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Research Article

Moderating Role of Perceived Trust and Perceived Service Quality on Consumers' Use Behavior of Alipay e-wallet System: The Perspectives of Technology Acceptance Model and Theory of Planned Behavior

Yang Tian [1], **Tak Jie Chan** [2], **Norazah Mohd Suki** [3,4] **and Mohd Ariff Kasim** [5]

[1]*Faculty of Modern Languages and Communication, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia*
[2]*Faculty of Applied Communication, Multimedia University, 63100 Cyberjaya, Selangor, Malaysia*
[3]*Othman Yeop Abdullah Graduate School of Business (OYAGSB), Universiti Utara Malaysia, Kedah, Malaysia*
[4]*Institute of Sustainable Growth and Urban Development (ISGUD), Universiti Utara Malaysia, Kedah, Malaysia*
[5]*College of Business Administration, Ajman University, UAE*

Correspondence should be addressed to Tak Jie Chan; tjchan@mmu.edu.my

The advancement of e-wallet systems, including Alipay, has led consumers to embrace digital payment with financial technologies. Yet, limited research focused on the usage of e-wallets in the context of emerging economies. This research is aimed at investigating the predictors of consumers' use behavior of the Alipay e-wallet system in an emerging market and moderating role of perceived trust and perceived service quality on this relationship. The technology acceptance model (TAM) and the theory of planned behavior (TPB) were applied as the guiding principle. Data gathered via online surveys among 378 Malaysian Alipay users were analyzed using the partial least square-structural equation modeling (PLS-SEM) approach. The results reveal that all hypotheses were significant towards consumers' intention to use Alipay in an emerging market except for the moderating role of perceived trust. Perceived usefulness was the strongest predictor factor towards consumers' intention to use Alipay in an emerging market. This is followed by perceived ease of use. They heavily emphasize the superiorities of Alipay over other e-wallet systems such as efficiency and convenience for conducting financial activities. This study contributes to the existing literature by proposing a comprehensive integrated research model. The research outcome can serve as a guideline for service providers towards enhancing consumers' adoption of e-wallets for digital payment with financial technologies.

1. Introduction

The rapid evolution of information and communication technology (ICT) has decisively influenced human lives [1]. Due to ICT's penetration, the financial sector's landscape has been enormously transformed [2]. With the availability of numerous mobile applications, consumers are encouraged to move beyond traditional transactions, embracing electronic payment such as the transition from physical cash to online payment such as electronic wallet (e-wallet), also known as a digital wallet [2–5]. e-wallet is considered a mobile application, which is installed on users' mobile phones, enabling users to store money or link with bank accounts, conducting financial activities without bringing cash or credit card [6, 7]. For instance, while using e-wallet applications, the payment can be processed by scanning a quick response (QR) code [8]. Examples of online transactions include Alipay, GrabPay, Touch n Go e-wallet, and Boost [9]. The beneficial features such as convenience, security, time-saving, and effort-saving have led many countries to adopt e-wallets as one of their payment methods [10, 11].

This research concentrates on the largest e-wallet platform in the world that is Alipay, which is also acknowledged as the third-party payment platform in China [12]. Over

decades, the number of registered users of Alipay has rapidly risen. As reported by Big Data-Research Consulting, 2019, the active Alipay users reached 540 million people in 2018 [13]. In the China context, 90% of the domestic market has been dominated by two digital payment giants, Alipay and WeChat Pay. In the first quarter of 2018, Alipay transactions accounted for 49% while WeChat Pay occupied 40% [14]. Malaysia, as one of the emerging economies, with 42 e-wallet licensed operators [15], has over 18000 merchants who adopted Alipay nationwide [16]. In addition, Alipay has reached collaborations with domestic prominent banks including Maybank, Public Bank, and CIMB bank, building partnership with Touch n Go (TNG) to implement the e-wallet system [3, 17].

Despite the use of electronic-based payment has been constantly increasing, little is known in terms of the adoption of its services by users [18]. In a similar vein, [19] stressed that several literatures contribute to the investigation of privacy, risk, and security of digital payment systems; however, fewer studies specifically analyzed the user's attitude towards usage of digital payment. [20] suggested an additional construct such as trust, commitment, and consumer satisfaction between behavioral intention and use behavior for boosting the association due to behavioral intention of consumers which is not the single antecedent that contributes to consumer behavior. On the other hand, while perceived service quality has been used as a strong moderator of predictors and continued intention of mobile money, whether and how the moderator can intervene both behavioral intention and use behavior is unwell known [21]. Accordingly, the moderating variables are suggested to adopt between behavioral intention and use behavior. This is because the intervening constructs can transform the intention-behavior relationship [20]. Moreover, limited empirical research has been carried out to examine the intention of users to adopt digital payment in emerging contexts [18]. Indeed, as research on predictors affecting e-wallet adoption is limited in the context of Malaysia, it is notable to determine the factors and their effect on the adoption of e-wallets from the viewpoint of Malaysian users [22, 23]. To promote the adoption of e-wallets and construct a cashless society, an initiative was launched by Bank Negara Malaysia (BNM), to introduce the Financial Sector Blueprint (FSBP) 2011-2020, as the incentive of the online payment agenda in Malaysia by the year 2020 [24]. Besides, the Malaysian government proposed the RM 30 eTunai Rakyat initiative, encouraging Malaysians to receive RM 30 worth of e-wallet credit. Similarly, e-wallet service providers carried out a sequence of promotions such as coupons, cashback, and rebates [25]. Yet, according to the 2019 Nielsen report, although 88% of Malaysians are familiar with e-wallets, only 10% of Malaysians use them as a payment method. Thus, the adoption rate of e-wallets kept low in Malaysia [6]. Accordingly, this research is aimed at investigating the predictors of consumers' intention to use the Alipay e-wallet system in an emerging market and moderating role of perceived trust and perceived service quality on this relationship. The theoretical principles of the technology acceptance model (TAM) and the theory of planned behavior (TPB) were integrated into the proposed model to understand the phenomenon.

2. Literature Review and Hypothesis Development

2.1. Theory of Planned Behavior. The theory of planned behavior (TPB) is the extended development of the theory of reasoned action (TRA), which was proposed by [26]. The TPB theory has been applied in considerable research as a theoretical principle, predicting behavioral intention and the actual behavior of individuals [27]. The behavior of individuals is anticipated by their behavioral intention. The intention to perform a behavior is predicted by three antecedents which are attitude, subjective norms, and perceived behavioral control [28]. The TPB theory is considered a useful model as it provides an appropriate conceptual framework for addressing the complexities of human behavior, which explicates that attitude, subjective norms, and perceived behavioral control are all cognitive factors that affect intention. The theory has been introduced, for understanding certain behaviors, in various contexts such as Internet banking [29], e-commerce [30], and intention towards technology usage [31].

2.2. Technology Acceptance Model. Technology acceptance model (TAM), introduced by [32], is the most well-known employed theoretical model in information technology literature [6, 33]. TAM was built on a well-known theoretical principle, the TAM, predicting users' adoption and usage of technology. TAM is aimed at bringing about a description in terms of acceptance of information technology [34]. TAM comprises two constructs which are perceived usefulness (PU) and perceived ease of use (PEOU). PU refers to the extent to which individuals believe that the utilization of specific technology would improve their job performance while PEOU is considered as the extent to which users perceive the system to be free effort. Although prior research [3, 35] has considered TAM as a significant model, providing robust empirical evidence, it did not contain all constructs that have a significant effect on users' adoption of information technology [36]. Hence, [37] suggested that external constructs such as the opinion of individuals (subjective norms) or individuals' skills and resources (perceived behavioral control) [28, 38, 39] should be incorporated or integrated into the model to enhance specificity and explanatory utility, as well as better anticipating users' decisions.

2.3. Perceived Usefulness. Perceived usefulness (PU) is considered the level to which individuals believe that the use of a specific technology enhanced their task performance [32]. Moreover, PU is also referred to as the extent to which users perceive that the use of digitalized technology can enhance their activity or performance [40, 41]. Consumers perceive that using such financial technology enables them to accomplish their financial goals, improving efficiency in their transactional process [42]. Some prior studies have revealed that there is a significant correlation between perceived usefulness and the behavioral intention of consumers to use e-wallets [7, 43, 44]. [9] in the context of mobile payment examined factors contributing to users' behavioral intention to use mobile payment; their outcome showed that

behavioral intention is significantly anticipated by perceived usefulness. Besides that, another research carried out by [45] in Indonesia suggested that perceived usefulness has a direct positive correlation towards behavioral intention to use e-wallets as it offers benefits to users. Based on the above discussion, the following hypothesis is developed:

Hypothesis 1. Perceived usefulness has a positive effect on the behavioral intention of consumers to use Alipay.

2.4. Perceived Ease of Use. Perceived ease of use (PEOU), another antecedent in the TAM model, predicts users' behavioral intention to use technology. Perceived ease of use, referred to by [32], is the level to which individuals perceive that the utilization of a specific system requires less effort. [41] refers perceived ease of use as releasing the technology from complexity and making it more user-friendly. Stumbling upon some extent of difficulty in utilizing the system would discourage users from using the system [25]. On the contrary, as reported by [6], simple payment processing steps and instructive functions facilitate the implementation of financial activity and further contribute to higher intention to use mobile payment. Some researchers have revealed a significant correlation between perceived ease of use and behavioral intention of mobile payment [46, 47]. Further, [48, 49] found perceived ease of use as a positive motive of behavioral intention towards e-wallet usage. The following hypothesis is developed based on theoretical evidence from past literature:

Hypothesis 2. Perceived ease of use has a positive influence on the behavioral intention of consumers to use Alipay.

2.5. Attitude. Intention to use technology has been intensively investigated by previous researchers, and one of the predictors that influence an individual's intention in terms of technology usage is attitude [50]. Based on the theory of reasoned action (TRA) carried out by [39], attitude is the predictor of anticipating behavioral intention. Moreover, [32] avowed that behavioral intention to use a specific system can be predicted by attitude. In the study of [51], it was found that attitude has a positive effect on intention towards the usage of e-wallets. Meanwhile, reference [52] explored the adoption of e-wallets among consumers in Sri Lanka, and they revealed a significant role of attitude on behavioral intention in terms of e-wallet usage. Therefore, the hypothesis for this research is put forward as follows:

Hypothesis 3. Attitude has a positive impact on the behavioral intention of consumers to use Alipay.

2.6. Subjective Norms. Subjective norms (SN), a vital element in the theory of planned behavior (TPB), predict behavioral intention [28]. Subjective norms are defined as the individuals' perception that relies on the people considered important to them to perform potential behavior [28, 53]. Subjective norms refer to the level to which people are affected by their social context (family, friends, celebrities, and relatives) to perceive an e-wallet as a desirable platform

[20]. Past researchers have illustrated that subjective norms are a positive determinant influencing behavioral intention. [54] asserted subjective norms as an influential factor in users' behavioral intention to use mobile payment. Likewise, [55] argued that subjective norms for Indonesian consumers have been found to positively affect their behavioral intention to use the mobile payment platform, SPayLater. [53] conducted empirical research in the Spain context, determining users' intention towards mobile payment usage. The outcome indicated that subjective norms have a direct strong impact on the behavioral intention of mobile payment. The past literature leads current research to hypothesize the following:

Hypothesis 4. Subjective norms have a positive effect on the behavioral intention of consumers to use Alipay.

2.7. Perceived Behavioral Control. Perceived behavioral control (PBC), the third element in TPB theory, is described as the perception of individuals towards the level of ease or difficulty in acting the behavior [56, 57]. PBC is considered a personal belief in terms of his/her capabilities to exhibit specific behavior [28]. Individuals' behavioral intention to perform potential behavior is predicted by their beliefs, as acknowledged by [58]. In the case of mobile banking, [59] applied TPB theory and its key constructs, determining the behavioral intention of consumers to use mobile banking. Perceived behavioral control was revealed as a significant antecedent of the behavioral intention of mobile banking usage. Similarly, the role of perceived behavioral control on behavior intention was found in another existing literature [56], suggesting that perceived behavioral control has a positive relationship with intention of mobile payment. This is supported by the scholarly works of [60], of which perceived behavioral control was found to have a positive association with behavioral intention to use QR mobile payment in Indonesia. This research, hence, proposed the following hypothesis:

Hypothesis 5. Perceived behavioral control has a positive impact on the behavioral intention of consumers to use Alipay.

2.8. Behavioral Intention and Use Behavior. [39] understood behavioral intention as the level at which the individual intends to use the technology. Similarly, behavioral intention is also referred to as the willingness of individuals to use or continue to use technology, concerning determinants that affect any utilization of technology [61]. In this study, consumers' use behavior is anticipated by their behavioral intention to use Alipay. Based on this definition, a body of prior literature using the unified theory of acceptance model and use of technology (UTAUT) found that behavioral intention enhances use behavior towards mobile payment and mobile banking. Meanwhile, [62] suggested that behavioral intention significantly and positively impacts the user behavior of consumers during the period of COVID-19. Though there is a considerable amount of past literature [63–65] that provided ample theoretical evidence, little attention focused on

the use of financial technology and mobile payment [66]. Consequently, this research formulated a hypothesis:

Hypothesis 6. Behavioral intention has a positive influence on the use behavior of consumers to use Alipay.

2.9. Moderating Role of Perceived Trust. Trust is understood as an individual's positive expectation in which someone has belief and confidence in the words, actions, and decisions of others [67]. As described by [68], trust is the users' intention towards an expected outcome brought by technology and their faith that the service provider will fulfill their responsibility. In this research, perceived trust is considered an influential predictor that strengthens the relationship between behavioral intention and use behavior. It has been demonstrated that perceived trust relating to digital payment is a vital factor directly affecting the behavioral intention of technology [17]. [25] showed that trust was a critical influential antecedent of e-wallet usage. Hence, it is argued that individuals with high levels of trust would be more likely to accept and use e-wallets than people with a lower level of trust. These outcomes are consistently supported by [69]. In that, trust positively impacts the behavioral intention of e-wallets in payment. Consumers with greater trust are expected to perform associated intentions in comparison with consumers with lower trust. Drawing on empirical evidence from past authors, extant literature has identified perceived trust as a crucial determinant influencing consumers' behavioral intention when using e-wallets as payment methods. Thus, the following is posited:

Hypothesis 7. Perceived trust strengthens the relationship between behavioral intention and the use behavior of consumers to use Alipay.

2.10. Moderating Role of Perceived Service Quality. Perceived service quality, defined by [68, 70], is the subjective comparison of consumers between the expected quality of service and the actual service quality they get. [71] noted that perceived service quality is consumers' judgment between service expectation and service performance. In the case of mobile service, it was defined as consumers' perception of quality towards the new payment services and their functions [72]. In this research, the perceived service quality is considered as the general quality of e-wallets, like Alipay. [73] confirmed a significant and positive effect of perceived service quality perception on customers' interest to use mobile banking. Another study by [74] discovered that service quality positively influences continuance intention to use mobile payment. In addition to this, a similar outcome evidenced that perceived service quality was an influential factor in consumers' adoption of an e-wallet [71]. Grounded on the literature above, the following hypothesis is proposed:

Hypothesis 8. Perceived service quality strengthens the relationship between behavioral intention and use behavior of consumers to use Alipay.

Based on the aforesaid discussion, Figure 1 illustrates the proposed research framework, of which both perceived trust and perceived service quality were the moderating variables, and the rest was the factors affecting consumers' usage of Alipay, an e-wallet system.

3. Methodology

3.1. Samples and Procedure. A cross-sectional quantitative research design was employed via an online survey method conducted between July 2022 and September 2022 via social media platforms such as Facebook, Instagram, Telegram, WeChat, and YouTube. [75] highlighted that the use of social media services for data collection would be appropriate and effective. Data was gathered using a purposive sampling technique among 400 respondents who are Malaysian Alipay users aged 18-65 years old, with experience using Alipay in recent three months. Of this, 378 were considered eligible for analysis of data. The rationale for the selection is that they are more likely to be users of mobile phones and e-wallet systems. [76] acknowledged that purposive sampling is considered a nonrandom sampling technique based on researchers' judgment.

3.2. Measurement of Instruments. The survey questionnaire for the study consists of demographic variables and nine constructs in the research model. The total ten sections in the research are section A, demographic information; section B, perceived usefulness; section C, perceived ease of use; section D, attitude; section E, subjective norms; section F, perceived behavioral control; section G, behavioral intention; section H, perceived trust; section I, perceived service quality; and section J: use behavior (the details of the items are presented in Table 1). Demographic variables for acquiring information about participants consisted of gender, age, race, and educational background. Other than that, to identify respondents who have experience in using Alipay, a screening question was included in demographic questions, which was the following: Do you use Alipay for your financial transaction? The survey items were assessed based on a seven-point Likert-type scale, where 1 indicates strongly disagree and 7 indicates strongly agree. The construct, perceived usefulness, was assessed by 3 items adopted from [6]. Furthermore, the 4 items for perceived ease of use were adopted from [77]. As for attitude, it contains 6 items, which were adopted from [78]. Subjective norms, measured by 4 items, were adopted from [79, 80]. Perceived behavioral control consists of 5 items, adopted from [57, 81]. In behavioral intention, 3 items were adopted from [6, 82]. Perceived trust was assessed by 4 items, adopted from [83, 84]. In perceived service quality, the 3 items were adopted from [74]. Lastly, use behavior was assessed by 4 items, adopted from [85].

3.3. Statistical Technique. The partial least square-structural equation modeling (PLS-SEM) approach using SmartPLS was employed for data analysis. This study consists of 36 latent variables, which can be deemed complex; therefore, PLS-SEM is considered appropriate for dealing with complex research models with larger numbers of latent variables
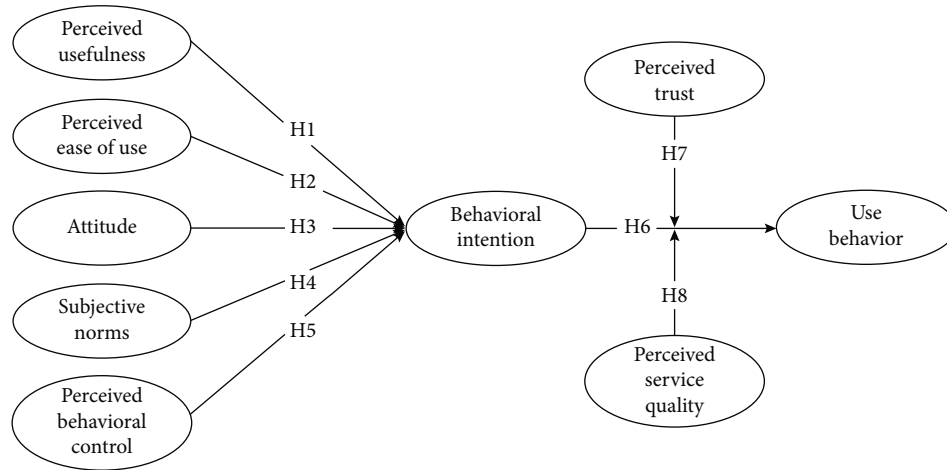
FIGURE 1: A proposed research framework.

[86]. The role of perceived usefulness, perceived ease of use, attitude, subjective norms, and perceived behavioral control were the exogenous variables, and behavioral intention and use behavior were the endogenous variables. Perceived trust and perceived service quality were the moderating variables.

3.4. Common Method Variance. According to [87], common method variance (CMV) presence in the study has to be detected first before examining the measurement model to prevent any bias. To detect any bias, this study utilized Harman's single factor test, which stated that if the variance is less than 50%, then it indicated no CMV issue. In this study, it is indicated that the percentage of variance is 37.058%, which indicated no presence of data bias in this study.

4. Results

4.1. Descriptive Analysis. The demographic data of the 378 respondents are detailed in Table 2. Of this, a higher number of male participants than female participants provided a complete response to the questionnaire. In terms of their classification of age, more than a quarter of the respondents were aged 35-34 years old (32.5%). With regard to the education level, the majority of them have accomplished a bachelor's degree.

4.2. Measurement Model Assessment. The measurement model was assessed through confirmatory factor analysis (CFA). The reliability of each construct was examined based on the criterion of Cronbach's alpha and factor loading. The Cronbach alpha and factor loading, as criteria, for gauging reliability are required to surpass 0.70 and 0.50, being considered acceptable [88]. The outcome of the measurement model assessment is presented in Table 1, indicating that the Cronbach alpha and the factor loading of each variable are higher than 0.70. The outcome for reliability in current research has reached an acceptable level.

After that, the validity test, consisting of convergent validity and discriminant validity, was carried out for testing the validity of constructs and their items on SmartPLS. In

examining convergent validity, [89] highlighted that the index of composite reliability (CR) should exceed 0.70 whereas the index of average variance extracted (AVE) should surpass 0.50. The outcome for convergent validity is listed in Table 1, reporting that the value of CR and AVE has exceeded the threshold of 0.70 and 0.50. Consequently, the convergent validity of the research is confirmed.

Besides, the heterotrait-monotrait ratio of correlations (HTMT) was checked to discover the discriminant validity of the constructs. Based on [90], the value of HTMT between constructs should not surpass 0.85 or 0.90. The outcome for HTMT is demonstrated in Table 3, reporting that all HTMT values between constructs were not greater than 0.85. Therefore, the discriminant validity was ascertained.

4.3. Structural Model Assessment. In the structural model assessment, the proposed relationships were gauged by applying bootstrapping with 5000 resamples [91]. The results of the path coefficients of the PLS-SEM shown in Table 4 reveal that perceived usefulness has a positive effect on the behavioral intention of Alipay e-wallet usage in an emerging market ($\beta_1 = 0.240$, $t-$value $= 4.820$, $p < 0.05$). Hence, Hypothesis 1 is supported. Likewise, consumers' behavioral intention of Alipay e-wallet usage in an emerging market is significantly and positively influenced by perceived ease of use ($\beta_2 = 0.198$, $t-$value $= 3.978$, $p < 0.05$), thus sustaining Hypothesis 2. In addition, Hypothesis 3, consumers' behavioral intention of Alipay e-wallet usage in an emerging market was also significantly influenced by attitude ($\beta_3 = 0.101$, $t-$value $= 2.011$, $p < 0.05$), subjective norms ($\beta_4 = 0.153$, $t-$value $= 3.285$, $p < 0.05$), and perceived behavioral control ($\beta_5 = 0.172$, $t-$value $= 3.208$, $p < 0.05$). Accordingly, Hypothesis 3, Hypothesis 4, and Hypothesis 5 are retained. Besides, Hypothesis 6 demonstrates that behavioral intention has a positive effect on the use behavior of the Alipay e-wallet system in an emerging market ($\beta_6 = 0.262$ and $t-$value $= 4.717$ at $p < 0.05$), thus maintaining Hypothesis 6.

4.4. Moderation Test. The two moderators, perceived trust and perceived service quality, were incorporated into the

TABLE 1: Convergent validity.

Construct	Items	Loadings	CR	AVE	Cronbach alpha
Perceived usefulness (PU)	PU1: Using Alipay would enable me to pay more quickly.	0.946	0.946	0.853	0.914
	PU2: Using Alipay makes it easier for me to conduct transactions.	0.915			
	PU3: Using Alipay would be advantageous.	0.909			
Perceived ease of use (PEOU)	PEOU1: Alipay is easy to use.	0.944	0.933	0.778	0.905
	PEOU2: Alipay's use is clear and understandable.	0.868			
	PEOU3: Alipay transactions save me a lot of time and energy.	0.859			
	PEOU4: It is easy to interact with Alipay.	0.854			
Attitude (ATT)	ATT1: I am fascinated with the Alipay payment system.	0.948	0.944	0.737	0.928
	ATT2: I am enjoying using Alipay when shopping.	0.809			
	ATT3: I am happy with the Alipay services.	0.842			
	ATT4: I am pleased with Alipay for its privacy reason.	0.850			
	ATT5: I am pleased with Alipay for its security reason.	0.837			
	ATT6: Overall, I am satisfied with Alipay.	0.858			
Subjective norms (SN)	BI1: The people whose opinions I value would agree with me using Alipay to buy products.	0.944	0.929	0.766	0.898
	BI2: Most of the people close to me think that I should use Alipay to buy products.	0.843			
	BI3: My friends/peers urge me to use Alipay to buy products.	0.855			
	BI4: The people I am close to would agree with me using Alipay to buy products.	0.855			
Perceived behavioral control (PBC)	PBC1: Using Alipay is entirely within my control.	0.959	0.940	0.758	0.919
	PBC2: I have the resources to use Alipay.	0.851			
	PBC3: I have the ability to use Alipay.	0.830			
	PBC4: I see myself as capable of using Alipay.	0.856			
	PBC5: If it were entirely up to me, I am confident that I will use Alipay.	0.849			
Behavioral intention (BI)	BI1: I plan to use Alipay in the future.	0.955	0.948	0.859	0.918
	BI2: I intend to use Alipay when I purchase items.	0.920			
	BI3: I plan to use Alipay frequently in my daily life.	0.905			
Perceived trust (PT)	PT1: I think that Alipay will keep its promises and commitments.	0.952	0.945	0.812	0.923
	PT2: Alipay is trustworthy.	0.883			
	PT3: I would consider Alipay to be honest.	0.897			
	PT4: I think that Alipay is responsible.	0.870			
Perceived service quality (PSQ)	PSQ1: Alipay anticipates and responds promptly to my needs as a user.	0.948	0.935	0.828	0.896
	PSQ2: Alipay meets my expectations.	0.888			
	PSQ3: Alipay instills confidence in users by reducing uncertainty.	0.893			
Use behavior (UB)	UB1: I use Alipay.	0.950	0.938	0.791	0.911
	UB2: I use Alipay to manage my e-wallet accounts.	0.883			
	UB3: I use Alipay to do transactions.	0.864			
	UB4: I sign up for Alipay that are specially designed for digital payment systems.	0.857			

research framework to assess their moderating roles in the relationship between behavioral intention and consumer use behavior of the Alipay e-wallet system. The present empirical research shows an insignificant moderating role

of perceived trust on the link between behavioral intention and consumer use behavior of Alipay ($\beta_7 = -0.018$, $t-$value = 0.347, LLCI $= -0.102$, ULCI $= 0.068$, $p > 0.05$). Therefore, Hypothesis 7 was not validated. On the other

TABLE 2: Demographic profile of respondents ($n = 378$).

Variable(s)	Items	Frequency	Percentage
Gender	Male	231	61.1
	Female	147	38.9
Age	18-24	34	9.0
	25-29	66	17.5
	30-34	76	20.1
	35-40	123	32.5
	41-49	55	14.6
	50-65	24	6.3
Educational level	Diploma	116	33.1
	Bachelor	125	30.7
	Master	89	23.5
	Ph.D	48	12.7

TABLE 3: HTMT ratio.

	PU	PEOU	ATT	SN	PBC	BI	PT	PSQ	UB
PU									
PEOU	0.419								
ATT	0.427	0.387							
SN	0.386	0.369	0.424						
PBC	0.457	0.434	0.440	0.459					
BI	0.515	0.467	0.417	0.443	0.486				
PT	0.388	0.459	0.375	0.435	0.419	0.455			
PSQ	0.488	0.432	0.428	0.437	0.432	0.504	0.449		
UB	0.536	0.444	0.412	0.389	0.431	0.487	0.491	0.394	

Note: PU = perceived usefulness; PEOU = perceived ease of use; ATT = attitude; SN = subjective norms; PBC = perceived behavioral control; BI = behavioral intention; PT = perceived trust; PSQ = perceived service quality; UB = use behavior.

TABLE 4: Hypothesis test outcome.

Hypothesis	Path	Std. beta	Std. errors	t-values	LLCI	ULCI	D	VIF	R^2	Q^2	f^2
Hypothesis 1	PU➔BI	0.240	0.050	4.820	0.157	0.319	S	1.391	0.373	0.308	0.066
Hypothesis 2	PEOU➔BI	0.198	0.048	3.798	0.104	0.262	S	1.334			0.040
Hypothesis 3	ATT➔BI	0.101	0.050	2.011	0.017	0.183	S	1.388			0.012
Hypothesis 4	SN➔BI	0.153	0.047	3.285	0.076	0.232	S	1.361			0.028
Hypothesis 5	PBC➔BI	0.172	0.054	3.208	0.083	0.261	S	1.477			0.032
Hypothesis 6	BI➔UB	0.262	0.056	4.717	0.171	0.354	S	1.406	0.313	0.24	0.071

Note: PU = perceived usefulness; PEOU = perceived ease of use; ATT = attitude; SN = subjective norms; PBC = perceived behavioral control; BI = behavioral intention; PT = perceived trust; PSQ = perceived service quality; UB = use behavior; ULCI = upper level confident interval; LLCI = lower level confident interval; D = decision; S = supported.

hand, perceived service quality was confirmed as a significant moderator on the link between behavioral intention and use behavior of Alipay ($\beta_8 = 0.152$, $t - \text{value} = 2.545$, LLCL = 0.053, ULCL = 0.249, $p < 0.05$). Consequently, Hypothesis 8 was strengthened.

As presented in Figure 2, it was depicted that the relationship between behavioral intention and consumers' use behavior is significantly moderated by perceived service quality (PSQ), but not perceived trust. Figure 3 presents that the slope analysis for the association between behavioral

intention and use behavior is moderated by perceived service quality and the relationship is stronger when PSQ is high.

4.5. *PLSpredict Analysis.* PLS-SEM was introduced as a "causal-predictive" approach to solving the apparent dichotomy between explanation and prediction [92]. To be helpful for future studies, variables can be replaced as the study continues to evolve, and the researchers hope to assess out-of-sample prediction ability by retaining the sample [93]. [94] proposed the PLSpredict procedure to make this analysis
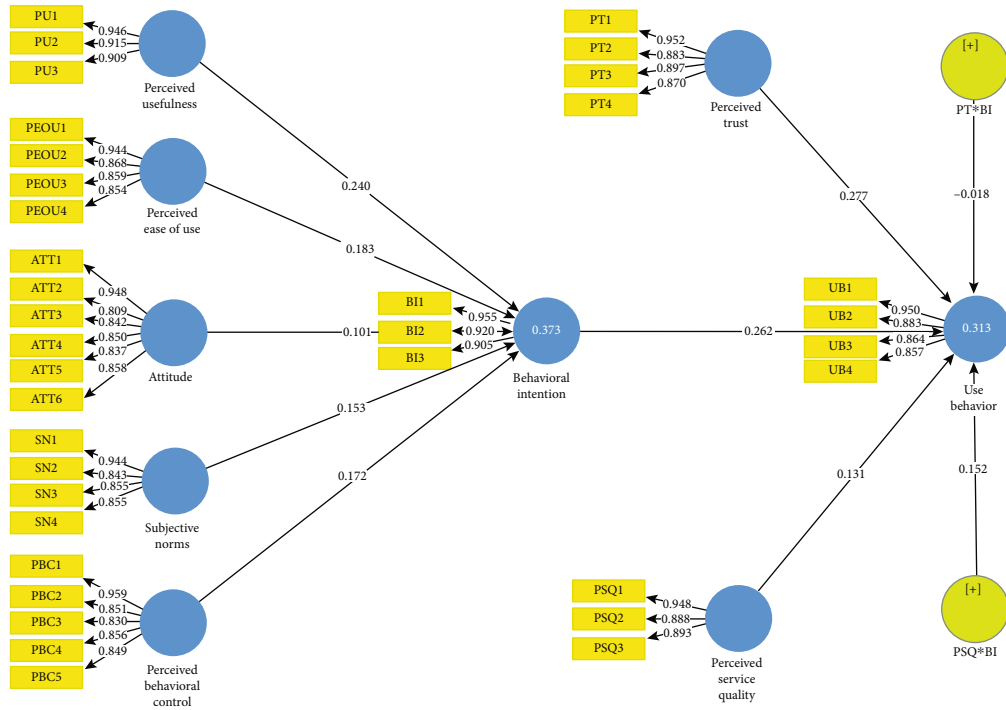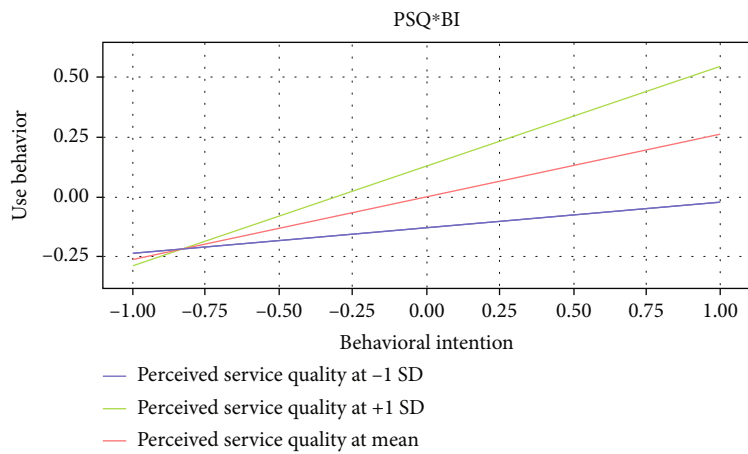
FIGURE 2: Path diagram of structural model.

FIGURE 3: Moderating role of perceived service quality on behavioral intention and use behavior.

TABLE 5: PLSpredict.

Items	Q^2predict	PLS-SEM (RMSE)	LM (RMSE)	PLS SEM-LM (RMSE)	Interpretation
BI1	0.381	1.390	1.406	-0.016	High
BI2	0.288	1.487	1.524	-0.037	
BI3	0.227	1.472	1.495	-0.023	
UB1	0.296	1.529	1.502	0.027	Medium
UB2	0.233	1.630	1.636	-0.006	
UB3	0.213	1.581	1.572	0.009	
UB4	0.197	1.639	1.651	-0.012	

Note: high: PLS<LM for all the items; medium: PLS<LM for most items; low: PLS<LM for a minority of the items.

TABLE 6: Moderation test outcome.

Hypothesis	Path	Std. beta	t-values	p value	LLCI	ULCI	Decision
Hypothesis 7	PT*intention—> UB	-0.018	0.347	0.364	-0.102	0.068	Rejected
Hypothesis 8	PSQ*intention—> UB	0.152	2.545	0.005**	0.053	0.249	Supported

Note: PT = perceived trust; PSQ = perceived service quality; UB = use behavior; ULCI = upper level confident interval; LLCI = lower level confident interval.

easier in PLS-SEM; this holdout-sample-based procedure produces case-level predictions on an item or construct level.

Since their resulting Q^2 predict values are above zero (see Table 5), the Q^2 predict evaluation indicates that both behavioral intention (BI) and use behavior (UB) have sufficient predictive relevance effects in the model. PLSpredict was used to assess the model's predictive relevance for out-of-sample prediction. The value of PLS-SEM root-mean-squared-error (RMSE) should be lower than LM (linear regression model) RMSE to indicate high predictive power. Hence, the findings can be summarized as follows: (1) behavioral intention has a high predictive power, and (2) use behavior has a medium predictive power (see Table 5).

5. Discussion and Conclusions

This study investigated the predictors of consumers' intention to use the Alipay e-wallet system in an emerging market and moderating role of perceived trust and perceived service quality on this relationship. TAM and TPB were applied as an integrated extended research model. Through a PLS-SEM approach, perceived usefulness was validated as a significant predictor anticipating behavioral intentions of the Alipay e-wallet system (see Table 4). This implies that consumers are more likely to use Alipay once they perceive the superiorities of Alipay such as efficiency and convenience for conducting financial activities which play a crucial role in individuals' behavioral intentions towards Alipay. This outcome coincided with a study conducted by [25, 44, 95] in terms of e-wallet usage. This confirmed that the use of Alipay would contribute to the consumers' financial transactions when they use Alipay for their transactions.

In addition, perceived ease of use was also proved as an antecedent leading to the behavioral intention to use Alipay. It was suggested that Malaysian consumers would intend to use Alipay as a platform if they believe that Alipay is easy to use and user-friendly. This outcome was supported by [32] who evidenced that the extent to which users perceive the use of the system requires less effort contributes to their adoption. The result was congruent with several prior studies [9, 43, 49] on users' acceptance of e-wallets. Of importance, the featured user-friendly mobile application should be provided by service developers, enabling the systems to be understandable to their users.

As for attitude, it was found as a predictive determinant that contributes to the behavioral intention of Alipay use. It was shown that consumers would be more interested in the e-wallet platform, Alipay, as a desirable financial platform for their transactions owing to the encouragement of positive experience formation. This is in line with the result of past research [55, 62, 78] indicating that an individual factor,

attitude, can drive individuals to do something. On top of that, subjective norms were also shown to positively influence consumers' behavioral intention to use Alipay. Subjective norms refer to the individuals' perception of how other people think about him/her and whether others will encourage him/her to do something [96]. For instance, the consumers' payment activity was influenced by their friends and their family who used it for the first time, and they intend to apply it in their transactional activities. This result was consistent with previous research findings [41, 53, 54] that consumers are significantly motivated by external influences to use Alipay.

Moreover, perceived behavioral control was revealed to have a positive effect on consumers' intention to use Alipay e-wallet system. This result is consistent with past results [56, 59, 60] that the perception of behavioral control significantly affects users' behavioral intention. The PLS-SEM approach also confirmed that behavioral intention positively leads to the use behavior of consumers. This highlighted that a higher level of behavioral intention towards the Alipay e-wallet system would increase their actual behavior towards its usage. The actual behavior of consumers was predicted by their willingness. Preceding research by [62, 97] found behavioral intention as an influential predictor. Therefore, consumers' behavioral intention is regarded as their interest in Alipay usage, anticipating their actual behavior to use Alipay as financial technology.

An additional test of the moderating role of perceived trust and perceived service quality on the relationship between behavioral intention and consumer use behavior of the Alipay e-wallet system was also investigated. The results of the PLS-SEM approach in Table 6 show that perceived trust was found to have an insignificant impact on the relationship between behavioral intention and use behavior. The scholarly works of [2, 7, 98] reported that trust performs a significant effect on users' behavioral intention to use e-wallet systems. This result was contradictory to prior research, which showed that the relationship between behavioral intention and use behavior would not be affected by the moderator's perceived trust. Conversely, perceived service quality was found to significantly moderate the relationship between behavioral intention and use behavior towards the Alipay e-wallet system. Previous research has evidenced the effect of perceived service quality on behavioral intention. [71] noted that perceived service quality performs a positive role in users' behavioral intention in terms of the e-wallet system. In a similar vein, [99] found that the service quality of WeChat payment was a significant driver of users' behavioral intention. Therefore, the linkage between behavioral intention and use behavior is high as the level of perceived service quality is high.

5.1. Theoretical Implications. Firstly, this research brings about a comprehensive understanding of predictors of the usage of Alipay among Malaysian consumers. From a theoretical perspective, this research contributed to the integration of TAM and TPB, perceived trust, and perceived service quality, as moderators. A PLS-SEM for data analysis empirically concluded that all assumed relationships were valid except the moderating effect of perceived trust, further evidencing that the proposed model is efficient for determining the consumers' use of Alipay.

Besides, relevant research was previously carried out by researchers, limited research on e-wallet adoption, and has been examined in the emerging context [18]. Hence, this paper contributed to the existing studies and extend the research phenomenon in the context of an emerging economy.

Moreover, this study also examined the moderating effect of perceived service quality, which was reported to moderate the relationship between behavioral intention and use behavior. As suggested by [20], behavioral intention is not the single predictor of actual behavior; additional factors, specifically moderating variables, are recommended to be included between behavioral intention and actual behavior. Consequently, the current research extended the scholarship of technology marketing by focusing on e-wallet usage.

5.2. Practical Implications. This research provides e-commerce service providers with practical guidelines for the adoption of Alipay. In that, the e-wallet service developers can refer to the findings of the study, improving the adoption level and actual usage among consumers. This is because the result can extend the service providers' knowledge of predictive factors of consumers to use Alipay. Thus, service providers can take those factors into account while developing their systems. They should consider and amplify the features of the system, such as ease of use, user-friendly, and enhancing the performance of consumers' transactions to retain the positive intention among consumers. According to the research findings, perceived service quality is considered to contribute to the relationship between behavioral intention and use behavior. Thus, the service quality of the financial system also should be emphasized. Of importance, service providers should improve the users' privacy and security of the Alipay system, improving consumers' reliability towards the system. Then, only the actual behavior towards the use of the system can be enhanced.

5.3. Limitations and Future Research Directions. Firstly, this research found that perceived trust has an insignificant impact on the relationship between behavioral intention and the use behavior of Malaysian consumers to use Alipay. As this finding is contradictory to past research, future researchers are suggested to carry out further analysis of whether perceived trust, as a moderator, has a significant impact on their relationship. Secondly, the sample size for the present research involved 378 respondents. To enhance the generalizability, future research is suggested to increase the sample size for obtaining higher accuracy and power of the statistical result. In the research approach in this paper, only the quantitative approach was employed. To address the shortage of quantitative approaches, it would be interest-

ing for future researchers to employ qualitative or mixed-method approaches to obtain a deeper comprehensive understanding of Alipay usage in Malaysia.

Besides, the locality for this paper is one of the emerging economies in Southeast Asia, Malaysia. Future research can conduct research regarding the usage of financial technology in other emerging economies and do comparative studies, or a comparative between the e-wallet platforms was also interesting to be carried out. Lastly, future studies are recommended to determine more influential variables which may lead to the users' adoption and usage behavior of the financial system such as product-related factors, perceived risk, compatibility, and personal innovativeness to be incorporated into the current model, to make it more robust and contributed to the marketing information system and technology scholarship.

Data Availability

The data used to support the findings of this study are available from the first author upon request.

Consent

Informed consent was obtained from all subjects involved in the study. Respondents were informed through the survey indicated on the voluntary participation and confidentiality of the respondent's information.

Conflicts of Interest

The authors declare no conflict of interest.

Acknowledgments

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