9022.1094

Gefen, D. (2003). TAM or just plain habit: A look experienced online shoppers. *Journal of Organizational and End User Computing*, *15*(3), 1–13.

Gefen, D., & Straub, D. W. (2004). Consumer trust in B2C e-commerce and the importance of social presence: Experiments in e-products and e-services. *Omega*, *32*(6), 407–424. https://doi.org/10.1016/j.omega.2004.01.006

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organisational capabilities perspective. *Journal of Management Information Systems*, *18*(1), 185–214.

GSMA. (2020). *The mobile economy 2020*. GSMA. Retrieved October 25, 2020, from https://www.gsma.com/mobileeconomy/

Gujarati, D. N. (2014). *Econometrics by example*. Palgrave Macmillan.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). *Análise multivariada de dados*. Bookman Editora.

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., & Thiele, K. O. (2017). Mirror, mirror on the wall: A comparative evaluation of composite-based structural equation modelling methods. *Journal of the Academy of Marketing Science*, *45*(5), 616–632.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152.

Hamann, D., & Omar, M. (2007). The incentive behind the adaptation process of high-technology product: An empirical research. *World Review of Science, Technology and Sustainable Development*, *4*(2/3), 126. https://doi.org/10.1504/wrstsd.2007.013579

Hassan, M. A., & Shukur, Z. (2019). Review of digital wallet requirements. In *2019 International Conference on Cybersecurity (ICoCSec)*. Institute of Electrical and Electronics Engineers. https://doi.org/10.1109/icocsec47621.2019.8970996

Hassan, M. A., Shukur, Z., Hasan, M. K., & Al-Khaleefa, A. S. (2020). A review on electronic payments security. *Symmetry*, *12*(8), 1344. https://doi.org/10.3390/sym12081344

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modelling. *Journal of the Academy of Marketing Science*, *43*(1), 115–113.

Herrero, Á., Martín, H. S., Del Mar, M., & Salmones, G.-D. L. (2017). Explaining the adoption of social networks sites for sharing user-generated content: A revision of the UTAUT2. *Computers in Human Behavior*, *71*, 209–217. https://doi.org/10.1016/j.chb.2017.02.007

Hong, S. J., Thong, J. Y., Moon, J. Y., & Tam, K. Y. (2008). Understanding the behaviour of mobile data services consumers. *Information Systems Frontiers*, *10*(4), 431–466.

Humphries, A. S., & Wilding, R. D. (2004). Long term collaborative business relationships: The impact of trust and C3 behaviour. *Journal of Marketing Management*, *20*(9-10), 1107–1122.

Indrawati, & Putri, D. A. (2018). Analyzing factors influencing continuance intention of E-payment adoption using modified UTAUT 2 model. In *2018 6th International Conference on Information and Communication Technology (ICoICT)*. Institute of Electrical and Electronics Engineers. https://doi.org/10.1109/icoict.2018.8528748

Jain, P., & Singhal, S. (2019). Digital wallet adoption: A literature review. *International Journal of Management Studies*, *VI*(1), 1. https://doi.org/10.18843/ijms/v6si1/01

Jasanoff, S., & Kim, S. (2015). *Dreamscapes of modernity: Socio-technical imaginaries and the fabrication of power.* University of Chicago Press.

Jin, C. C., Seong, L. C., & Khin, A. A. (2020). Consumers' Behavioural intention to accept of the Mobile wallet in Malaysia. *Journal of Southwest Jiaotong University*, *55*(1), 1–13.

Kaabachi, S., & Obeid, H. (2014). The Islamic bank in Tunisia: Brakes, motivations and expectations of the banking clientele. *Banque et Strategie*, *32*(3), 41–50.

Karim, M., Haque, A., Ulfy, M. A., Hossain, A., & Anis, Z. (2020). Factors influencing the use of E-wallet as a payment method among Malaysian Young adults. *International Journal of Business and Management*, *3*, 1–12. https://doi.org/10.37227/jibm-2020-2-21

Khalilzadeh, J., Ozturk, A. B., & Bilgihan, A. (2017). Security-related factors in extended UTAUT model for NFC based mobile payment in the restaurant industry. *Computers in Human Behavior*, *70*, 460–474. https://doi.org/10.1016/j.chb.2017.01.001

Kim, C., Tao, W., Shin, N., & Kim, K. (2010). An empirical study of customers' perceptions of security and trust in e-payment systems. *Electronic Commerce Research and Applications*, *9*(1), 84–95. https://doi.org/10.1016/j.elerap.2009.04.014

Kim, M. J., Chung, N., & Lee, C. K. (2011). The effect of perceived trust on electronic commerce: Shopping online for tourism products and services in South Korea. *Tourism Management*, *32*(2), 256–265.

Kim, S. S., & Malhotra, N. K. (2005). A longitudinal model of continued IS use: An integrative view of four mechanisms underlying postadoption phenomena. *Management Science*, *51*(5), 741–755. https://doi.org/10.1287/mnsc.1040.0326

Kline, R. B. (2011). *Principles and practice of structural equation modelling* (3rd ed.). The Guilford Press.

Kolodinsky, J. M., Hogarth, J. M., & Hilgert, M. A. (2004). The adoption of electronic banking technologies by US consumers. *The International Journal of Bank Marketing*, *22*(4), 238–259.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1997). Trust in large organizations. *The American Economic Review*, *87*(2), 333–338. Retrieved April 24, 2020, from www.jstor.org/stable/2950941.

Lee, H. S. H., Loke, Y. J., & Tan, A. K. G. (2013). The demand for e-payments in Malaysia: An examination of usage intensity. *Margin: The Journal of Applied Economic Research*, *7*(4), 371–389. https://doi.org/10.1177/0973801013500167

Lee, Z. W., & Khaw, D. P. T. (2018). *Quarterly bulletin: Transforming mobile phones into e-wallets in Malaysia*. Bank Negara Malaysia.

Leong, C., Tan, K., Puah, C., & Chong, S. (2020). Predicting mobile network operators' users m-payment intention. *European Business Review*, *33*, 104–126. https://doi.org/10.1108/ebr-10-2019-0263

Lew, S., Tan, G. W., Loh, X., Hew, J., & Ooi, K. (2020). The disruptive mobile wallet in the hospitality industry: An extended mobile technology acceptance model. *Technology in Society*, *63*, 101430. https://doi.org/10.1016/j.techsoc.2020.101430

Liao, S., Shao, Y., Wang, H., & Chen, A. (1999). The adoption of virtual banking: An empiricalstudy. *International Journal of Information Management*, *19*(1), 63–74.

Liébana-Cabanillas, F., Japutra, A., Molinillo, S., Singh, N., & Sinha, N. (2020). Assessment of mobile technology use in the emerging market: Analyzing intention to use m-payment services in India. *Telecommunications Policy*, *44*(9), 102009. https://doi.org/10.1016/j.telpol.2020.102009

Limayem, M., Hirt, S. G., & Cheung, C. M. K. (2007). How habit limits the predictive power of intentions: The case of IS continuance. *MISQ*, *31*(4), 705–737.

Lwin, T. H., & Thanabordeekij, P. (2019). Factor influencing the use of Mobile wallets in Myanmar. *Panyapiwat Journal*, *11*(3), 30–41.

Macedo, I. M. (2017). Predicting the acceptance and use of information and communication technology by older adults: An empirical examination of the revised UTAUT2. *Computers in Human Behavior*, *75*, 935–948.

Madan, K., & Yadav, R. (2016). Behavioural intention to adopt mobile wallet: A developing country perspective. *Journal of Indian Business Research*, *8*(3), 227–244. https://doi.org/10.1108/jibr-10-2015-0112

Malaquias, R. F., & Hwang, Y. (2016). An empirical study on trust in mobile banking: A developing country perspective. *Computers in Human Behavior*, *54*, 453–461. https://doi.org/10.1016/j.chb.2015.08.039

Martins, G., Oliveira, T., & Popovic, A. (2014). Understanding the internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application. *International Journal of Information Management*, *34*(1), 1–13.

Maruping, L. M., Bala, H., Venkatesh, V., & Brown, S. A. (2016). Going beyond intention: Integrating behavioral expectation into the unified theory of acceptance and use of technology. *Journal of the Association for Information Science and Technology*, *68*(3), 623–637. https://doi.org/10.1002/asi.23699

Mastercard. (2020). *Malaysia has highest mobile wallet usage in Southeast Asia*. Retrieved October 12, 2020, from https://ringgitplus.com/en/blog/e-wallet/mastercard-malaysia-has-highest-mobile-wallet-usage-in-southeast-asia.html.

Merhi, M., Hone, K., & Tarhini, A. (2019). A cross-cultural study of the intention to use mobile banking between Lebanese and British consumers: Extending UTAUT2 with security, privacy and trust. *Technology in Society*, *59*, 101151. https://doi.org/10.1016/j.techsoc.2019.101151

Mitchell, G. (1966). Effects of automation on the structure and functioning of banking. *The American Economic Review*, *56*(1/2), 159–166. Retrieved August 31, 2020, from http://www.jstor.org/stable/1821279.

Moorthy, K., T'ing, L. C., Yee, K. C., Huey, A. W., In, L. J., Feng, P. C., & Yi, T. J. (2019). What drives the adoption of mobile payment? A Malaysian perspective. *International Journal of Finance & Economics*, *25*(3), 349–364. https://doi.org/10.1002/ijfe.1756

Morosan, C., & Defranco, A. (2016). It's about time: Revisiting UTAUT2 to examine consumers' intentions to use NFC mobile payments in hotels. *International Journal of Hospitality Management*, *53*, 17–29. https://doi.org/10.1016/j.ijhm.2015.11.003

Mun, S. G., Woo, L., & Seo, K. (2021). Importance of F&B operation in luxury hotels: the case of Asia versus the US. *International Journal of Contemporary Hospitality Management*, *33*(1), 125–144.

Mun, Y. P., Khalid, H., & Nadarajah, D. (2017). Millennials' perception on mobile payment services in Malaysia. *Procedia*

Computer Science, *124*, 397–404. https://doi.org/10.1016/j.procs. 2017.12.170

Nguyen, T. D., & Huynh, P. A. (2017). The roles of perceived risk and trust on E-payment adoption. In *Econometrics for Financial Applications Studies in Computational Intelligence* (pp. 926–940). Springer. https://doi.org/10.1007/978-3-319-73150-6_68

Nisha, N., Iqbal, M., & Rifat, A. (2019). The changing paradigm of health and mobile phones. *Journal of Global Information Management*, *27*(1), 19–46. https://doi.org/10.4018/jgim. 2019010102

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

Oney, E., Guven, G. O., & Rizvi, W. H. (2017). The determinants of electronic payment systems usage from consumers' perspective. *Economic Research-Ekonomska Istraživanja*, *30*(1), 394–415. https://doi.org/10.1080/1331677x.2017.1305791

Palau-Saumell, R., Forgas-Coll, S., Sánchez-García, J., & Robres, E. (2019). User acceptance of mobile apps for restaurants: An expanded and extended UTAUT-2. *Sustainability*, *11*(4), 1210. https://doi.org/10.3390/su11041210

Parasuraman, A. (2000). Technology readiness index (tri): A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, *2*(4), 307–320. https://doi. org/10.1177/109467050024001

Park, J., Amendah, E., Lee, Y., & Hyun, H. (2018). M-payment service: Interplay of perceived risk, benefit, and trust in service adoption. *Human Factors and Ergonomics in Manufacturing & Service Industries*, *29*(1), 31–43. https://doi.org/10.1002/hfm. 20750

Patel, K., & Brown, I. (2016). Towards a theory of multi-channel banking adoption amongst consumers. *Electronic Journal of Information Systems Evaluation*, *19*(3), 137.

Pavlou, P. A., & Fygenson, M. (2006). Understanding and predicting electronic commerce adoption: An extension of the theory of planned behavior. *MIS Quarterly*, *30*, 115–143.

Peterson, T., & Wezel V. (2016). *The evolution of digital and mobile wallets*. Retrieved October 17, 2020, from https://www. paymentscardsandmobile.com/wp-content/uploads/2016/10/ The-Evolution-of-Digital-and-Mobile-Wallets.pdf.

Poon, W. C. (2008). Users' adoption of e-banking services: The Malaysian perspective. *Journal of Business & Industrial Marketing*, *23*(1), 59–69.

Qasim, H., & Abu-Shanab, E. (2015). Drivers of mobile payment acceptance: The impact of network externalities. *Information Systems Frontiers*, *18*(5), 1021–1034. https://doi.org/10.1007/ s10796-015-9598-6

Rakhi, T., & Mala, S. (2014). Adoption readiness, personal innovativeness and perceived risk. *Internet Research*, *24*(3), 369–392.

Ramírez-Correa, P., Rondán-Cataluña, F. J., Arenas-Gaitán, J., & Martín-Velicia, F. (2019). Analysing the acceptation of online games in mobile devices: An application of UTAUT2. *Journal of Retailing and Consumer Services*, *50*, 85–93. https://doi.org/ 10.1016/j.jretconser.2019.04.018

Rana, N. P., Weerakkody, V., Dwivedi, Y. K., & Piercy, N. C. (2014). Profiling existing research on social innovation in the public sector. *Information Systems Management*, *31*(3), 259–273.

Raza, S. A., & Hanif, N. (2013). Factors affecting internet banking adoption among internal and external customers: A case of Pakistan. *International Journal of Electronic Finance*, *7*(1), 82–96.

Reiersen, J. (2017). Trust as belief or behavior? *Review of Social Economy*, *75*(4), 434–453. https://doi.org/10.1080/00346764. 2016.1269939

Rogers, E. M. (1995). *Diffusion of innovations* (4th ed.). Free Press.

Rondan-Cataluña, F. J., Arenas-Gaitán, J., & Ramírez-Correa, P. E. (2015). A comparison of the different versions of popular technology acceptance models. *Kybernetes*, *44*(5), 788–805. https:// doi.org/10.1108/k-09-2014-0184

Shaw, N., & Sergueeva, K. (2019). The non-monetary benefits of mobile commerce: Extending UTAUT2 with perceived value. *International Journal of Information Management*, *45*, 44–55. https://doi.org/10.1016/j.ijinfomgt.2018.10.024

Shih, Y., & Fang, K. (2004). The use of a decomposed theory of planned behavior to study internet banking in Taiwan. *Internet Research*, *14*(3), 213–223. https://doi.org/10.1108/ 10662240410542643

Shin, D. H. (2009). Understanding user acceptance of DMB in South Korea using the modified technology acceptance model. *International Journal of Human–Computer Interaction*, *25*(3), 173–198.

Siau, K., & Shen, Z. (2003). Building customer trust in mobile commerce. *Communications of the ACM*, *46*(4), 91–94.

Simintiras, A. C., Yeniaras, V., Oney, E., & Bahia, T. K. (2014). Redefining confidence for consumer behavior research. *Psychology & Marketing*, *31*(6), 426–439.

Singh, N., Sinha, N., & Liébana-Cabanillas, F. J. (2020). Determining factors in the adoption and recommendation of mobile wallet services in India: Analysis of the effect of innovativeness, stress to use and social influence. *International Journal of Information Management*, *50*, 191–205. https://doi.org/10.1016/j. ijinfomgt.2019.05.022

Soodan, V., & Rana, A. (2020). Modeling customers' intention to use E-wallet in a developing nation. *Journal of Electronic Commerce in Organizations*, *18*(1), 89–114. https://doi.org/10.4018/ jeco.2020010105

Taiwo, A. A., & Downe, A. G. (2013). The theory of user acceptance and use of technology (UTAUT): A meta-analytic review of empirical findings. *Journal of Theoretical & Applied Information Technology*, *49*(1), 48–58.

Tang, C. Y., Lai, C. C., Law, C. W., Liew, M. C., & Phua, V. V. (2014). Examining key determinants of mobile wallet adoption intention in Malaysia: An empirical study using the unified theory of acceptance and use of technology 2 model. *International Journal of Modelling in Operations Management*, *4*(3/4), 248. https://doi.org/10.1504/ijmom.2014.067383

Tenk, M. T. T., Yew, H., & Heang, L. (2020). E-wallet adoption: A case in Malaysia. *International Journal of Research in Commerce and Management Studies*, *2*(2), 135–138.

Thaker, H. M., Khaliq, A., Mand, A. A., Hussain, H. I., Thaker, M. M., & Pitchay, A. B. (2020). Exploring the drivers of social media marketing in Malaysian Islamic banks. *Journal of Islamic Marketing*, *12*, 145–165. https://doi.org/10.1108/jima-05-2019-0095

Thakur, R., & Srivastava, M. (2014). Adoption readiness, personal innovativeness, perceived risk and usage intention across customer groups for mobile payment services in India. *Internet Research*, *24*(3), 369–392.

The Inclusive Internet Index. (2020). Retrieved September 10, 2020, from https://theinclusiveinternet.eiu.com/.

Tseng, T. H., Lin, S., Wang, Y.-S., & Liu, H.-X. (2019). Investigating teachers' adoption of MOOCs: The perspective of UTAUT2. *Interactive Learning Environments*, *1–16*, 1–16. https://doi.org/10.1080/10494820.2019.1674888

Tun, P. M. (2020). An investigation of factors influencing intention to use mobile wallets of mobile financial services providers in Myanmar. *The Asian Journal of Technology Management (AJTM)*, *13*(2), 129–144. https://doi.org/10.12695/ajtm.2020.13.2.3

UBS. (2018). *Shifting Asia: Cashless societies*. UBS Group AG. Retrieved October 25, 2020, from https://www.ubs.com/global/en/wealth-management/chief-investment-office/market-insights/digital-disruptions/2018/cashless-societies.html.

Utz, S., Kerkhof, P., & Bos, J. V. (2012). Consumers rule: How consumer reviews influence perceived trustworthiness of online stores. *Electronic Commerce Research and Applications*, *11*(1), 49–58. https://doi.org/10.1016/j.elerap.2011.07.010

Van Der Heijden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly*, *28*(4), 695–704.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*, 425–478.

Venkatesh, V., Thong, J. Y., & 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.

Ward, M. (1967). Towards A cashless society—A note on credit cards. *The South African Journal of Economics*, *35*(2), 145–152. https://doi.org/10.1111/j.1813-6982.1967.tb02484.x

Widodo, M., Irawan, M. I., & Sukmono, R. A. (2019). Extending UTAUT2 to explore digital wallet adoption in Indonesia. In *2019 International Conference on Information and Communications Technology (ICOIACT)*. Institute of Electrical and Electronics Engineers. https://doi.org/10.1109/icoiact46704.2019.8938415

Williams, D. M., Roderick, S., & Davies, G. H. (2017). Risk, trust, and compatibility as antecedents of mobile payment adoption. In *AMCIS Proceedings, Adoption and Diffusion of Information Technology* (p. 34). Americas Conference on Information Systems (AMCIS).

World Bank. (2018). *Malaysia's digital economy: A new driver of development*. World Bank Group. Retrieved November 16, 2020, from https://openknowledge.worldbank.org/handle/10986/30383.

Yousafzai, S. Y., Pallister, J. G., & Foxall, G. R. (2005). Strategies for building and communicating trust in electronic banking: A field experiment. *Psychology & Marketing*, *22*(2), 181–201.

Yu, C. S. (2012). Factors affecting individuals to adopt mobile banking: Empirical evidence from the UTAUT model. *Journal of Electronic Commerce Research*, *13*(2), 104–121.

Yusof, A. (2020). *Physical currency widely used in local economy*. Bank Negara: New Straits Times. Retrieved October 24, 2020, from https://www.nst.com.my/business/2020/04/581483/physical-currency-widely-used-local-economy-bank-negara.

Zhou, T. (2012). Understanding users' initial trust in mobile banking: An elaboration likelihood perspective. *Computers in Human Behavior*, *28*(4), 1518–1525.

Zhou, T. (2013). An empirical examination of continuance intention of mobile payment services. *Decision Support Systems*, *54*(2), 1085–1091. https://doi.org/10.1016/j.dss.2012.10.034

Zhou, T. (2014). An empirical examination of initial trust in mobile payment. *Wireless Personal Communications*, *77*(2), 1519–1531. https://doi.org/10.1007/s11277-013-1596-8

Zhou, T., Lu, Y., & Wang, B. (2010). Integrating TTF and UTAUT to explain mobile banking user adoption. *Computers in Human Behavior*, *26*(4), 760–767.