Exploring the Future of Digital Wallets in the Post-COVID-19 Era: Insights from Jakarta's Transition to the Endemic Phase

Anggi Eka Femiawan[1], Gilbert Alexandro Onggo[2], Miranda Tanjung[3]

[1]Management Department, BINUS Business School Master Program, Bina Nusantara University, Jakarta, Indonesia
[2]Management Department, BINUS Business School Master Program, Bina Nusantara University, Jakarta, Indonesia
[3]Management Department, BINUS Business School Master Program, Bina Nusantara University, Jakarta, Indonesia

Abstract
This research aims to determine whether digital wallets will continue to be used in the transition period towards this Covid-19 endemic. The study framework adopts the Technology Continuance Theory (TCT) to support the research. The digital wallet has been popular and commonly used by Indonesians, but now the pandemic has decreased and is under control. The declining rate of spread and Covid-19 sufferers makes Indonesia currently in a transition period towards endemic. The sustainability of the Digital Wallet business is challenged by several contradictive phenomena, such as the use of cash transactions, the rise of digital banks, and the high complaint level of digital wallet services. Data collection using a questionary using purposive random sampling. 256 people participated in the study as a whole, and structured equation modelling (SEM) and partial least squares (PLS) were used to examine the data techniques provided by the Smart PLS 4.0 program. The findings demonstrated that continuous usage was directly correlated with perceived usefulness and attitude but not significantly with enjoyment.

Keywords - *Digital Wallet, Continuous Usage, TCT model, transition to Endemic Covid-19*

I.   INTRODUCTION

In December 2019, a deadly virus called COVID-19 was identified for the first time. In just several months, the virus spread globally and had a significant impact worldwide. The most effective methods to prevent its spread are frequent hand washing, wearing a mask, and maintaining distance everywhere. In some countries, extreme control policies were implemented, such as lockdowns and staying home [1]. According to research conducted by Tamara et al. (2021) [2], WHO stated that one of the causes of the spread of COVID-19 is the use of paper money in transactions. For prevention, a switch to non-cash transactions must be made.

The pandemic has drastically changed human transaction behaviour from offline to online payments. The increasing demand for contactless transaction services has become a digital business opportunity for fintech payment service providers. In Indonesia, shifting to non-cash transactions is strongly supported by Bank Indonesia as an acceleration of digital transactions [3]. The use of electronic transactions began to be implemented throughout the world as a solution to the lockdowns or prevention of physical transactions. According to the Global Payment Gateways Processing Solution Market Analysis, the global payment market will increase to 23.45 USD billion throughout 2020–2024, in line with the increase in digital transactions [4]. Non-cash transactions are multiplying worldwide, including in Indonesia, which reached 147.1 million users in 2019—one of the highest growths of digital transactions in Asia during the COVID-19 pandemic.

There are two factors influencing the rapid growth of digital transactions in Indonesia. The first is the support of the Internet's network infrastructure, and the second is support from Bank Indonesia related to digital wallet transactions. As per Bank Indonesia's definition, digital wallets are transactions that can be used electronically, stored funds, and make payment transactions using Internet media [5]. Some examples of digital wallets Indonesians use today are OVO, GoPay, Dana, and LinkAja [6].

However, the situation today has changed. Indonesia is currently heading into a transition period toward a COVID-19 endemic [7]. The rate of COVID-19 spread in Indonesia is decreasing and under control.

The spread decline reached 83% on a national scale, with total active cases below 100 thousand. The hospital occupancy rate (bed occupancy ratio) is at 6%, and the positive rate is below 4%, which means it is below the WHO standards. The death rate falls to 88%, generating a secure and comfortable feeling for the community [8]. The government has also relaxed the rules, among others, by disabling PPKM rules and permitting the release of masks in an outdoor area [9].

For the digital wallet business to continue to be sustainable, profitable, and grow, transactions must be carried out continuously [10]. But, during the period leading to the COVID-19 endemic transition today, several phenomena have emerged that threaten the sustainability of the digital wallet business. Cash transactions can be used again because there are no more distance restrictions. As the biggest player in the financial industry, banking opens digital services that resemble digital wallet features, such as QRIS payment, at a lower cost [11]. Moreover, today's digital wallet services could be better. The level of complaints over dissatisfaction with services is still relatively high, as reflected in the digital wallet's social media accounts.
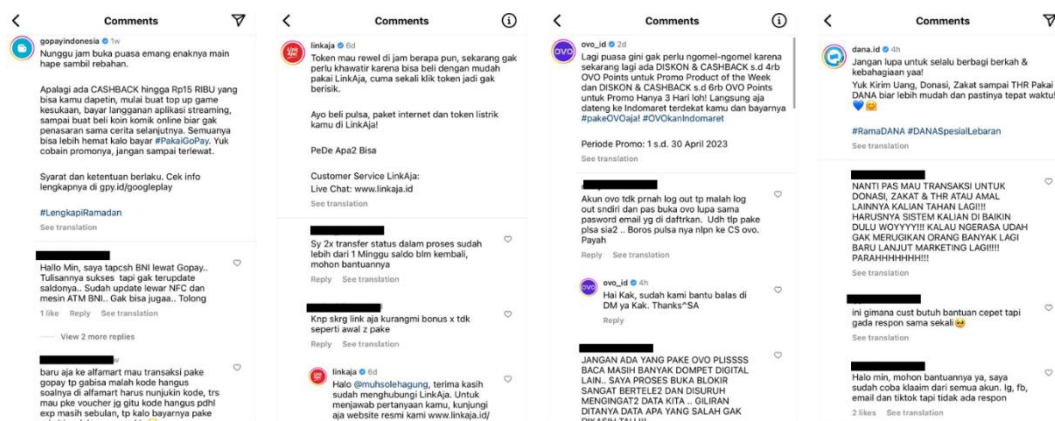

Figure 1. Voice of Customer on Social Media

Many studies have been conducted on the continuity of usage of digital wallets during the COVID-19 pandemic. Examples are research from Ly et al. (2022) [10] on the continuance of usage of digital wallets in Vietnam and research from Santosa et al. (2021) [12] on the continuance of usage of digital wallets among baby boomers and Gen X. However, research on the continued usage of digital wallets during the transition to endemic COVID-19 is currently very rare. The authors argue that this study is very important to determine whether digital wallets will continue to be used, especially during the transition to endemic COVID-19 with the contradictory phenomena mentioned above. This study's primary target audience is Jakarta's people. The city of Jakarta was chosen because it is the center of Indonesia's economy and is included in the top 20 megapolitan cities in the world [13].

II. LITERATURE REVIEW

The authors' choice of model, TCT (Technology Continuance Theory), was made because the study being done is focused on activities that take place in the post-adoption period. TCT is the ideal paradigm for research on continuity for three reasons, according to [14]. First or Firstly, TCT is a module that may gauge a product's continued adoption behaviour. Second, TCT employs two independent variables—satisfaction and attitude—that have a significant influence on the dependent variables associated with continuity. Finally, TCT is an improvement over the first three models (TAM, ECM, and COM) since it can track adoption activities over their whole life cycle, from initialization to long-term retention. TCT is also used in several studies as a continuity measuring model, including Rahi et al. (2020) [15], which measures continuous intents for Internet banking, and Khayer et al. (2019) [16], which examines continuous intentions for Alipay usage.

TCT (Technology Continuance Theory)

According to research conducted by Thiruselvi et al. (2013) [17], they explained that Liao et al. (2009) [18] proposed the Technology Continuance Theory (TCT), a fresh theory for anticipating users' intent to keep utilizing technology. It combines the three most popular theories in the study of technology and information systems: the Cognitive Model (COG) by Oliver (1980) [19], the Expectation Confirmation Model (ECM), and the Technology Acceptance Model (TAM) by Davis (1989) [20]. The last dependent variable in the three-level TCT model is the intention to continue using IS. TCT is made up of two fundamental constructs, satisfaction, and attitude, and three first-level antecedents, confirmation, perceived utility, and perceived ease of use.

2.1 Confirmation

According to definitions, the idea that the actual use of technology-driven services matches the expected use of such technologies is known as confirmation. Strong link between confirmation and user happiness has been backed by several studies of persistent usage patterns [21][22]. The user satisfaction level will be positively enhanced if the initial expectation of using a digital wallet matches the experience. Additionally, confirmation is important for users' post-adoption habits, including perceived usefulness. Users' perceptions of usefulness may be shaped by their confirmation experiences.

2.2 Perceived usefulness

Davis (1989) [20] states that perceived usefulness is related to a user's conviction that employing a certain system enhances their work performance. There is a clear connection between perceived usefulness and user enjoyment, as well as between perceived usefulness and intention to continue using the service, according to past studies [23][24]. Liao et al. (2009) [18] found a strong and positive correlation between perceived usefulness and user happiness in the context of Taiwan, along with perceived usefulness and willingness to keep using the service. In the context of this study, users will be more satisfied, their attitudes will be favorably affected, and they will be more inclined to continue using this service if they receive more benefits from utilizing Digital Wallet.

2.3 Perceived ease of use

"Perceived ease of use" refers to how convenient and easy to understand an information system. The ease of use in this study relates to how little effort users have to make to understand, obtain, and use the Digital Wallet. If customers find it simple to incorporate new technology into their daily lives, adoption chances will be higher. Previous studies [25][26][27] demonstrated a substantial relationship between perceived ease of use and perceived utility and attitude in technology adoption.

2.4 Satisfaction

Consumer happiness, according to marketing literature, is crucial for fostering and maintaining loyalty [28]. This also applies to the field of information systems (IS), where user pleasure tends to increase a user's intention to use an application continuously [21]. Bhattacherjee (2001) [23] explains user happiness as one of the primary elements determining post-adoption behaviour, such as continuation intention. Additionally, customers' positive experiences using the device positively impact their sentiments toward whether they want to continue using the Digital Wallet.

2.5 Attitude

The extent to which a person evaluates or appraises a behaviour favorably or unfavorably is referred to as attitude [29]. Numerous adoption and post-adoption theories for IS/IT have been utilized to examine how attitudes affect behavioural intention or use intentions. For example, according to TAM and the concept of planned behaviour, attitude, individual creativity, and trust all interact to impact consumers' behavioural intentions [27]. The relationship between attitude and behavioural intention in the context of mobile payment is well supported by research.

There were 7 latent variables in this investigation. Confirmation (CON), Perceived Usefulness (PU), Perceived Ease of Use (PEU), Satisfaction (SAT), Attitude (ATT), and Continuance Intention (CI). Then, these hypotheses were developed.

H1: Perceived Ease of Use affects Perceived Usefulness
H2: Confirmation affects Perceived Usefulness
H3: Confirmation affects Satisfaction
H4: Perceived Usefulness affects Satisfaction
H5: Perceived Usefulness affects Attitude
H6: Perceived Ease of Use affects Attitude

H7: Perceived Usefulness affects Continuous Usage
H8: Satisfaction affects Attitude
H9: Satisfaction affects Continuous Usage
H10: Attitude affects Continuous Usage

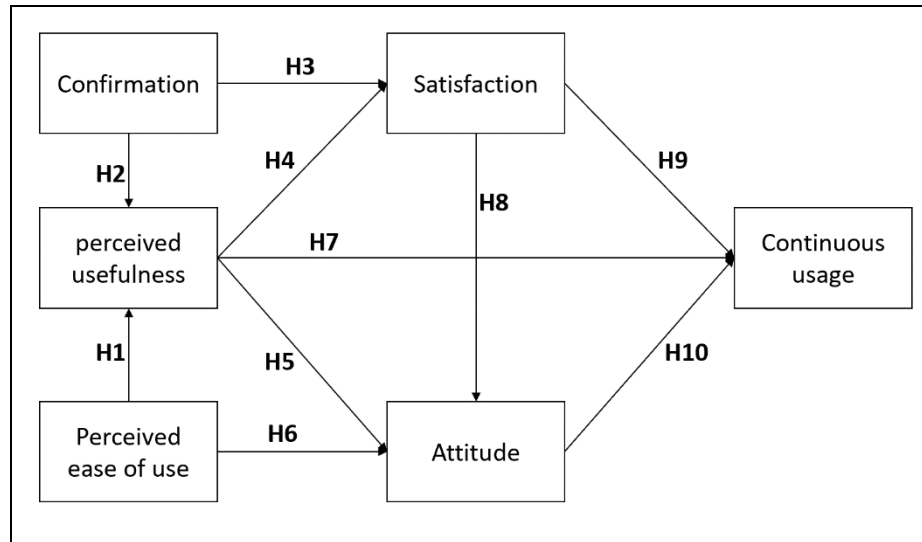**Figure 2**. Theoretical Research Framework

III. METHODOLOGY

3.1 Research Variable

Research variables are anything that the researcher chooses to study to gather data from which conclusions can be drawn. Independent variables and research variables are the two categories into which the variables to be employed are split. The dependent variable changes because of the independent variable**.** The dependent variable is the one that results from or is produced from the independent variable.

3.2 Population and Sample

The population of the study are those who reside in Jakarta, Indonesia, and have at least once used a digital wallet for a transaction. The extent of researcher interference we apply is minimal, as we aim to collect data based on the routine daily basis of the subject's life. The study setting that we use is non-contrived, where we do the study without a place arrangement because, in the research we do, there is no need for a place factor in collecting data. The unit of analysis we use is individual because we will analyze respondents who live in Jakarta, Millennials, or Gen Z. The time horizon we use is cross-sectional, meaning the data collection we do is done at one time and does not occur repeatedly with respondents.

3.3 Data collection and technique

The data collection method we are using is the questionnaire method because a questionnaire method is an instrument for the measurement of one construct or more employing aggregated item scores [30]. According to Yaddanapudi (2019) [31] and Aithal (2020) [32], the questionnaire method is used to collect quantitative data from respondents, which is one of the requirements for our research. According to (Wright, 2017) [33], there are several benefits of using the questionnaire method as our data collection method, such as convenience (questionnaires can be operated easily and quickly), low cost (questionnaires cost is low because all we need is an internet connection and the platform to create the questionnaires), anonymity (participants do not need to worry about their identity, thus they can answer the question more openly and honestly), and scalability (questionnaires can be used to accommodate large samples). Because of the benefits, we chose the questionnaire method to get the data needed. Researchers employed the Likert scale as their assessment scale for this investigation. Each independent and dependent variable's measurement scale in this study is strongly Agree receives a score of 5, agrees to receive a score of 4, disagrees to receive a score of 3, and strongly disagrees to receive a score of 1.

Instrument Design

The questionnaire utilized in this study draws upon a comprehensive review of previous research as a point of reference. We selected indicators for measuring performance expectancy variables from the works of Sleiman et al. (2022) [34], Indrawati (2019) [35], and (Phongsavath, Andriani, & Saputra Hutabarat, 2022) [36]. Similarly, indicators for habit variables were adopted from the research of Sleiman et al. (2022) [34], Indrawati (2019) [35], and Santosa (2021) [12]. To assess price-saving orientation, we incorporated indicators from the studies conducted by Sleiman et al. (2022) [34] and Juningsih (2020) [38], using four items. For continuous usage indicators, we drew from the research conducted by Hutabarat et al. (2022) [36] utilizing a total of four items. Please refer to Table 1 and Table 2 for the complete list of questionnaires employed in this study.

By employing these validated and previously used indicators, we aim to ensure the reliability and consistency of our research instrument. The selection process was driven by the need to capture relevant dimensions and constructs pertinent to our research objectives. The subsequent sections will provide an overview of our data collection and analysis methods and the results obtained from administering the questionnaire.

Table 1 Demographic Question

Gender
Male
Female

Marital Status
Married
Unmarried

Age
Less than 28 Years Old (Gen Z)
More than 28 Years Old (Gen Y)

Last Education
Bachelor Degree/Associate Degree
Master Degree
Doctoral Degree
Senior High School
Other

Job Type
House Wife/Husband
Government/BUMN Employee
Private Employee
Self Employee
Other

Income per Month
Between IDR 5 Million to 10 Million
Less than IDR 5 Million
More than IDR 10 Million

Frequency of use of Digital Wallet
3-5 Times a Week
More than 5 Times a Week
less than 3 Times a Week

Average Spending per Month
Between Rp. 5 million to Rp. 10 million
Less than Rp. 5 million
More than Rp. 10 million

Average Spending per Month using a Digital Wallet
Between Rp. 1 Million to Rp. 3 Million
Less than Rp. 1 Million
More than Rp. 3 Million

Frequently Used Digital WalletAapps
OVO
Gopay
Dana
LinkAja
ShopeePay
I saku
flip

Frequent transactions using a Digital wallet
Payment Merchant
Bill Payment (electricity, water, tax)
Telecommunications (pulse, data)
Move Funds (cash withdrawal, transfer to account)
Transportation

Table 2 Variable Question

Variable	Question	Refference
Confirmation		
CO1	My experience with using Digital Wallet was better than what I expected	(Daragmeh, et al. 2021), (Thiruselvi et al.,2013), (Rahi et al., 2020), (Khayer et al., 2019)
CO2	The service level provide by Digital Wallet was better than what I expected	
CO3	Digital Wallet was easy to use than what I expected	
CO4	Overall, most of my expectations from using Digital Wallet were confirmed	
Perceived Usefulness		
PU1	using Digital Wallet improves my performance in my payment activity	(Daragmeh, et al. 2021), (Thiruselvi et al.,2013), (Rahi et al., 2020), (Khayer et al., 2019)
PU2	Using Digital Wallet enhances my effectiveness in my payment activity	
PU3	Using Digital Wallet improves my performance in my payment activity	
PU4	overall, Digital Wallet is useful in managing my payment activity	
Perceived Ease of Use		
PE1	Digital Wallet is easy to use	(Daragmeh, et al. 2021), (Thiruselvi et al.,2013), (Rahi et al., 2020), (Khayer et al., 2019)
PE2	My interaction with Digital Wallet would be clear and understandable	
PE3	Interaction with Digital Wallet does not require a lot of my mental effort	
PE4	I find it easy to get Digital Wallet to do what I want it to do	
Satisfaction		
SF1	I feel satisfied with Digital Wallet usage	(Daragmeh, et al. 2021), (Thiruselvi et al.,2013), (Rahi et al., 2020), (Khayer et al., 2019)
SF2	I feel happy using Digital Wallet service	
SF3	Digital Wallet has met my expectations in making my payment activity	
SF4	Digital Wallet is efficient in fulfilling my payment activity	
Attitude		
AT1	Using Digital Wallet for payment would be a wise idea	(Daragmeh, et al. 2021), (Thiruselvi et al.,2013), (Rahi et al., 2020), (Khayer et al., 2019)
AT2	Using Digital Wallet would be a pleasant experience	
AT3	Using Digital Wallet would be a good idea	
AT4	I like the idea of Digital Wallet for my payment	
Continuous Usage		
CU1	I intend to always use digital wallet	(Daragmeh, et al. 2021), (Thiruselvi et al.,2013), (Rahi et al., 2020), (Khayer et al., 2019)
CU2	I will continue to use digital wallet regularly	
CU3	I continue use digital wallet instead of using other payment instruments	
CU4	I would suggest others use the digital wallet application	

3.4 Data Analysis

This study used partial least squares and structural equation modelling to evaluate the survey questionnaire data (PLS-SEM). PLS-SEM is a robust statistical method suitable for both predictive and explanatory research purposes, as recommended by Hair et al. (2017) [39] and Sarstedt et al. (2017) [40]. It is particularly well-suited for analyzing large sample sizes, capturing complex relationships, and testing hypotheses.

Testing the proposed linear correlations between the independent variables (performance expectancy, habit, and price-saving orientation) and the dependent variable was the main goal of the data analysis (continuous usage). The mediating impact of two generational cohorts (Millennials and Gen Z) on the relationship between the independent factors and the dependent variable was also investigated using PLS-SEM.

PLS-SEM analysis findings will be given as standardized path coefficients and R2 values. The R2 values offer information on the percentage of variance the model explains, while the standardized path coefficients show the strength and direction of the relationships between the variables.

To conduct the analysis, we utilized Smart PLS 4.0 software, which is widely recognized and accepted in the field of PLS-SEM. The software provides a comprehensive suite of tools for estimating parameters, assessing model fit, and conducting bootstrapping procedures to validate the statistical significance of the relationships.

IV.   VALIDITY TEST

4.1 Respondent Profile

A total of 256 participants voluntarily completed the meticulously designed questionnaire, which yielded valuable insights for this research study. Among the respondents, 15 individuals (5.8%) reported no prior usage of digital wallets, while the remaining 241 respondents (94.2%) had prior experience with digital wallet usage. The data collected through this diverse pool of respondents has been further enriched by including various demographic factors, such as gender, marital status, age (categorized as millennials or Gen Z), educational background, and more. A comprehensive overview of the respondent profiles can be found in Table 3.

The richness and validity of the data acquired are improved by including various respondent profiles. This study seeks to give a thorough knowledge of the variables influencing the use of digital wallets and any potential ramifications within the framework of our research goals by considering various demographic characteristics.

Table 3. Respondent Profile

Gender		
Male	145	60%
Female	96	40%
Marital Status		
Married	139	58%
Unmarried	102	42%
Age		
Less than 28 Years Old (Gen Z)	87	36%
More than 28 Years Old (Gen Y)	154	64%
Last Education		
Bachelor Degree/Associate Degree	193	80%
Master Degree	23	10%
Doctoral Degree	2	1%
Senior High School	22	9%
Other	1	0%
Job Type		
House Wife/Husband	23	10%
Government/BUMN Employee	43	18%
Private Employee	111	46%
Self Employee	25	10%
Other	39	16%
Income per Month		
Between IDR 5 Million to 10 Million	93	39%
Less than IDR 5 Million	60	25%
More than IDR 10 Million	88	37%
Frequency of use of Digital Wallet		
3-5 Times a Week	74	31%
More than 5 Times a Week	114	47%
less than 3 Times a Week	53	22%
Average Spending per Month		
Between Rp. 5 million to Rp. 10 million	79	33%
Less than Rp. 5 million	123	51%
More than Rp. 10 million	39	16%
Average Spending per Month using a Digital Wallet		
Between Rp. 1 Million to Rp. 3 Million	101	42%
Less than Rp. 1 Million	117	49%
More than Rp. 3 Million	23	10%

Frequently Used Digital WalletAapps		
OVO	140	29%
Gopay	207	43%
Dana	49	10%
LinkAja	38	8%
ShopeePay	39	8%
I saku	3	1%
flip	1	0%
Frequent transactions using a Digital wallet		
Payment Merchant	218	53%
Bill Payment (electricity, water, tax)	17	4%
Telecommunications (pulse, data)	107	26%
Move Funds (cash withdrawal, transfer	60	15%
Transportation	10	2%

4.2 Convergent validity Assessment

Convergent validity was meticulously evaluated in this study by employing two crucial parameters: factor/outer loading and Average Variance Extracted (AVE). To establish convergent validity, it is commonly advised that factor/outer loadings should use a threshold of 0.708, and the AVE value should be equal to or greater than 0.5 [41]. Moreover, in certain research endeavours, a factor/outer loading value of at least 0.5 is deemed acceptable if the AVE meets or surpasses 0.5. The results of the comprehensive convergent validity analysis conducted in this research are presented in Tables 4 and 5, demonstrating that all variables satisfactorily meet the prescribed criteria for convergent validity.

Table 4 Factor/Outer Loading

	Attitude	Confirmation	Continuous Usage	Perceived Ease of Use	Perceived Usefulness	Satisfaction
A1	0,859					
A2	0,907					
A3	0,896					
A4	0,885					
C1		0,793				
C2		0,864				
C3		0,863				
C4		0,85				
CU1			0,875			
CU2			0,899			
CU3			0,895			
CU4			0,854			
PEU1				0,847		
PEU2				0,885		
PEU3				0,822		
PEU4				0,895		
PU1					0,927	
PU2					0,896	
PU3					0,904	
PU4					0,798	
S1						0,886
S2						0,882
S3						0,904
S4						0,888

Table 5 AVE

Variable	Average variance extracted (AVE)
Attitude	0,787
Confirmation	0,711
Continuous Usage	0,776
Perceived Ease of Use	0,745
Perceived Usefulness	0,779
Satisfaction	0,792

4.3 Construct Reliability Assessment

In this study, the assessment of construct reliability was conducted using two fundamental metrics: Cronbach's alpha and composite reliability. The criteria for establishing construct dependability were set at a composite reliability value exceeding 0.7 and a Cronbach's alpha value surpassing 0.7. The results of the construct reliability analysis, as shown in Table 6, demonstrate that all variables successfully meet the prescribed criteria for satisfactory construct reliability.

Cronbach's alpha, a measure of internal consistency, evaluates the degree of correlation among the elements of a construct. A higher Cronbach's alpha value indicates stronger internal consistency and greater reliability of the measurement scale. Similarly, composite reliability evaluates how much of the shared variance among its indicators is explained by the latent construct. A higher composite reliability value signifies a higher level of reliability for the construct [42].

By meeting the criteria for construct reliability, the measurement model employed in this study effectively demonstrates that the selected indicators consistently and reliably capture the underlying constructs. As such, the measurement instrument utilized in this research is dependable and apt for accurately assessing the constructs under investigation.

Table 6 Construct Reliability

Variable	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Attitude	0,909	0,91	0,936	0,787
Confirmation	0,864	0,865	0,907	0,711
Continuous Usage	0,904	0,904	0,933	0,776
Perceived Ease of Use	0,886	0,894	0,921	0,745
Perceived Usefulness	0,904	0,909	0,934	0,779
Satisfaction	0,912	0,914	0,938	0,792

4.4 Discriminant Validity

This study's discriminant validity was examined using the widely recognized Fornell-Larcker criterion with a more conservative method [41]. This criterion checks whether the Average Variance Extracted (AVE) square root for each construct exceeds the correlations between the constructs. The primary objective of this test is to ensure that the constructs under investigation are distinct and capable of being clearly distinguished from one another. To establish discriminant validity, it is imperative to demonstrate that the square root of the AVE for each construct is greater than the correlations between them. The outcomes of the discriminant validity analysis, presented in Table 7, unequivocally indicate that every variable meets the prescribed criteria for discriminant validity.

Table 7 Discriminant Validity (Fornell Lecker)

Variable	Attitude	Confirmation	Continuous Usage	Perceived Ease of Use	Perceived Usefulness	Satisfaction
Attitude	0,887					
Confirmation	0,61	0,843				
Continuous Usage	0,709	0,536	0,881			
Perceived Ease of Use	0,59	0,667	0,531	0,863		
Perceived Usefulness	0,634	0,653	0,558	0,657	0,883	
Satisfaction	0,731	0,629	0,628	0,675	0,677	0,89

V.   RESULTS

This study examined the relationships between variables based on one-tailed hypotheses. The minimum threshold for significance was determined with t-values greater than 1.645 and p-values less than 0.05. The results of the hypothesis testing are presented in Table 8. It is worth noting that the two hypotheses did not meet the minimum threshold and, therefore, have no significant effect. These hypotheses include the impact of Perceived Ease of Use on Attitude and Perceived Usefulness on Continuous Usage.

5.1 Hypothesis 1: Perceived Ease of Use affects Perceived Usefulness.

The results reveal a significant positive effect of Perceived Ease of Use on Perceived Usefulness (T statistics = 4.966, P values = 0). This finding indicates that participants who perceived digital wallets as easier to use also perceived them as more useful. This result is consistent with prior research conducted by Abdul-Halim et al. (2021) [43] in Malaysia, reaffirming the influential role of perceived ease of use in shaping users' perceptions of usefulness. The significance of this relationship suggests that enhancing the user-friendliness and simplicity of digital wallet interfaces could potentially lead to higher perceived usefulness, fostering greater acceptance and adoption among users.

5.2 Hypothesis 2: Confirmation affects Perceived Usefulness.

The findings demonstrate a significant positive relationship between Confirmation and Perceived Usefulness (T statistics = 5.005, P values = 0). This implies that users whose initial expectations and beliefs about digital wallets are confirmed through their experiences tend to perceive these payment methods as more useful. This result aligns with the outcomes of research by Abdul-Halim et al. (2021) [43] in Malaysia, indicating the importance of positive confirmation in enhancing perceived usefulness. Digital wallet providers should prioritize delivering experiences that align with users' preconceived notions to positively influence their perceptions and foster greater satisfaction and acceptance.

5.3 Hypothesis 3: Confirmation affects Satisfaction.

The analysis reveals a significant positive effect of Confirmation on Satisfaction (T statistics = 4.579, P values = 0). This indicates that when users' expectations about digital wallets are confirmed, they experience higher satisfaction with the service. The results align with prior research by Abdul-Halim et al. (2021) [43] in Malaysia, highlighting the importance of meeting users' expectations to enhance their satisfaction. Confirming user experiences can foster long-term user loyalty and continuous usage of digital wallets.

5.4 Hypothesis 4: Perceived Usefulness affects Satisfaction.

The results demonstrate a significant positive impact of Perceived Usefulness on Satisfaction (T statistics = 7.235, P values = 0). This finding suggests that users who perceive digital wallets as more useful also tend to be more satisfied with their usage. This result is consistent with research conducted in Vietnam [44] and Malaysia [45], as well as supported by Olivia and Kezia Marchyta's (2022) [46] study. The significance of this relationship emphasizes the critical role of perceived usefulness in shaping user satisfaction and highlights the importance of providing value-added features and functionalities to enhance users' overall experience.

5.5 Hypothesis 5: Perceived Usefulness affects Attitude.

The analysis indicates a significant positive effect of Perceived Usefulness on Attitude (T statistics = 2.846, P values = 0.002). This suggests that users who perceive digital wallets as useful also tend to be more positive toward these payment methods. The findings align with the results of Abdul-Halim et al. (2021) [43] in Malaysia, emphasizing the role of perceived usefulness in shaping users' overall attitudes and perceptions. Providers should focus on enhancing perceived usefulness and highlighting the benefits and advantages of using these payment solutions to encourage increased acceptance and usage of digital wallets.

5.6 Hypothesis 6: Perceived Ease of Use affects Attitude.

The findings reveal no significant relationship between Perceived Ease of Use and Attitude (T statistics = 1.24, P values = 0.108). This indicates that users' perceptions of how easy digital wallets are to use are relatively low on their overall attitude towards these payment methods. This finding agrees with the work done in Malaysia by Abdul-Halim et al. (2021) [43]. While this relationship is not statistically significant, other factors may substantially shape users' attitudes toward digital wallets.

5.7 Hypothesis 7: Perceived Usefulness affects Continuous Usage.

The analysis indicates that there is no significant relationship between Perceived Usefulness and Continuous Usage (T statistics = 1.48, P values = 0.07). This suggests that users' perception of digital wallets' usefulness does not directly translate into increased continuous usage. This result is consistent with research conducted by Hapsoro, B., and Kismiatun, K. (2023) [47] in Indonesia. However, it differs from the findings of Brahanta and Wardhani (2021) [48], who argue that Perceived Usefulness significantly affects the continuous usage of digital wallets. Further investigation may be needed to understand the factors influencing continuous usage beyond perceived usefulness.

5.8 Hypothesis 8: Satisfaction affects Attitude.

The results demonstrate a significant positive impact of Satisfaction on Attitude (T statistics = 7.125, P values = 0). This suggests that users who are more satisfied with their digital wallet experiences also tend to hold a more positive attitude toward using these payment methods. The findings of Abdul-Halim et al. (2021) [43] in Malaysia are consistent with this finding, indicating that user satisfaction plays a crucial role in shaping positive attitudes toward digital wallets. To promote sustained usage and positive perceptions, digital wallet providers should prioritize delivering satisfying user experiences.

5.9 Hypothesis 9: Satisfaction affects Continuous Usage

The analysis reveals a significant positive effect of Satisfaction on Continuous Usage (T statistics = 2.498, P values = 0.006). This implies that users more satisfied with their digital wallet experiences are more

likely to engage in continuous usage. In Malaysia, Abdul-Halim et al. (2021) [43] came to similar conclusions, therefore, ours dovetails with theirs, emphasizing the importance of user satisfaction in driving long-term adoption and usage. Digital wallet providers should prioritize user satisfaction to encourage continuous and sustainable usage among their customer bases.

5.10 Hypothesis 10: Attitude affects Continuous Usage

The findings indicate a significant positive impact of Attitude on Continuous Usage (T statistics = 6.417, P values = 0). This suggests that users with a more positive attitude towards digital wallets are more likely to continue using them over time. According to Abdul-Halim et al. (2021) [43] research in Malaysia, our results are consistent with theirs, emphasizing the role of positive attitudes in shaping users' behavioural intentions. Digital wallet providers should focus on cultivating positive perceptions through targeted marketing and enhancing user experiences to promote sustained usage and encourage favorable attitudes.

Table 8 Direct Effect

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Result
Attitude -> Continuous Usage	0,503	0,51	0,078	6,417	0	Affect
Confirmation -> Perceived Usefulness	0,387	0,39	0,077	5,005	0	Affect
Confirmation -> Satisfaction	0,327	0,331	0,071	4,579	0	Affect
Perceived Ease of Use -> Attitude	0,095	0,099	0,077	1,24	0,108	Not Affect
Perceived Ease of Use -> Perceived Usefulness	0,399	0,397	0,08	4,966	0	Affect
Perceived Usefulness -> Attitude	0,222	0,224	0,078	2,846	0,002	Affect
Perceived Usefulness -> Continuous Usage	0,116	0,115	0,079	1,48	0,07	Not Affect
Perceived Usefulness -> Satisfaction	0,464	0,46	0,064	7,235	0	Affect
Satisfaction -> Attitude	0,517	0,514	0,073	7,125	0	Affect
Satisfaction -> Continuous Usage	0,182	0,177	0,073	2,498	0,006	Affect

VI. DISCUSSION

The present study sought to examine the relationships between various constructs related to digital wallet usage among 256 respondents. Validity and reliability tests were performed during the analysis to confirm data quality. All variables successfully met the criteria for these tests, indicating the validity and reliability of the measurement model. The findings from the Fornell-Larcker discriminant validity test further confirmed that the variables were distinct and distinguishable from one another.

Regarding the hypotheses testing, the results revealed that 8 out of the 10 proposed hypotheses exhibited significant positive effects. These supported hypotheses included the positive impacts of perceived ease of use on perceived usefulness, confirmation on perceived usefulness, perceived usefulness on satisfaction, perceived usefulness on attitude, perceived usefulness on continuous usage, satisfaction on attitude, satisfaction on continuous usage, and attitude on continuous usage. These findings are consistent with prior research conducted by Abdul-Halim et al. (2021) [43], PHUONG et al. (2020) [44], and Hapsoro, B., and Kismiatun, K. (2023) [47], which strengthens the validity and generalizability of the results. It is worth noting that the research conducted specifically in the Southeast Asia region has similar results compared to other regions.

However, two hypotheses did not meet the significance criteria. Specifically, the relationship between perceived ease of use and attitude and perceived usefulness and continuous usage yielded non-significant results. The p-values for these two relationships were 0.108 and 0.07, respectively. These non-significant findings contrast with the previous studies [15][16][17][48] that reported significant effects, indicating that perceived ease of use influences attitude and perceived usefulness affects continuous usage.

These non-significant effects warrant further discussion and exploration. Possible explanations for these results could be attributed to unmeasured variables or contextual factors not considered in this study. For instance, the influence of trust, security concerns, or the impact of social influence on users' attitudes and continuous usage of digital wallets might play a more substantial role than previously acknowledged. Additionally, the specific characteristics of the sample or limitations in the measurement instruments could have influenced these outcomes.

The significant effects observed in the supported hypotheses emphasize the importance of perceived usefulness, satisfaction, and attitude in shaping users' continuous usage of digital wallets. These findings have practical implications for digital wallet providers and policymakers, highlighting the significance of user-centric design and positive user experiences to foster long-term adoption and usage.

Nevertheless, the non-significant effects underscore the complexity of user behaviour and decision-making processes concerning digital wallet usage. As such, it is crucial for future research to delve deeper into the unexplored variables and contextual factors that may influence users' attitudes and continuous usage. Future research on the factors affecting attitude and continued use of digital wallets would benefit more by incorporating elements like trust, security concerns, and social impact.

Moreover, increasing the sample size and including a more varied set of individuals may improve the findings' generalizability and robustness. Additionally, longitudinal research or experimental approach may offer insightful information on the causal connections between the variables.

VII.   CONCLUSION

This study examines the ongoing use of digital wallets, particularly during the period leading up to the COVID-19 endemic, evaluating a total of 10 hypotheses. Data collection used a survey method, with a total of 256 participating respondents. The tools used to perform data analysis are Smart PLS 4.0. The study results found that two hypotheses were not following previous research, so it was concluded that perceived ease of use did not affect attitude and perceived usefulness did not affect continuous usage. Several factors can explain these differences, namely the existence of differences in the objects studied, such as Thiruselvi (2013) [17] researching the continued usage of E-HRM applications or research locations such as Khayer et al. (2019) [16], who researched the continuity usage of Alipay in China. Additionally, the timing of the research can also be a differentiating factor as the research was conducted during the COVID-19 pandemic, which also had contradictory phenomena and the potential to weaken the digital wallet industry, as stated in the introduction.

There are several limitations to this research. First, the number of sample research data points is small, so it cannot represent the entire population. Second, the research is still general, and no more specific classification has been carried out, such as gender, age, or livelihood factors. Third, for further research, other variables can be added that can complement and strengthen the effect of continuous usage, such as the trust variable.

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