Expanding the technology acceptance model with the inclusion of trust and mobility to assess e-wallet user behavior: Evidence from OVO consumers in Indonesia

D Hidayat¹, C H Pangaribuan²*, O P B Putra³, F J Taufiq⁴

¹ BINUS Entrepreneurship Center, Management Department, Bina Nusantara University, Jakarta, Indonesia, 11480
² BINUS Business School Undergraduate Program, Management Department, Bina Nusantara University, Jakarta, Indonesia, 11480
³ Management Study Program, Faculty of Business, Sampoerna University
⁴ Email: pangaribuanchristian@yahoo.com

Abstract. In view of the government’s demonetizing decision to make Indonesia a cashless society, this study aimed to discover the important factors influencing consumers’ attitudes and intentions in using the e-wallet payment system. The authors wanted to find out whether trust, mobility, easiness of use, and usefulness attract customers and encourage them for usage. The quantitative approach in this study was due to the practicality of interpretation and analysis of the data. The primary data was collected by conducting the survey through questionnaires that were sent to the respondents. To test the proposed research model, the authors collected data using a questionnaire survey from 286 OVO consumers in Jakarta. The research findings reveal that mobility is the weakest factor, and perceived usefulness is the strongest factor affecting the users’ attitudes and intention towards using the e-wallet payment system.

Keywords: e-wallet, OVO, consumers’ attitudes

1. Introduction

The world is gradually transitioning from money-driven or the use of physical money in the transition to a cashless society. The advance exchanges are traceable, accordingly effectively accessible, ruling out the course of dark cash [22]. This modernization of cash exchanges has motivated the user to do the cashless transaction. It provides more benefits to both parties, the user, and the bank or provider.

Consumer awareness of Fintech is also increasing. Fintech report 2018 stated that understanding Fintech increased from 26.34% in 2016 to 67.20% in 2017 and increased to 70.63% in 2018 [13]. From a survey conducted with 2009 respondents, Fintech users increased from 18.46% in 2016 to 60.96% in 2017, and 58.14% in 2018. The respondents also explain the reasons for using Fintech, which include ease to use, simplicity, efficiency, and practicality. While Fintech service operated by the bank was decreasing in the past three years; from 87.00% in 2016 to 73.40% in 2017, and 42.18% in 2018, Fintech service operated by start-ups were increasing, from 10.27% in 2016, 15.02% in 2017 and increased to 35.27% in 2018. In regards to scale and volume, OVO, which will be discussed further in this research, is leading among the more than 100 mobile payment providers in Indonesia [37]. The number of OVO...
users has increased to 115 million up to the end of December 2018. This increase 400% compared to the three most significant transactions on transportation, retail, and e-commerce [17]. It is apparent that Indonesia has been facing a rapid growth of Fintech. While it brings an abundance of benefits, this advancement has its fair share of risk, such as security issues. The mobile payment instrument is prone to crime. Despite the rapid increase of mobile wallet users, the main factors influencing the attitudes towards using OVO and intention to use OVO remains unknown. Perhaps, a study of assessing customer attitudes toward intention to use mobile payment instrument OVO that gives the effect of the increase of mobile payment instrument in Indonesia. Therefore, our first objective is to analyze whether trust, perceived usefulness, ease of use, and mobility positively influence the attitude towards using mobile payment service. Our second objective is to analyze whether the attitudes towards using e-wallet payment transactions positively influence the intention to use a mobile payment instrument and determine whether the four independent variables positively influence the intention to use e-wallet payment service. The current study’s findings would provide a comprehensive view of the consumers using e-wallet transactions so that the developers and marketers can pay more attention to convenience, security, and belief factors to improve the system’s effectiveness.

2. Literature review

Technology Acceptance Model (TAM) is an adaptation theory from the Theory of Reasoned Action (TRA) developed by Fishbein and Azjen [14] for users’ acceptance of information systems. The TRA was developed into the TAM theory emphasizing the perceived usefulness and perceived ease of use [11]. TAM suggests that perceived usefulness (PU) and perceived ease of use (PEOU) are the two most important factors in explaining individuals’ user acceptance and actual usage [30]. TAM explains that behavioral intention is determined by attitude toward technology use, which has also been determined by the two external variables of perceived usefulness and perceived ease of use [18]. This external variable will be analyzed for its effect on perceived usefulness and ease of use in this research. It will later be analyzed on how it affects the attitude toward using electronic payment and then how it affects the usage intention.

Although various security measures and mechanisms have been designed for the virtual environment, many security problems still remain [6]. To attract and retain e-payment users, it is important to enhance consumers’ security perceptions and maintain customers’ trust during e-payment transactions [20]. Therefore, understanding the mechanism that mitigates risks and facilitates transactions is necessary [19].

Trust can be divided into trust in mobile technology’s ability to reduce transaction risk, and trust about service providers will meet the expectations of customers [35]. Trust can be defined as a crucial enabling factor when uncertainty and opportunism exist [28]. Trust may affect people’s attitudes toward using a technological device. Trust has emerged as one of the most important factors in the context of consumers’ attitudes towards the adoption of wallet apps for making small day to day payments to other financial transactions [27]. Accordingly, when a consumer finds that the details provided by them in an online and unknown environment are secured and safe, then it results in building a positive attitude towards wallet app adoption [39] [27]. According to previous studies, trust is indicated to have a strong effect on the intention to use a mobile payment system [42] [9]. However, Generation Y may have understood and adapted to the digital transactions well enough; hence the factor of trust may not be a significant influence on behavioral intentions [31] [38]. Based on the discussion, we can hypothesize:

H1: Trust positively affects the attitude towards using e-wallet for online transactions.
H2: Trust positively affects the intention to use e-wallet for online transactions.
Perceived usefulness is defined as the extent to which the individual believes that using a system will enhance her/his job performance [11]. In the current study, a person forms perceived usefulness judgment by comparing what the e-wallet payment system is capable of doing with what they need to get done. Previous studies indicate that the usefulness factor is positively associated with acceptance of e-wallet amongst Gen Y in India [38]. It is continuance intention in the context of electronic textbooks [4], mobile service providers [1], online travel services [23], and online shopping in Malaysia [25]. Nonetheless, the relationship between perceived usefulness and intention to shop online remains contradictory [32]. Hence, it is expected that:

H3: Perceived usefulness positively affects the attitude towards using e-wallet for online transactions.

H4: Perceived usefulness positively affects the intention to use e-wallet for online transactions.

Perceived ease of use refers to the extent to which an individual believes using a system will be free of effort [11]. The antecedents to what make technology easy to use is due to the ease of learning and to become skillful at using it [8]. From the perspective of this study, it is expected that the basis of e-wallet ease of use requires direct hands-on experience for someone to become well-formed in order to judge how easy or difficult it is. Perceived ease of use was also a factor that strongly influences behavioral intention to use a new system or technology [36]. Previous studies indicate that the ease of use factor is positively associated with mobile payment in Hong Kong [41], online shopping in Malaysia [25], purchasing airlines ticket online [34], and intention to use e-wallet in Bangkok [29]. Previous studies found that perceived ease of use did not affect attitude and intention to adopt internet banking and 3G technology [5] [7]. Therefore, we propose the following hypothesis:

H5: Perceived ease of use positively affects the attitude towards using e-wallet for online transactions.

H6: Perceived ease of use positively affects the intention to use e-wallet for online transactions.

Mobility is among the attributes that solve daily problems or satisfy users’ wishes [33]. The term ‘mobility’ is referred to the ability to access services ubiquitously, on the move, and through wireless networks and a variety of mobile devices, including personal digital assistant (PDA) and mobile phones [21]. Mobility, one of the most important features that differentiate mobile payment to traditional payment systems, can make all the transactional processes [10]. The key influence to adopt a new product or service is mobility factors such as independence of time and location in use [3]. Mobility plays a key role for customers in Vietnam to use mobile payment services to pay for products or services [26]. Thus, the following hypotheses are proposed to be tested:

H7: Mobility positively affects the attitude towards using e-wallet for online transactions.

H8: Mobility positively affects the intention to use e-wallet for online transactions.

The TAM model approach is the later version of the theoretical ideas of Fishbein and Ajzen [14], which was revised and expanded by Davis [12] by including the factor of attitudes. Attitudes have proven to have a direct and positive effect on the intention to adopt various innovations in past studies, e.g., the mobile payment system in Brazil [24], online recruitment [2], elementary school multimedia teaching [40], and collaborative learning [16]. Therefore, the following hypothesis is proposed:

H9: Attitude positively affects the intention to use e-wallet for online transactions.
3. Research methodology
The quantitative approach in this study is due to the practicality of interpretation and analysis of the data. The primary data was collected by conducting the survey through questionnaires that were sent to the respondents. It is explained that a minimum of five subjects per variable is needed [15]. Therefore, to determine the total sample for this research, the required minimum sample size is 90 (18x5 subjects). The explanation is that 18 is the measurement item from each question of the variables. However, this study managed to get 286 respondents in total for the sample size from the online survey.

The measurement used in this questionnaire in this research is the Likert scale. The author uses a 5-points Likert scale, which ranges from strongly disagree to strongly agree. The use of the 5-point Likert scale is to minimize respondent’s confusion in answering the questions and keeping the originality of the questionnaire questions from a previous study where this questionnaire is adopted.

There are two multiple regression models in this study. In the first model, multiple regression was utilized to evaluate the relationship between the four independent variables (trust, perceived usefulness, ease of use, and mobility) and one dependent variable (attitude). Meanwhile, the second model was to assess the relationship between the five independent variables (trust, perceived usefulness, perceived ease of use, mobility, and attitude), and one dependent variable (intention). The framework model of this current research can be illustrated in Figure 1.

![Figure 1. Framework Model](image)

4. Results and discussion
In Table 1, the validity and reliability results of the variables were pre-tested by getting inquiries from 30 respondents. All variables are deemed valid to be tested further by having the KMO of more than 0.5 and Cronbach’s Alpha greater than 0.7. Respondents who participated in completing the questionnaires are 193 females, 91 males, and two preferred not to answer. Most of the respondents participated are 22-25 (199 people), followed by < 20 years old group (47). For places of residence, most of them are from Jakarta (58%).

The multiple R (R) in Model 1 is 0.793, or its value is greater than 0.1, and it indicates a strong linear relationship. Besides, the model summary shows the R square (R²) value is 0.629, which illustrates that 62.9% of the Attitude factor can be explained by Trust (TRU), Perceived Usefulness (PU), Perceived Ease of Use (PEOU) and Mobility (MOB). The model summary includes the Adjusted R Square with value 0.568, which indicates that 62.4% of the model can be described through those four
independent variables. Multiple R (R) in Model 2 is 0.754. It indicates a strong linear relationship value as it is greater than 0.1. Besides, the model summary shows the R square (R²) is 0.569, which illustrates that 56.9% of intention to use e-wallet can be explained by the variable attitude. The model summary includes the Adjusted R Square with value 0.568, which indicates that 56.8% of the model can be described by the predictor variable.

It can be seen in Tables 1 and 2 that the ρ-value of TRU is 0.003 and 0.013, respectively, meaning that both are higher than α (0.05). Also, the values of the t-test (2.999 in Model 1 and 2.492 in Model 2) are higher than the t-table value of 1.962. Overall, the variable trust is significant, and H1 and H2 should be accepted, meaning that the trust factor does affect the attitude towards using e-wallet and intention to use it significantly. This result aligns with the findings from previous studies, which described that the increase in the app safety and security could be attributed to the attitude to using the mobile payment, thus giving consumers a more positive belief in using e-wallet [39] [27] [42] [9].

The values of the t-test of PU (8.142 and 3.405) are higher than the t-table value of 1.962. Overall, perceived usefulness is significant, and H3 and H4 can be accepted, meaning that the useful perception factor does affect the attitude towards using e-wallet and intention to use it significantly. This result aligns with the findings from previous studies which described that the increase in judgment that the app can enhance one’s job performance could be attributed to the attitude to using the mobile payment, thus giving consumers a more positive belief in using e-wallet [38] [4] [1] [23] [25].

The value of the t-test of PEOU (3.868) is higher than the t-table value of 1.962. Overall, ease of use towards attitude is significant, and H5 can be accepted. This means that the useful perception factor plays a key role in significantly affecting the attitude towards using the e-wallet. This result aligns with the findings from previous studies, which described that the increase in the belief that using the system will be free of effort could be attributed to the attitude to using the mobile payment [41] [25] [34] [29].

Since the t-table value of PEOU towards intention (1.599) is lower than the t-table, H6 should be rejected, which means that the ease of use of an e-wallet does not affect someone’s intention using the app. On the other hand, some studies indicate that ease of use of a device can facilitate or inhibit the adoption of technology [5] [7]. It is expected that a mobile app’s menu display, for example, should be important to most Internet users. This finding may be attributable to the fact that customers in this study context used their personal devices, which carries an implicit trust in these devices. It is also important to note that there is no significant relationship between ease of use and customers’ intention to adopt e-wallet.

### Table 1. Coefficients of Multiple Regression (Model 1)

| Model | Unstandardized Coefficients | Standardized Coefficients | t | Sig. |
|-------|----------------------------|---------------------------|---|------|
|       | B                           | Std. Error                | Beta |     |      |
| 1     | (Constant)                 | -0.282                    | 0.207 | -1.361 | 0.175 |
|       | TRU                         | 0.160                     | 0.053 | 0.145 | 2.999 | 0.003 |
|       | PU                          | 0.479                     | 0.059 | 0.418 | 8.142 | 0.000 |
|       | PEOU                        | 0.238                     | 0.062 | 0.210 | 3.868 | 0.000 |
|       | MOB                         | 0.143                     | 0.030 | 0.196 | 4.759 | 0.000 |

a. Dependent Variable: ATT
Table 2. Coefficients of Multiple Regression (Model 2)

| Model | Unstandardized Coefficients | Standardized Coefficients | t     | Sig.  |
|-------|-----------------------------|---------------------------|-------|-------|
|       | B              | Std. Error | Beta |       |       |
| 2     | (Constant)  | -0.742 | 0.346 | 2.353 | 0.33  |
| TRU   | 0.221 | 0.089 | 0.152 | 2.492 | 0.013 |
| PU    | 0.334 | 0.098 | 0.221 | 3.405 | 0.001 |
| PEOU  | 0.164 | 0.103 | 0.110 | 1.599 | 0.111 |
| MOB   | 0.307 | 0.050 | 0.321 | 6.143 | 0.000 |
| ATT   | 0.994 | 0.051 | 0.754 | 19.368| 0.000 |

a. Dependent Variable: INT

The values of the t-test of MOB (4.759 and 6.143) are higher than the t-table value of 1.962. The data revealed that mobility was significantly associated with attitudes and intentions; thus, H7 and H8 can be accepted. This result aligns with the findings from previous studies, which described that the ability to access services ubiquitously could explain the consumers’ attitude and intention to use e-wallet [26].

The t-test value of ATT (19.368) is higher than the t-table value of 1.962. The data revealed that attitude was significantly associated with intentions; thus, H9 cannot be rejected. This result aligns with the findings from previous studies, which described that the favorable attitude of a consumer towards an e-wallet app would improve his intention to adopt it [24] [2] [40] [16].

5. Conclusion and recommendations

The main conclusion of this study is that trust, usefulness, ease of use, and mobility are important antecedents of attitude. However, perceived ease of use influence on intention is more complex than originally thought. From the proposed model, one can conclude that the relationship between ease of use and intention was not statistically significant. Although usefulness seems to be the most important direct predictor of attitude, one can see that attitude plays a significant role when conserving the indirect effect of usefulness. Moreover, trust and mobility conserve better direct effects on intention rather than through attitude.

As suggested by our research, factors such as trust, perceived usefulness, ease of use, and mobility are keys to companies interested in adopting mobile payment systems. However, the key to diffuse these new payment systems is in the general public’s change regarding mobile payments. It is therefore advised that corporations focus marketing strategies on informing consumers of the benefits of the service while promoting the safety of the technologies to the process of adoption of the payment system through mobile phones. These factors are related to the trust and mobility elements of today’s technological environment.

Trust is a basic factor in the acceptance by consumers of the new payment systems, hence implementing relevant security measures to reduce perceived risk and, consequently, encourage future intention to use. Furthermore, usefulness is also crucial in creating an attitude towards using the payment systems as it reinforces the intention to use. Again, the usefulness of the e-wallet may want to encourage e-wallet suppliers to add value to their use. The effect on attitude toward e-wallet highlights the need for firms to create an effort to ensure that the perception and general opinion of the new payment system are improved.

The data used in this study are limited to the OVO users. Some additional measurements could be used to collect the perspectives of other e-wallet users of mobile payment technologies in future work. Furthermore, the sample size should be increased to strengthen the findings’ validity in any future work.
References

[1] Abbas H A and Hamdy H I 2015 Determinants of continuance intention factor in Kuwait communication market: Case study of Zain-Kuwait Comp. in Hum. Beh. 49 pp 648–657
[2] Arsanjani T A and Yulisasari E 2018 Personal Factors as Predictors of Intention to Use IT J Manajemen dan Kewirausahaan 20 129–136
[3] Arvidsson N 2014 Consumer attitudes on mobile payment services – results from a proof of concept test Int’l J Bank Mkrg 32 150–170
[4] Baker-Evelleth L. and Stone R W 2015 Usability, expectation, confirmation, and continuance intentions to use electronic textbooks Beh. & Info. Tech. 34 992–1004
[5] Boateng H, Adam D R, Okoe A F and Anning Baker Arvidsson N Buton Abbas H A and Hamdy H I 2015 Individual differences and usage behaviour: revisiting a technology acceptance model assumption. The DATA BASE for Adv. in Info. Sys. 36 58–77
[6] Cao T K, Dang P L and Nguyen H A 2016 Predicting consumer intention to use mobile payment services: Empirical evidence from Vietnam Int’l J Mkrg Studies 8 117–124
[7] Davis F D and Venkatesh V 2004 Toward Pre-prototype User Acceptance Testing of New Information Systems: Implications for Software Project Management IEEE Transactions on Eng. Manag. 5131–46
[8] Davis F D 1989 Perceived usefulness, perceived ease of use, and user acceptance of information technology MIS Quarterly 13 319-340
[9] Eka R 2018 Laporan DailySocial Fintech Report 2018 Retrieved from https://dailysocial.id/post/fintech-report-2018
[10] Fishbein M and Ajzen I 1975 Belief, attitude, intention and behavior: An introduction to theory and research (Reading MA: Addison Wesley)
[11] Huang Y-M 2015 Exploring the factors that affect the intention to use collaborative technologies: The differing perspectives of sequential/global learners Australasian J Educ. Tech. 31 278–292
[12] InvestorDaily 2019 Pengguna OVO capai 115 Juta Retrieved from investor.id: https://investor.id/archive/pengguna-OVO-capai-115-juta
[13] Kabir M A, Saidin S Z and Ahmi A 2017 The Influence of Perceived Usefulness and Perceived Ease of Use on the Continuous Intention to Use Electronic Collection System in Nigerian Hospitals: A Conceptual Approach Asian J Multidisciplinary Studies 5 225–228
[14] Khrais L T 2015 Highlighting the Vulnerabilities of Online Banking System Journal of Internet Banking and Commerce 20 1–10
[15] Kim C, Mirusmonov M and Lee I 2010a An empirical examination of factors influencing the intention to use mobile payment Comp. in Hum. Beh. 26 310–322
[16] Kim C, Tao W, Shin N and Kim K-S 2010b An Empirical Study of Customers’ Perceptions of Security and Trust in e-Payment Systems. Elect. Comm. Res. & Apps 9 84–95
[17] Kumar K, Sivasannugam C and Venkataraman A 2017 Intention to use mobile wallet: extension of TAM model Int’l J Current Eng. & Sci. Res. 4 5–11
[18] Li H and Liu Y 2014 Understanding Post-adoption Behaviors of e-Service Users in the Context of Online Travel Services Info. & Manag. 51 1043–1052
[19] Liébana-Cabanillas F, de Luna I R and Montoro-Rios F 2017 Intention to use payment systems: a comparative analysis of SMS and NFC payments Economic Research-Ekonomiska Istraživanja 30 892–910
[20] Lim W M and Ting D H 2012 E-shopping: an analysis of the uses and gratifications theory Mod. App. Sci. 6 48–63
[21] Malik A, Suresh S and Sharma S 2019 An empirical study of factors influencing consumers’ attitude towards
adoption of wallet apps Int’l J Manag. Prac. 12 426–442
[28] McKnight D H and Chervany N L 2002 What Trust Means in E-Commerce Customer Relationships: An Interdisciplinary Conceptual Typology Int’l J Elec. Comm. 6 35–53
[29] Nag A K and Gilitwala B 2019 E-Wallet - Factors Affecting its Intention to use Int’l J Recent Tech. & Eng. 8 3411–3415
[30] Omol E, Abeke D and Wauyo F 2017 Factors Influencing Acceptance of Mobile money Applications in Enterprise Management: A Case Study of Micro and Small Enterprise Owners in Kisumu Central Business District, Kenya IJARCCE 6 208–219
[31] Pangaribuan C H Ravenia A and Sitinjak M F 2019 Beauty Influencer’s User-Generated Content On Instagram: Indonesian Millennials Context Int’l J of Sci. & Tech. Res. 8 1911–1917
[32] Ramayah T and Ignatius J 2005 Impact of perceived usefulness, perceived ease of use and perceived enjoyment on intention to shop online ICFAI J Syst. Manag. 3 36–51
[33] Rao S and Troshani I 2007 A Conceptual Framework and Propositions for the Acceptance of Mobile Services J Theor. & App. Elec. Comm. Res. 2 61–73
[34] Renny, Guritno S and Siringoringo H 2013 Perceived Usefulness, Ease of Use, and Attitude towards Online Shopping Usefulness towards Online Airlines Ticket Purchase Procedia – Soc. & Beh. Sci. 81 212–216
[35] Siau K and Shen Z 2003 Building Customer Trust in Mobile Commerce Communications of the ACM 46 91–94
[36] Terzis V and Economides A A 2011 The acceptance and use of computer based assessment Comp. & Educ. 56 1032–1044
[37] Timones L 2019 Total e-wallet size in Indonesia likely to hit $15 billion by 2020 Retrieved from http://www.theasianbanker.com/updates-and-articles/indonesia-mobile-payments-still-closely-tied-to-mobile-top-ups-and-online-purchases
[38] Trivedi J 2016 Factors determining the acceptance of e wallets Int’l J Appl. Mktg. & Manag. 1 42–53
[39] Vanderheijden H and Verhagen T 2004 Online store image: conceptual foundations and empirical measurement Info. & Manag. 41 609–617
[40] Weng F, Yang R-J, Ho H-J and Su H-M 2018 A TAM-Based Study of the Attitude towards Use Intention of Multimedia among School Teachers Appl. Sys. Innov. 1 1–9
[41] Wong W H and Mo W Y 2019 A study of consumer intention of mobile payment in Hong Kong, based on perceived risk, perceived trust, perceived security and technological acceptance model J Adv. Mgmt. Sci. 7 33–38
[42] Xin H, Techatassanasoontorn A A and Tan F B 2013 Exploring the influence of trust on mobile payment adoption Pacific Asia Conf. on Info. Sys. 143 1–17