Customers' continuance usage of mobile payment during the COVID-19 pandemic

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Abstract

Purpose – The COVID-19 pandemic has significantly affected how consumers make payment choices. This study aims to develop a comprehensive model explaining customers' continuance usage of mobile payment during the COVID-19 pandemic by investigating both the pull (positive) factors of mobile payment and the push (negative) factors of cash payment.

Design/methodology/approach – A survey was conducted on 508 mobile payment users. A quota sampling method was applied to collect the data. Then, the data were analyzed using structural equation modeling. This study employed SPSS and LISREL software.

Findings – This study reveals that four antecedent factors: favorable attitude toward mobile payment, social influence, facilitating conditions and unfavorable attitude toward cash payment, positively affect the continuance intention to use mobile payment during the COVID-19 pandemic. The finding also corroborates the effect of continuance intention on the actual use of mobile payment.

Practical implications – This research provides valuable insights for formulating business strategies. The results indicate that mobile payment providers should not only consider the positive aspects of mobile payments but also the negative aspects of cash payment when encouraging the continuance usage of mobile payments to customers.

Originality/value – This study is among the first to empirically test the effect of unfavorable attitudes toward cash payment on the continuing use of mobile payment. Specifically, the research extends the unified theory of acceptance and use of technology by adding the push–pull-mooring model to enhance the explanatory power.

Keywords Attitude, Mobile payment, Continuance intention, COVID-19, UTAUT, PPM

Paper type Research paper

Uso continuado del pago por móvil por parte de los clientes durante la pandemia de COVID-19

Resumen

Propósito – La pandemia de COVID-19 ha afectado significativamente a la forma en que los consumidores toman sus decisiones de pago. Este estudio pretende desarrollar un modelo completo que explique el uso continuado del pago por móvil por parte de los clientes durante la pandemia COVID-19, investigando tanto los

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factores de atracción (positivos) del pago por móvil como los factores de empuje (negativos) del pago en efectivo.

Metodología – Se realizó una encuesta a 508 usuarios de pago por móvil. Se aplicó un método de muestreo por cuotas para recoger los datos. A continuación, los datos se analizaron mediante un modelo de ecuaciones estructurales. En este estudio se empleó el software SPSS y LISREL.

Conclusiones – El estudio revela que cuatro factores antecedentes: la actitud favorable hacia el pago por móvil, la influencia social, las condiciones facilitadoras y la actitud desfavorable hacia el pago en efectivo; afectan positivamente a la intención de permanencia en el uso del pago por móvil durante la pandemia COVID-19. El hallazgo también corrobora el efecto de la intención de permanencia en el uso real del pago por móvil.

Implicaciones prácticas – Esta investigación aporta valiosas ideas para la formulación de estrategias comerciales. Los resultados indican que los proveedores de pagos por móvil no sólo deben tener en cuenta los aspectos positivos de los pagos por móvil, sino también los aspectos negativos del pago en efectivo a la hora de fomentar el uso continuado de los pagos por móvil entre los clientes.

Originalidad – Este estudio es uno de los primeros en comprobar empíricamente el efecto de las actitudes desfavorables hacia el pago en efectivo en el uso continuado del pago por móvil. En concreto, la investigación amplía la teoría unificada de la aceptación y el uso de la tecnología (UTAUT) añadiendo el modelo push-pull-mooring (PPM) para mejorar el poder explicativo.

Palabras clave Actitud, pago por móvil, intención de uso, COVID-19, UTAUT, PPM

Tipo de artículo Trabajo de investigación

Covid-19疫情期间消费者对移动支付的持续使用情况

摘要

目的 – COVID-19疫情对消费者的支付方式产生了重大影响。本研究旨在通过研究移动支付的拉动（积极）因素和现金支付的推动（消极）因素，建立一个综合模型来解释客户在COVID-19疫情期间持续使用移动支付的情况。

方法 – 本研究采用配额抽样方法，对508位移动支付用户进行了调查。然后通过SPSS和LISREL软件，运用结构方程模型对数据进行了分析。

结果 – 研究结果揭示了四个前因因素对COVID-19疫情期间持续使用移动支付的意愿有积极影响，这四个因素分别是：对移动支付的有利态度、社会影响、便利条件和对现金支付的不利态度；这一发现也证实了持续使用意愿对移动支付实际使用的影响。

实践意义 – 这项研究为制定商业战略提供了宝贵的见解。结果表明，移动支付供应商在鼓励客户持续使用移动支付时，不仅要考虑移动支付的积极方面，还要考虑现金支付的消极方面。

原创性 – 本研究首次通过实证检验了消费者对现金支付的不利态度对移动支付持续使用的影响。具体而言，本研究通过加入推拉式模型（PPM）扩展了技术接受和使用的统一理论（UTAUT），从而增强了该理论的解释力。

关键词 关键词 态度，移动支付，持续意愿，COVID-19，技术接受和使用的统一理论，（UTAUT），推拉式模型（PPM）

文章类型 研究型论文

1. Introduction

The COVID-19 pandemic has dramatically affected global health and socioeconomic factors, requiring people to adapt and change their behaviors to protect themselves from the disease. One fundamental change is that people try to avoid direct contact with infected persons and indirect contact with objects near or used by infected persons (Zhao and Bacao, 2021; Tang *et al.*, 2020). The growing number of people avoiding contact because of feeling vulnerable during the pandemic (Milaković, 2021) also has been influenced by frequent warnings from the World Health Organization (Zhao and Bacao, 2021). A significant behavioral change is observed in how people deal with purchase transactions by relying more on contactless or digital payment systems (Milaković, 2021).

The contactless payment system includes digital wallet or mobile payment methods, which have been adopted globally, such as e-wallet, e-money, mobile banking, near field communication, smartphone credit card and quick reader codes (Karjaluoto *et al.*, 2020; Ooi and Tan, 2016). Recent studies demonstrated that during the COVID-19 pandemic, m-payment was widely accepted for its contactless features and reliability (Musyaffi *et al.*, 2021). Consumers believe digital payment methods could help reduce virus transmission risks, increase safety and support the social economy (Yang *et al.*, 2021). Hence, the global m-payment market is predicted to grow from US$1.97tn in 2021 to US$11.83tn in 2028, a compound annual growth rate of 29.1% (Fortune Business Insights, 2022).

This trend to use m-payment has prompted researchers to explore the phenomenon. Many studies have examined consumer behaviors using digital payment (e.g. Ooi and Tan, 2016; Flavián *et al.*, 2020). One theory commonly adopted to explore the phenomenon of changing consumer attitudes toward digital payment is the unified theory of acceptance and use of technology (UTAUT). UTAUT is extensively applied as a foundation to explain how consumers behave toward a new technology (Venkatesh *et al.*, 2003). By adopting UTAUT, researchers have comprehensively examined factors affecting consumers' use of digital payments, focusing on the appealing attributes of m-payment such as performance expectancy (PE), effort expectancy (EE) or other perceived benefits of m-payment (Aslam *et al.*, 2017; Sivathanu, 2019; Yang *et al.*, 2021). However, most studies focus on the m-payment method itself. They tend to neglect the reasons for a consumer's decision to switch from cash payment to m-payment and to continue using it. Sivathanu (2019), for instance, mainly discusses perceived security (PS) as the main predictor of continuous usage of m-payment. Musyaffi *et al.* (2021) examine the problems of digital payment adoption during the COVID-19 pandemic, focusing on PS and personal innovativeness factors.

Nevertheless, these studies do not directly explain the motivating factors behind consumers' intention to use m-payment. We still do not understand how consumers' attitudes toward cash payment have influenced their intention and decision to replace the traditional payment method with a digital one. Therefore, there is a need to investigate further consumers' perceptions of cash payment that have facilitated their intention to use m-payment continuously and simultaneously reduce cash payment usage.

Furthermore, a systematic literature review of the UTAUT framework by Williams *et al.* (2015, p. 469) reveals that "UTAUT research is still in its relatively early stages of development, with no clear areas of maturity, but appears to be developing quickly." This motivates us to pay more attention to the antecedent factors (of cash payment) behind consumers' intention to use digital payments. For this purpose, we adopted the push–pull-mooring (PPM) model's key constructs (Lee, 1966; Bansal *et al.*, 2005). The PPM model helped us understand consumers' unfavorable (negative) attitude toward cash payment during the COVID-19 pandemic, which forced them to shift toward cashless payment (push factor). The model also explained that m-payment offers more attractive services than cash payment (pull factor) and other aspects that could influence their switching decision (mooring factor). By adopting the PPM model to understand consumers' attitudes toward cash payment, we can enhance the UTAUT framework's predictive power, particularly for antecedent factors that consumers consider when comparing the traditional method to the new technology before making a switching decision and an intention to use it continuously.

The present research aims to examine consumers' continuance intention (CI) to use digital payment during the COVID-19 pandemic by incorporating the antecedent factors related to consumers' attitudes toward cash payment. Hence, this study proposes a research model that includes variables derived from the UTAUT model, supported by the PPM model, aiming to enhance the ability to explain consumers' CI in using m-payment. The

results contribute to the existing literature on consumer behavior related to m-payment. This study also contributes to managerial decision-making by suggesting supporting factors that companies should focus on in their marketing strategies involving digital payment methods.

2. Literature review and hypotheses building

2.1 Theories of technology adoption

Contactless payment systems through digital technology refer to mobile payment (m-payment) or an electronic payment method that does not use cash (Karjaluoto *et al.*, 2020). In addition to its primary function in financial transactions, digital payment offers several benefits: storing payment instrument data, saving funds, accelerating payment, efficiency, effectiveness, ease of use, accessibility and transparency (Wu *et al.*, 2016; Venkatesh *et al.*, 2012). Extensive research has examined consumer behavior using m-payment technology (Ooi and Tan, 2016; Liu *et al.*, 2019). The UTAUT developed by Venkatesh *et al.* (2003) is the most common theoretical approach used to explain consumers' intention to adopt new technology and their subsequent usage behavior.

The UTAUT model proposes four key constructs [PE, EE, social influence (SI) and facilitating conditions (FC)] that directly influence consumers' behavioral intention to adopt a new system (Venkatesh *et al.*, 2003). One scholarly work by Shin (2009) supplements the UTAUT model with a PS factor influencing consumers' attitudes and intention to use m-payment. However, as discussed earlier, only a few empirical studies use a model incorporating consumers' perceptions (acting as antecedent factors) toward cash payment to influence their intention to use m-payment continuously. To address the limitation, we adopted the PPM model (Bansal *et al.*, 2005). The basic argument of the PPM model is that a decision to migrate from the original place to a new one is influenced by push, pull and mooring factors (Bansal *et al.*, 2005). Push factors refer to stressors (unfavorable factors that drive someone from the original place), and pull factors refer to attractors (the positive elements of the new place) (Bansal *et al.*, 2005). Mooring factors (involving personal or social aspects) affect the decision to stay at the original location or move to the new destination (Lee, 1966). The present study employed the construct of push factors to explain consumers' unfavorable attitudes toward cash payment and pull factors to explain consumers' favorable attitudes or their interest in m-payment. The mooring factor was defined as the social dimension considered by consumers when deciding to switch from cash payment to m-payment methods.

2.2 Hypotheses building

The widespread use of digital services such as m-payment has triggered concerns despite its benefits. One consumer concern is PS (Shin, 2009; Sivathanu, 2019). The security issue is relevant because consumers are asked to provide their personal information when using m-payment, raising concerns about the possible misuse of data. Consumers will interpret the degree of security based on the service provider's actions to protect financial and personal information from any possible violation during and after the transaction process (Balapour *et al.*, 2020; Singh and Srivastava, 2018). A high level of security for digital technology is perceived as a guarantee that personal data is secured and will not be lost or stolen by third parties for illegal or unethical purposes (Gracia *et al.*, 2015). If consumers perceive that the provider policy on privacy issues is effective, they will have more confidence in the security, increasing their willingness to install and use the application (Balapour *et al.*, 2020). This argument leads to the first hypothesis:

H1. Perceived security of m-payment positively affects a favorable attitude toward m-payment.

Furthermore, when people believe new technology will perform adequately or provide benefits, they will be more likely to use it (Sivathanu, 2019). This notion refers to PE as the level to which individuals believe using new technology will help them fulfill their needs (Venkatesh *et al.*, 2012). If consumers perceive that a digital payment method could offer several benefits (such as efficiency, effectiveness and speed of services), they will have a more positive attitude toward adopting it (Davis, 1989; Musyaffi *et al.*, 2021). Thus, we propose the second hypothesis:

H2. Performance expectancy of m-payment positively affects a favorable attitude toward m-payment.

The third variable is EE, defined as the belief that a system will be easy to use and require little effort (Chopdar and Sivakumar, 2018). Prior studies revealed that consumers' purchase experience using a particular technology impacts how they perceive the convenience level of the technology (Yang *et al.*, 2021; Gia-Shie and Pham, 2016). When consumers believe a digital payment system makes it easier for them to make successful online transactions, they are likely to increase their frequency of using it (Musyaffi *et al.*, 2021). We thus posit the third hypothesis:

H3. Effort expectancy of m-payment positively affects a favorable attitude toward m-payment.

The three variables discussed above (PS, PE and EE) potentially influence positive or favorable attitudes toward the use of digital payment and can be regarded as the pull factors of the PPM model (Bansal *et al.*, 2005). Existing studies (Lim *et al.*, 2019; Musyaffi *et al.*, 2021) suggest that both PE and EE variables can be used to measure the intensity of the purchase intention of a product. A recent study by Akdim *et al.* (2022) reveals that perceived usefulness and ease of use influence CI to adopt mobile apps. Zhao and Bacao (2020) also pointed out that the users' PE of contactless features can affect their intention to continue using m-payment. Thus, we propose the fourth hypothesis:

H4. Favorable attitude toward m-payment positively affects continuance intention to use the m-payment method.

When addressing consumers' intention to use m-payment methods, we cannot ignore the issues related to social dimensions, which are essential in influencing attitude and intention to use a particular technology (Sivathanu, 2019). Venkatesh *et al.* (2012) define SI as how much others' perceptions about new technology influence consumers' intention to use it. Some scholarly works about the PPM model (Hati *et al.*, 2020; Guo *et al.*, 2021) have found SI to be a mooring factor influencing the user's intention to adopt a new system. Park *et al.* (2019) argue that adopting m-payment services is significantly influenced by the external environment (including social aspects) and internal technological perception. Based on these arguments concerning SI, the fifth hypothesis is thus formulated:

H5. Social influence positively affects continuance intention to use m-payment.

Another variable that encourages consumers to act is a FC (Venkatesh *et al.*, 2012). A FC is a consumer's perception of resources available to support their actions (Wu *et al.*, 2016), including guidance, training and assistance, in using the technology (Sivathanu, 2019). In

the case of m-payment usage, if consumers have the resources to use m-payment, such as gadgets, internet connections and infrastructure, this will increase their intention to use the technology (Venkatesh *et al.*, 2012). Moreover, if consumers believe they can access the support system in the future when using the technology, we can predict their behavioral intention to continue using it (Yadav *et al.*, 2015; Mukherjee and Nath, 2007; Singh and Srivastava, 2018). We thus propose the sixth hypothesis:

H6. Facilitating conditions positively affect the continuance intention to use m-payment.

During the COVID-19 pandemic, people became increasingly aware of the virus transmission risks and tried to avoid direct or indirect contacts with infected people (Tang *et al.*, 2020). In this situation, cash (banknotes or coins), which frequently changes hands, was considered susceptible to transmission of the SARS-CoV-2 virus (Karjaluoto *et al.*, 2020). As noted by Schiffman and Wisenblit (2015), a consumer's attitude toward an object can be either good (favorable) or bad (unfavorable), depending on the perceived situation. During the COVID-19 pandemic, the virus is believed to be easily transmitted through human touch; hence, avoiding contact with humans or objects is essential. This perception has influenced people's attitude that using cash for purchase transactions during the pandemic is harmful behavior (push factor) and should be avoided (Musyaffi *et al.*, 2021). For this reason, people will prefer to use m-payment continuously as a safer option than using cash. The following hypothesis is proposed:

H7. Unfavorable attitude toward cash payment positively affects continuance intention to use m-payment.

Furthermore, previous literature has demonstrated a significant correlation between behavioral intention and actual behavior (Thakur and Srivastava, 2014). For instance, empirical research by Venkatesh *et al.* (2012) suggests a significant relationship between consumers' behavioral intention and actual use (AU) of mobile internet technology. Schiffman and Wisenblit (2015) also confirm that intention to use correlates with actual behavior. We thus propose our last hypothesis:

H8. Continuance intention to use m-payment has a positive effect on the actual continuous use of m-payment.

Based on the hypotheses above, the research model is presented in Figure 1.

3. Methodology

3.1 Data collection and sampling method

Because this study was carried out during the COVID-19 pandemic, the authors used an online survey via Google Forms to collect data. The questionnaire link was sent to m-payment users in Indonesia who regularly used m-payment apps for their purchase transactions. The Indonesian context provides an interesting background because Indonesia is the fourth largest populated country in the world and its internet economy will grow tremendously (Baijal *et al.*, 2021).

A professional marketing research company was in charge of conducting the fieldwork on June 1–30, 2021. The online questionnaire used filter questions asking whether the respondents used m-payments during the past six months. Only those who answered yes could participate in this survey. The sampling method was quota sampling, aiming to obtain representative samples based on specific categories at a relatively low cost (Malhotra, 2020,

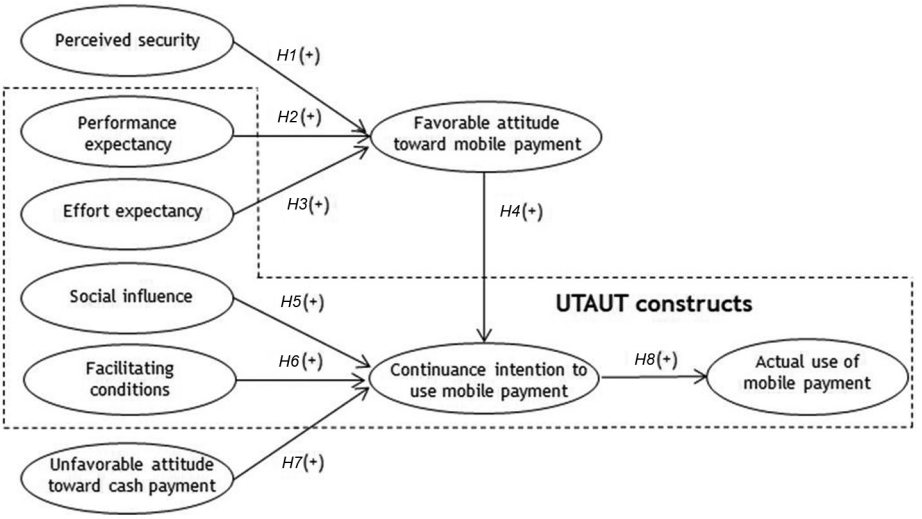

Figure 1.
Research model

p. 365). The method was chosen to ensure that each identified group or category was represented in this study: gender, age, education, occupation and residence. This study attempted to include a fair distribution in each subcategory, such as between male and female respondents. The authors set a minimum target of 500 respondents as the sample size because the research model incorporates many constructs (Hair *et al.*, 2014, p. 574).

3.2 Constructs and instruments

This study comprises 36 measurement items as indicators to examine nine constructs with four items per construct. The items were borrowed and/or adapted from several previous studies. Some words in the original sources were refined to the context in this study. For example, the words of "mobile banking" (Jouda, 2020) were replaced by "m-payment," the word of "e-wallet" (Yang *et al.*, 2021) was substituted by "m-payment" and the items measuring "unfavorable attitude" were adapted from the "favorable attitude" questionnaire (Jouda, 2020; Aslam *et al.* (2017).

The constructs in the research model are PE, EE, PS, favorable attitude toward m-payment (FATM), SI, FC, unfavorable attitude toward cash payment (UATC), CI and the AU of m-payment. The measuring items are scored on a seven-point Likert scale with anchors ranging from 1 (strongly disagree) to 7 (strongly agree). The detailed items are shown in Table 2.

3.3 Analysis method

This research employed the structural equation modeling (SEM) technique for the quantitative data analysis. SEM was used because it allowed us to simultaneously test the measurements and evaluate the relationships between the variables of interest (Mayfield *et al.*, 2008). Moreover, SEM has become a dominant analytical tool for examining the cause–effect relationship model with latent variables (Benoliel *et al.*, 2019). To this purpose, SPSS version 25 and LISREL version 8.8 were applied. LISREL enabled a covariance-based analysis and offered insights related to the model fit (Jöreskog and Sörbom, 1996). Following

Anderson and Gerbing (1988), the primary analysis of this research comprised two stages: validating the measurement model and testing the structural model.

The detailed process of data analysis is explained in the Section 4.

4. Data analysis

4.1 Profile of respondents

In total, 518 responses were collected from the survey, but we excluded 10 cases with invalid values found when doing the data cleaning process. Therefore, 508 responses were considered eligible for further analysis. As quota sampling (Malhotra, 2020) was used in this study, the composition of samples was quite balanced between the gender groups: 51.6% male and 48.4% female, and the age groups: between 15.2% and 24.8% for each group. Meanwhile, the education groups were relatively even between high school (54.1%) and college graduates (45.9%). In the occupation groups, the majority of respondents were employees (39.0%) and businesspeople (25.8%), and they were mainly in Jakarta (66.3%). Regarding m-payment brands, most respondents used Go-Pay (29.1%), followed by Shopee Pay (21.1%) and Ovo (20.7%). Table 1 depicts the detailed demographics of the respondents.

Variable	Cases (%)
Gender	
Male	262 (51.6)
Female	246 (48.4)
Age (years old)	
Below 20	77 (15.2)
20–29	114 (22.4)
30–39	126 (24.8)
40–49	96 (18.9)
50 and above	95 (18.7)
Education	
High school	275 (54.15)
Diploma	51 (10.0)
Bachelor	152 (29.9)
Master	30 (5.9)
Occupation	
Student	98 (19.3)
Employee	198 (39.0)
Business person	131 (25.8)
Housewife	34 (6.7)
Others	61 (12.0)
Residential city	
Jakarta	337 (66.3)
Outside Jakarta	171 (33.7)
Brand mostly used	
Go-Pay	148 (29.1)
Shopee Pay	107 (21.1)
Ovo	105 (20.7)
Dana	54 (10.6)
Others	94 (18.5)

Table 1. Respondent characteristics

4.2 Validity, reliability and measurement model

The measurement model was evaluated using confirmatory factor analysis, performed through SPSS version 25.0 and LISREL version 8.8. To address the issue of construct validity (Hair *et al.*, 2014), this research used convergent validity (meaning whether the measuring items effectively reflect their corresponding constructs) and discriminant validity (whether the constructs are statistically different). The convergent validity was examined by average variance extracted (AVE) and factor loadings (Hair *et al.*, 2014, p. 618). All the AVE values in this study were higher than 0.5 (ranging from 0.68905 to 0.81915), suggesting the scale has a good convergent validity (Bagozzi and Yi, 1988; Hair *et al.*, 2014). Further, the factor loading values for each item to the related constructs were greater than 0.5. The values ranged from 0.805 to 0.942, indicating an acceptable validity (Hair *et al.*, 2014, p. 115).

The next step was to compare the square root of AVE and factor correlation coefficients to examine the discriminant validity. The discriminant validity is considered good if the square root of AVE for each construct exceeds the correlation between any pair of the constructs (Fornell and Larcker, 1981). The results showed that the square root of AVE for each factor (ranging from 0.830 to 0.905) was larger than its correlation coefficients with other factors, except for the value of the square root of AVE for FC (0.830), which was slightly below the value of its correlation with FATM (0.848). However, the difference was minimal and the only one; therefore, the results fulfilled the discriminant validity criteria.

We then tested the construct reliability by measuring composite reliability (CR) and Cronbach's alpha factors. The results demonstrated CR, ranging from 0.8981 to 0.9469 for each factor, above the recommended value of 0.7 (Hair *et al.*, 2014, p. 605); this indicates acceptable construct reliability. In addition, all the values of Cronbach's alpha (from 0.897 to 0.947) exceeded 0.7, indicating good reliability (Nunnally, 1978).

We also examined the common method bias as a possible source of measurement errors (Podsakoff *et al.*, 2003). Common method bias exists if a single factor emerges from the factor analysis that accounts for most of the covariance among the variables (Podsakoff *et al.*, 2003). Similar to previous studies, we carried out Harman's one-factor test on the items included in the model and discovered several factors (four factors with an eigenvalue greater than 1) accounting for 75.27% of the variance in the data. Because no single factor emerged, common method bias was not an issue in this study. To reduce common-source bias, we also communicated the study goals to respondents and ensured anonymity in survey administration, as suggested by Podsakoff *et al.* (2003). In addition, because this study used a large sample size of Likert data (508 samples, more than 200), the risk of drawing incorrect inferences was reduced (Bothma and Roodt, 2012; Tabachnick and Fidell, 2007). Norman (2010) also stated that parametric statistics could be employed with Likert data, even with nonnormal distributions, with no fear of "coming to the wrong conclusion."

The results show that the validity and reliability measurements were acceptable for all factors in this study. Table 2 exhibits the exact values of the measures, including the mean and the standard deviation for each construct. The results of the data analysis will be discussed in Section 5.

4.3 Structural model

The goodness of the model fit was evaluated by using the main indices: χ^2/df (Cmin or the normed chi-square), root mean square error of approximation (RMSEA), adjusted goodness of fit index (AGFI), normed fit index (NFI), comparative fit index (CFI) and standardized root mean square residual (SRMR). Based on the existing literature, χ^2/df should be the same as or less than 5 (Hair *et al.*, 2014); RMSEA and SRMR should be less than 0.08 (Hair *et al.*,

Constructs and items	Factor loadings
Performance expectancy (PE)	
Mean = 6.373; SD = 0.874; Cronbach's α = 0.933; CR = 0.933; AVE = 0.775 (Zhao and Bacao, 2021; Cabanillas *et al.* (2020))	
I feel using m-payment as a contactless payment is safer than traditional payment during the COVID-19 pandemic	0.888
I feel using m-payment is a beneficial payment method among people when conducting a financial transaction during the COVID-19 pandemic	0.915
I perceive convenience when using m-payment during the COVID-19 pandemic	0.922
I find using m-payments useful in my daily life	0.926
Effort expectancy (EE)	
Mean = 6.351; SD = 0.872; Cronbach's α = 0.935; CR = 0.936; AVE = 0.787 (Ooi and Tan, 2016; Zhao and Bacao, 2021; Yang *et al.*, 2021)	
I think using m-payments is easy for me	0.910
I think learning to use m-payments is easy	0.924
It is easy to follow all the steps of m-payment	0.926
I like the fact that payments done through m-payments require minimum effort	0.903
Perceived security (PS)	
Mean = 5.413; SD = 0.1.109; Cronbach's α = 0.922; CR = 0.913; AVE = 0.723 (Aslam *et al.*, 2017; Zhao and Bacao, 2021; Pal *et al.*, 2021)	
I would find m-payment services secure when conducting my payment transactions	0.909
I feel m-payments are secure when transmitting sensitive information during COVID-19 pandemic	0.911
The risk of abuse of usage (e.g. names of business partners, payment amount) is low	0.889
The password protection guarantees security	0.894
Social influence (SI)	
Mean = 5.357; SD = 1.237; Cronbach's α = 0.942; CR = 0.941; AVE = 0.801 (Zhao and Bacao, 2021; Yang *et al.*, 2021; Jouda, 2020)	
People who are important to me (e.g. family members, close friends and colleagues) recommend me to use m-payments during the COVID-19 pandemic	0.921
People who are important to me think that I should use m-payments	0.925
People who are important to me support me to use m-payments during the COVID-19 pandemic	0.918
People who influence my behavior want me to use m-payments instead of any other alternative means	0.928
Facilitating conditions (FC)	
Mean = 5.539; SD = 1.071; Cronbach's α = 0.897; CR = 0.898; AVE = 0.689 (Jouda, 2020; Yang *et al.*, 2021)	
I have the resources necessary to use m-payments	0.869
I have the knowledge necessary to use m-payments	0.889
I have the financial and technological resources required to use m-payments	0.850
I have access to the software and hardware required to use m-payments	0.891
Favorable attitude toward m-payment (FATM)	
Mean = 5.595; SD = 1.116; Cronbach's α = 0.947; CR = 0.946; AVE = 0.814 (Jouda, 2020; Aslam *et al.*, 2017)	
Using m-payment service is a good decision	0.931
Using m-payment service is a wise decision	0.927
I like to use m-payment service	0.927
Using m-payment service is a good idea	0.929

Table 2. Mean, standard deviation, convergent validity and reliability measurement

(*continued*)

Constructs and items	Factor loadings
Unfavorable attitude toward cash payment (UATC)	
Mean = 5.174; SD = 1.227; Cronbach's α = 0.930; CR = 0.930; AVE = 0.766 (Jouda, 2020; Aslam *et al.*, 2017)	
Still using cash for payment during COVID-19 pandemic is a wrong decision	0.917
Still using cash for payment during COVID-19 pandemic is a careless decision	0.922
I do not like to use cash payment (banknote) during COVID-19 pandemic	0.891
Using cash payment is a bad idea	0.909
Continuance intention (CI)	
Mean = 5.414; SD = 1.182; Cronbach's α = 0.949; CR = 0.946; AVE = 0.819 (Zhao and Bacao, 2021; Yang *et al.*, 2021; Pal *et al.*, 2021)	
I intend to continue using m-payments more frequently in the future during COVID-19 pandemic	0.916
I am willing to continuously use m-payments in the near future during COVID-19 pandemic	0.937
I intend to increase my use of m-payments in the future	0.942
I intend to increase the frequency of my overall use of the m-payments	0.927
Actual use (AU)	
Mean = 5.427; SD = 1.207; Cronbach's α = 0.923; CR = 0.922; AVE = 0.744 (Yang *et al.*, 2021; Pal *et al.*, 2021)	
I often use m-payments to manage my account	0.878
I often use m-payments to transfer and remit money	0.897
I often use m-payments to make payments	0.904
I use m-payment apps for a variety of transactions	0.925

Table 2.

2014); AGFI should be more than 0.80 (Hu and Bentler, 1999); NFI should be greater than 0.90 (Bentler and Paul, 1996); and CFI should be more than 0.90 (Hair *et al.*, 2014). The results indicated all the values fulfilled the prerequisite indicators with χ^2/df = 2.65, RMSEA = 0.057, SRMR = 0.041, AGFI = 0.83, NFI = 0.98 and CFI = 0.99. Therefore, the model has a good fit for the data.

Next, we ran the hypotheses testing, using the structural model in this study to test the effects of PS, PE and EE on a FATM. Then, we examined the impact of a FATM, SI, FC and an UATC on the CI to use m-payment. Finally, we assessed the effect of CI on the AU of m-payment.

The authors used the standardized coefficient estimates (β) and the p-value of every path to test the respective effect of the aforementioned independent variables on the dependent variable. The findings revealed significantly that PS ($\beta = 0.84$, $p < 0.05$) and PE ($\beta = 0.26$, $p < 0.05$) had a positive influence on a FATM. Therefore, *H1* and *H2* were supported. However, the results showed that EE ($\beta = -0.19$, $p < 0.05$) had a negative effect on a FATM. This indicates that the data did not support *H3*.

Further, the results also showed the positive effect of a FATM ($\beta = 0.32$, $p < 0.05$), SI ($\beta = 0.08$, $p < 0.05$), FC ($\beta = 0.35$, $p < 0.05$) and an UATC ($\beta = 0.30$, $p < 0.05$) on the CI to use m-payment. These results support *H4–H7*. Ultimately, the research findings validated the hypothesis that CI ($\beta = 0.91$, $p < 0.05$) positively affects the AU of m-payment. The data, therefore, supported *H8*. A more detailed explanation of the hypothesis testing is presented in Table 3 and Figure 2.

5. Discussion and implications

The present research aimed to develop and test the comprehensive model of consumers' continuance usage of m-payment during the COVID-19 pandemic. First, this research

investigated the effects of PS, PE and EE of m-payment on a FATM usage. The results show that the PS of m-payment positively affects a FATM (*H1* was supported). This finding confirms previous studies (Fan *et al.*, 2018; Anouze and Alamro, 2020).

Next, PE influenced a FATM (*H2* was supported). In the COVID-19 pandemic context, this implies that consumers perceived m-payment not only as helping them avoid contact with infected people during purchase transactions (Milaković, 2021) but also as having a reliable performance (Zhao and Bacao, 2021) that could help them achieve faster and less costly services (Yang *et al.*, 2021). The finding that the perceived positive performance of m-payment promotes a positive evaluation of m-payment corroborates prior literature (Jouda, 2020; Aslam *et al.*, 2017).

Interestingly, this study found that EE had a negative effect on FATM (*H3* was not supported). A similar result was reported by Zhao and Bacao (2021), who found that EE negatively affected behavioral intention. The reason may be that during the COVID-19 pandemic, people were willing to make an effort to take any action for their safety, including learning complex digital payment technology. Using m-payment is not as simple as using

Table 3. Results of standardized estimates of the structural model

Hypotheses	Path	Standardized estimate (β)	t	p-value	Result
H1	PS → FATM	0.84	20.59	0.000	Supported
H2	PE → FATM	0.26	3.26	0.001	Supported
H3	EE → FATM	−0.19	−2.45	0.014	Not supported
H4	FATM → CI	0.32	8.44	0.000	Supported
H5	SI → CI	0.08	2.16	0.031	Supported
H6	FC → CI	0.35	8.05	0.000	Supported
H7	UATC → CI	0.30	8.95	0.000	Supported
H8	CI → AU	0.91	22.87	0.000	Supported

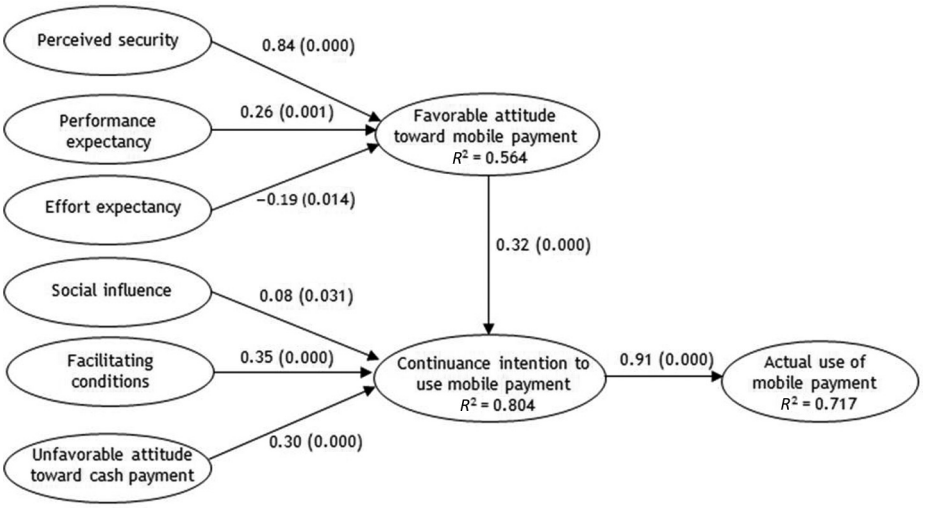

Figure 2. Path coefficients

cash, especially for those who primarily relied on cash before the pandemic. For instance, users must create an account first, input a password and keep it safe and then top up the value before using it. However, EE may not have been a concern for consumers during the pandemic compared to other factors such as reliability, security and benefits (Zhao and Bacao, 2021).

Second, the findings also enhance the existing literature about the antecedents of CI. Prior studies (Mohammadi, 2015; Gupta and Arora, 2017) argue that consumer attitude affects the intention to continue using m-payment. Related to this, Schiffman and Wisenblit (2015) suggest that attitude can be divided into two types: favorable (positive) and unfavorable (negative). Accordingly, the present study investigated both favorable attitudes toward m-payment and unfavorable attitudes toward cash payment. The results show a positive effect of a FATM on consumers' CI to use it (*H4* was supported). This finding corroborates prior studies (Akdim *et al.*, 2022; Barta *et al.*, 2021; Chopdar and Sivakumar, 2018), suggesting the degree of users' intention to continue using new technology is influenced by their perceived level of its usefulness or the PE of the technology.

This study also found that an UATC strongly predicts intention to continue using m-payment (*H7* was supported). This means that CI to use m-payment does not arise only from a FATM method but also from an UATC. Further, the results show that an UATC ($\beta = 0.30$) and a FATM ($\beta = 0.32$) strongly affect the CI to use m-payment. This suggests that consumers will continue to use m-payment, shifting from cash to cashless methods in their purchase transactions.

The results also show that SI positively affects the CI to use m-payment (*H5* was supported). SI can be in the form of suggestions, orders, requests or recommendations from others that influence someone's behavioral intention. Literature supports this by suggesting that SI significantly affects behavioral intention (Yang *et al.*, 2017; Nuryyev *et al.*, 2020). Consumers generally will consider social norms and their impact when making decisions.

Our next finding suggests that FCs significantly impact the intention to continue using m-payment (*H6* was supported). This finding validates previous studies (Mukherjee and Nath, 2007; Singh and Srivastava, 2018). Consumers can adopt new technology, such as digital payment, if equipped with a specific FC or an integrated system, including the instrument (gadget), internet connection and infrastructure (Venkatesh *et al.*, 2012).

Finally, this study verified that CI influenced the AU of m-payment (*H8* was supported). Behavioral intention has a strong relationship with actual behavior (Ajzen, 1985) and is supported by other researchers (Thakur and Srivastava, 2014; Venkatesh *et al.*, 2012). In the case of m-payment usage, the present study enhances the existing literature.

The present study offers several significant contributions. From the theoretical perspective, it applies the knowledge of behavioral intention to the continuing use of m-payment by expanding UTAUT with the PPM model as the foundation of explanation. Moreover, by adding the variable of UATC to the model, this study provides a comprehensive understanding of previous studies, particularly those concerning consumers' continuance usage of m-payment.

This study's practical contribution shows the importance of consumers' perspectives, which the industry can consider when determining the key factors affecting consumers' continuance use of m-payment. By incorporating several essential elements simultaneously, including both favorable and unfavorable factors, a company can predict consumers' behavior relating to a specific m-payment method. In contrast, if the company

considers only a few factors at a time, it could lead them to overemphasize or underemphasize some aspects (Liu *et al.*, 2008). They might not be able to optimize their strategy and decision-making quality. Specifically, marketing managers should consider the positive aspects for the consumer of using m-payment and the negative side of using cash.

Moreover, management should recognize the positive impact of SI on continuance usage when adopting new technology; they may encourage consumers to recommend the m-payment method to friends and family and perhaps give them incentives to do so. At the same time, the m-payment service providers also need to improve their FC, such as the quality of internet connection, to maintain the users' intention to continue using the payment method. This will increase customer acquisition and attract more merchants to use their m-payment services. Table 4 shows the conclusions and implications of the findings.

6. Limitation and future research direction

No study is free from limitations, and the present study has some flaws; therefore, further research is needed to address the shortcomings. The major limitations of this study are its reliance on a single country as the research context and the nonprobability sampling technique used to collect the data. The findings thus cannot be generalized. Further research in other countries is recommended to verify the results. Although this study proposes a new antecedent factor (unfavorable attitude) and combines it with previous antecedent factors in the model, all elements should be integrated and examined to achieve full explanatory power. To this end, future studies should include other variables in the model to increase the model's explanatory (Lin *et al.*, 2020) and predictive power (Jain *et al.*, 2019). In addition, this study does not consider the impact of moderating variables. Therefore, future studies might examine the effect of demographic factors of the respondents as moderating variables, such as age, gender, income level or educational level.

Conclusions	Theoretical and managerial implications
Customers consider not only pull (positive) factors of mobile payment but also push (negative) factors of cash payment	• This study enhances the theory of behavioral intention to the continuance usage of m-payment by expanding UTAUT with the PPM model as the foundation of explanation. Four antecedent factors, namely, favorable attitude toward m-payment, social influence, facilitating conditions and unfavorable attitude toward cash payment, positively affect the continuance intention • By incorporating the important elements simultaneously, both positive and negative factors, companies can formulate marketing strategies to encourage customers' continuance usage of m-payments more effectively
Behavioral intention is validated as the predictor of actual behavior	• The study corroborates the effect of continuance intention on the actual use of m-payment • The m-payment service providers need to focus on the factors that significantly influence customers' continuance intention to use m-payments as they finally influence the actual behavior

Table 4.
Conclusions, theoretical and managerial implications

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