# Factor Analysis of Continuance Intention to Use QR Code Mobile Payment Services: An Extended Expectation-Confirmation Model (ECM)

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ABSTRACT

QR code mobile payment is a payment method that is quite popular in Indonesia where users only need to open or display a QR code on the m-payment application when making transactions. Users can make payments easily, anywhere and anytime. Apart from the benefits of QR codes on m-payments, there are still obstacles regarding the intention to continue using them. Some users stopped using the QR code service on the m-payment application due to the potential risks involved. The purpose of this study is to find out what factors can affect continued intention to use QR code m-payment. The research model used is the Extended Expectation-Confirmation Model (ECM) by combining ECM and UTAUT and adding trust and perceived risk variables. The number of samples in this study was 313 participants who were users who had used QR code m-payment OVO, GoPay, or ShopeePay with a minimum age of 17 years. The sampling technique used is purposive sampling. This study uses quantitative methods and data analysis with the PLS-SEM approach using SmartPLS version 3. The results of this study are three rejected hypotheses and nine accepted hypotheses. Based on the accepted hypotheses, it shows that social influence, trust, and satisfaction affect continuance intention to use QR code m-payment. Social influence is the biggest factor affecting continuance intention to use QR code m-payment service. These results can be considered for developers and companies such as OVO, GoPay, and ShopeePay.

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## 1 Introduction

The increasingly developed technology has made progress with the presence of a transaction method using mobile payment or m-payment as a digital payment. M-payment has now dominated the market in both developed and developing countries (Franque *et al.*, 2021). Several innovations have been implemented in the m-payment application service, one of which is the Quick Response (QR) code technology is a code that has a black and white grid arrangement and is usually used to store information that can be read by a cell phone camera (Gao *et al.*, 2018). QR code m-payment is used by opening the m-payment application to display or scan QR code. According to a Kadence (2021) survey, it shows that OVO, GoPay, and ShopeePay are the three most widely used m-payment applications in Indonesia with a percentage of OVO 31%, GoPay 25%, ShopeePay 20%, DANA 19%, and LinkAja 4%. The three applications are OVO, GoPay, and ShopeePay. They also have a QR code service for transaction processing. M-payment applications are very convenient payment method and can be integrated with QR codes (Silalahi *et al.*, 2022).

The main advantage of using QR code m-payment is that users can make payments easily, anywhere and anytime. However, there are still obstacles related to the intention to continue using

them. Some users stop using QR code m-payment because of some potential risks associated with it. For example smartphones can be infected with viruses via QR codes and money stolen from m-payment applications (Gao *et al.*, 2018). So it is important to know the factors that affect the continued intention to use QR code m-payments. Continuing use of a system is very important because the success of a system ultimately depends on its continued use, not its initial use (Lee & Kwon, 2011).

Several previous studies have used different theoretical models to find out continuance intention on m-payment. Shao *et al.* (2019) use the theory of diffusion of innovations (DOI), then there will be an expansion of the IT continuance (ITC) model (Chen & Li, 2017). Several studies use the ECM as the theoretical basis for researching intentions to continue using m-payments (Franque *et al.*, 2021; Humbani & Wiese, 2019; Lu *et al.*, 2017). UTAUT is also used to identify continuance intention in using a technology (Franque *et al.*, 2021; Humbani & Wiese, 2019; Lu *et al.*, 2017).

Although the trend of m-payment is increasing, research related to continued intention to use QR code m-payment is still rarely done. Several previous studies have only focused on continuance intentions towards the use of m-payments and did not focus on continuance intentions for certain service features or specific services contained in m-payments (Cao *et al.*, 2018; Chen & Li, 2017; Franque *et al.*, 2021; Shao *et al.*, 2019). Several previous studies have examined the continuance intention factor using the extended ECM model by combining the ECM and UTAUT models (Singh, 2020; Wu & Wu, 2019). However, there are still limited studies that use the combined ECM and UTAUT models in the context of the QR code m-payment service. In addition, combining the ECM and UTAUT models can explain continuance intention more strongly (Singh, 2020). In addition to the original construction of ECM, the author combines it with the UTAUT model, which uses the effort expectancy and social influence variables. Trust is an important factor on continuance intention because it is connected to transaction of financial (Cao *et al.*, 2018). In addition, perceived risk is also a major concern for m-payment service users. Some users stop using the QR code m-payment service because of the potential associated risks (Gao *et al.*, 2018). So, this research uses the extended ECM model by combining the ECM model (Bhattacherjee, 2001) with UTAUT (Venkatesh *et al.*, 2003) and adding two variables, namely perceived risk (Yuan *et al.*, 2016) and trust (Cao *et al.*, 2018) to identify continued intention in using QR code m-payments.

This study explores the factors that influence continuance intention to use QR code m-payment OVO, GoPay, and ShopeePay. Two research questions are posed:
RQ1. What factors influence continuance intention to use the QR code m-payment service?
RQ2. How is the influence of perceived usefulness, satisfaction, effort expectancy, social influence, perceived risk, and trust on continuance intention to use the QR code m-payment service?

## 2 Research Model and Hypothesis

### 2.1 Confirmation

Confirmation refers to a user's assessment of a product, service, or technology (Franque *et al.*, 2021). The user will get a positive confirmation when the expectations are met, and when it is not as expected, the user will get a negative confirmation (Oghuma *et al.*, 2016). So that QR code m-payment users can try to adjust their perceived usefulness to be more in line with reality. Previous research explains that confirmation determines positively on perceived usefulness (Franque *et al.*, 2021; Mouakket, 2015; Yuan *et al.*, 2016). Confirmation of the suitability of a product or service to meet user expectations can trigger satisfaction. Confirmation will determine user satisfaction and perceived usefulness of m-payment services (Susanto *et al.*, 2016).

H1: Confirmation (C) has a positive effect on Perceived Usefulness (PU)
H2: Confirmation (C) has a positive effect on Satisfaction (S)

### 2.2 Perceived Usefulness

Perceived usefulness in this study is defined as the user's opinion of the expected advantages of using the QR code m-payment. Sustainable relationships will increase if the benefits of the service are felt by users (Franque *et al.*, 2021). Perceived usefulness explains satisfaction positively on m-payment (Franque *et al.*, 2021; Lim *et al.*, 2019). Perceived usefulness determines continuance intention on m-payment (Franque *et al.*, 2021; Liébana-Cabanillas *et al.*, 2021).

H3: Perceived Usefulness (PU) has a positive effect on Satisfaction (S)
H4: Perceived Usefulness (PU) has a positive effect on Continuance Intention (CI)

### 2.3 Trust

Trust is the user's level of belief in the QR code m-payment service. Lack of security will also increase the risk and uncertainty of QR code m-payment after adoption of usage, so that it can affect the intention of continued use. Several studies have shown the effect of trust on continuance intention in various contexts, such as m-payment (Cao *et al.*, 2018), *m-wallet* (Kumar *et al.*, 2018), and *m-banking* (Susanto *et al.*, 2016). When users feel a service is reliable, it will lead to a sense of satisfaction. If the user does not trust it, then there is a possibility of dissatisfaction with the service, resulting in a negative evaluation (Cao *et al.*, 2018). Trust has been shown to have a significant positive effect on satisfaction (Cao *et al.*, 2018; Poromatikul *et al.*, 2019; Susanto *et al.*, 2016).

H5: Trust (T) has a positive effect on Satisfaction (S)
H6: Trust (T) has a positive effect on Continuance Intention (CI)

### 2.4 Effort Expectancy

Effort expectancy in this study is the user's perception of the ease of using the QR code m-payment. Effort expectancy in UTAUT can be used to investigate continuance intention (Venkatesh *et al.*, 2011). Marinković *et al.* (2020) used the UTAUT and stated that effort expectancy determines satisfaction. Furthermore, effort expectancy affects continuance intention in using m-payment (Singh, 2020). The research of Gao *et al.* (2018) also shows that there is a positive effect of effort expectancy with continuance intention in the use of QR codes in m-payments.

H7: Effort Expectancy (EE) has a positive effect on Satisfaction (S)
H8: Effort Expectancy (EE) has a positive effect on Continuance Intention (CI)

### 2.5 Perceived Risk

Perceived risk is the user's response to uncertainty and adverse consequences when using a system or service (Yuan *et al.*, 2016). QR code m-payment services are often associated with risks related to privacy, loss of personal data, and transactions, which are of greatest concern to consumers (Gao *et al.*, 2018). Some users may be concerned if the service provider discloses their personal data to other companies or people. Perceived risk has a significant negative effect on satisfaction in the use of m-payment (Chen & Li, 2017; Yuan *et al.*, 2016). There is a negative effect between perceived risk and continuance intention of using m-payment services (Chen & Li, 2017; Rouibah *et al.*, 2016; Shao *et al.*, 2019).

H9: Perceived Risk (PR) has a negative effect on Satisfaction (S)
H10:Perceived Risk (PR) has a negative effect on Continuance Intention (CI)

### 2.6 Social Influence

Social influence, in the context of this study, is specified as the influence of the family or friends environment. Since people observe the actions of others when using m-payment services, they are influenced by those around them (Gao *et al.*, 2018). Previous research discovered that social influence explains positively on continuance intention to use m-payment (Gao *et al.*, 2018; Lu *et al.*, 2017).

H11: Social Influence (SI) has a positive effect on Continuance Intention (CI)

### 2.7 Satisfaction

Satisfaction is defined as a user's feeling of satisfaction in using the QR code m-payment service. However, when users are dissatisfied with the product, they can stop using it (Kumar *et al.*, 2018). In accordance with several previous studies, continuance intention is affected by satisfaction (Joo *et al.*, 2017; Kumar *et al.*, 2018; Yuan *et al.*, 2016).

H12: Satisfaction (S) has a positive effect on Continuance Intention (CI)

The research model used is shown in Figure 1.

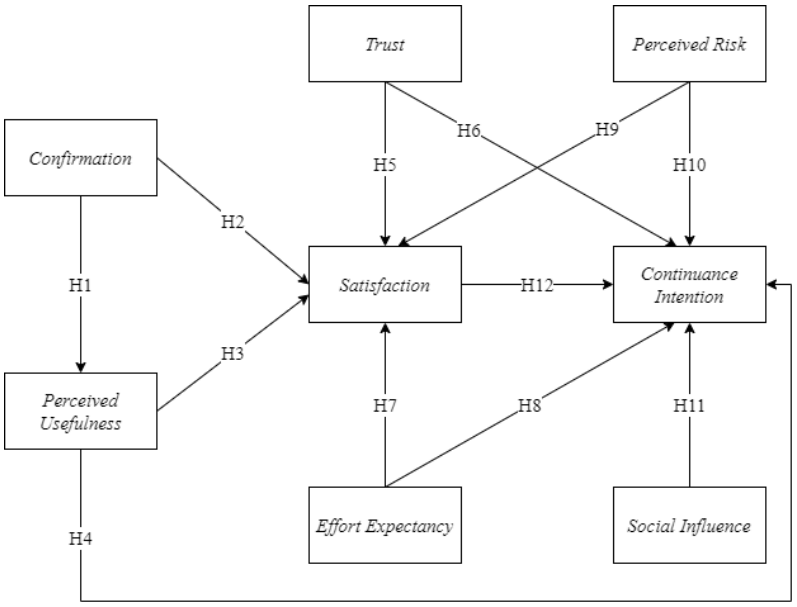


**Figure 1**. Research model

## 3 Method

This study uses quantitative methods in testing the extended ECM by combining ECM and UTAUT and adding trust and perceived risk to explain continuance intention to use QR code m-payment services. Quantitative methods are used through surveys using questionnaires. The questionnaire consists of 34 items. Questionnaires were distributed to users of QR code m-payments such as OVO, GoPay, or ShopeePay via WhatsApp, Instagram, and Twitter.

### 3.1 Participants

The sampling technique used is purposive sampling. The specified criteria are users who have used QR code m-payment OVO, GoPay, or ShopeePay and are at least 17 years old. Using a minimum sample of 250, because in PLS-SEM the sample size of more than 250 can increase accuracy and consistency (Sholihin & Ratmono, 2021). This study obtained 313 valid participants. Based on gender, 183 (58.5%) of the 313 participants were female and 130 (41.5%) were male. Most of the participants were 17-25 years old 240 (76.7%), and most of them had a high school education or equivalent 197 (62.9%). Students dominated 207 (66.1%) of the total 313 participants. The most participants were ShopeePay users, with 284 (90.7%). Furthermore, most of the participants used the QR code m-payment more than once a week 159 (50.8%). Table 1 shows the profile of participants.

**Table 1.** Demographic information of the participants

| Category | Number | Percentage (%) |
|---|---|---|
| *Gender* | | |
| Male | 130 | 41.5 |
| Female | 183 | 58.5 |
| *Age* | | |
| 17-25 years old | 240 | 76.7 |
| 26-35 years old | 60 | 19.2 |
| 36-45 years old | 13 | 4.2 |
| 46-50 years old | 0 | 0.0 |
| *Last education* | | |
| Junior High School/Equivalent | 0 | 0.0 |
| Hmkijuhyg igh School/Equivalent | 197 | 62.9 |
| Diploma (D1/D2/D3/D4) | 14 | 4.5 |
| Bachelor degree (S1) | 101 | 32.3 |

| | | |
|---|---|---|
| Master (S2) | 1 | 0.3 |
| Doctorate (S3) | 0 | 0.0 |
| *Jobs* | | |
| Student | | |
| Private employees | 207 | 66.1 |
| Government employees | 48 | 15.3 |
| Self-employed | 15 | 4.8 |
| Housewife | 33 | 10.5 |
| Freelancer | 4 | 1.3 |
| Doesn't work | 2 | 0.6 |
| Teacher | 2 | 0.6 |
| Extracurricular Coach | 1 | 0.3 |
| Private employees | 1 | 0.3 |
| *Mobile payment used* | | |
| OVO | 120 | 38.3 |
| GoPay | 200 | 63.9 |
| ShopeePay | 284 | 90.7 |
| *Frequency of using QR code mobile payment OVO, GoPay, or ShopeePay* | | |
| At least 1 time a day | 8 | 2.6 |
| >1 time a week | 159 | 50.8 |
| 1 time a week | 35 | 11.2 |
| <1 time a week | 111 | 35.5 |

### 3.2 Measures

The data was obtained from a survey using a questionnaire. The questionnaire consists of eight constructs and 34 items. They are perceived usefulness (PU) (four items), confirmation (C) (four items), satisfaction (S) (five items), effort expectancy (EE) (four items), social influence (SI) (five items), perceived risk (PR) (five items), trust (T) (four items), and continuance intention (CI) (three items). The research questionnaire consists of demographic information and questions of construct. The questionnaire uses 7 choices on a Likert scale with 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neutral, 5 = slightly agree, 6 = agree, and 7 = strongly agree (Jogiyanto, 2008). The items used in this study were adapted from several sources (Alalwan *et al.*, 2016; Bhattacherjee, 2001; Gao *et al.*, 2018; Park *et al.*, 2019; Susanto *et al.*, 2016; Venkatesh *et al.*, 2003; Venkatesh *et al.*, 2012; Yuan *et al.*, 2016).

### 3.3 Data Analysis

Data analysis is a process after collecting participant data or other data sources (Sugiyono, 2013). Then the data analysis was carried out by dividing it into two steps are demographic analysis and statistical analysis. Demographic analysis by processing and analyzing demographic data from the results of distributing questionnaires. The next stage is statistical analysis to test the model and test the proposed hypothesis using the Partial Least Square-Structural Equation Modeling (PLS-SEM) approach with SmartPLS version 3.

## 4 Results and Discussion

### 4.1 Evaluation of the Measurement Model (Outer Model)

#### 4.1.1 *Individual Item Reliability*

Individual item reliability is done by checking the outer loading value of each variable. The indicator or item is declared valid if the outer loading value is above 0.7 (Hair *et al.*, 2017). Based on Table 2, the outer loading is more than 0.7, so it can be said to be valid and can be continued on the test afterwards.

**Table 2.** Outer loading value

| | C | CI | EE | PR | PU | S | SI | T |
|---|---|---|---|---|---|---|---|---|
| **C1** | 0.863 | | | | | | | |
| **C2** | 0.878 | | | | | | | |
| **C3** | 0.886 | | | | | | | |
| **C4** | 0.846 | | | | | | | |
| **CI1** | | 0.922 | | | | | | |
| **CI2** | | 0.934 | | | | | | |
| **CI3** | | 0.934 | | | | | | |
| **EE1** | | | 0.878 | | | | | |
| **EE2** | | | 0.908 | | | | | |
| **EE3** | | | 0.900 | | | | | |
| **EE4** | | | 0.874 | | | | | |
| **PR1** | | | | 0.898 | | | | |
| **PR2** | | | | 0.930 | | | | |
| **PR3** | | | | 0.940 | | | | |
| **PR4** | | | | 0.911 | | | | |
| **PR5** | | | | 0.877 | | | | |
| **PU1** | | | | | 0.865 | | | |
| **PU2** | | | | | 0.888 | | | |
| **PU3** | | | | | 0.914 | | | |
| **PU4** | | | | | 0.859 | | | |
| **S1** | | | | | | 0.901 | | |
| **S2** | | | | | | 0.915 | | |
| **S3** | | | | | | 0.890 | | |
| **S4** | | | | | | 0.889 | | |
| **S5** | | | | | | 0.872 | | |
| **SI1** | | | | | | | 0.857 | |
| **SI2** | | | | | | | 0.884 | |
| **SI3** | | | | | | | 0.835 | |
| **SI4** | | | | | | | 0.864 | |
| **SI5** | | | | | | | 0.719 | |
| **T1** | | | | | | | | 0.790 |
| **T2** | | | | | | | | 0.894 |
| **T3** | | | | | | | | 0.927 |
| **T4** | | | | | | | | 0.879 |

### 4.1.2 *Internal Consistency Reliability*

The internal consistency reliability test is based on the value of composite reliability and Cronbach's alpha values with the condition that the value is above 0.7 (Hair *et al.*, 2017). Based on Table 3, composite reliability and Cronbach's alpha have values above 0.7, so that the variable is in accordance with the requirements.

**Table 3.** Composite reliability and cronbach's alpha value

| Variable | Composite reliability | Cronbach's alpha |
|---|---|---|
| Confirmation (C) | 0.925 | 0.891 |
| Continuance Intention (CI) | 0.950 | 0.922 |
| Effort Expectancy (EE) | 0.939 | 0.913 |
| Perceived Risk (PR) | 0.961 | 0.949 |
| Perceived Usefulness (PU) | 0.933 | 0.904 |
| Satisfaction (S) | 0.952 | 0.937 |
| Social Influence (SI) | 0.919 | 0.889 |
| Trust (T) | 0.928 | 0.896 |

### 4.1.3 *Convergent Validity*

The convergent validity test is carried out based on the value of the average variance extracted (AVE) and accepted if it is more than 0.5 (Hair *et al.*, 2017). Table 4 shows that The AVE for every variable is more than 0.5.

**Table 4.** AVE value

| Variable | AVE |
|---|---|
| Confirmation (C) | 0.754 |
| Continuance Intention (CI) | 0.865 |
| Effort Expectancy (EE) | 0.792 |
| Perceived Risk (PR) | 0.831 |
| Perceived Usefulness (PU) | 0.777 |
| Satisfaction (S) | 0.798 |
| Social Influence (SI) | 0.696 |
| Trust (T) | 0.764 |

4.1.4 ***Discriminant Validity***

Discriminant validity is based on the fornell-larcker and cross loading values (Hair *et al.*, 2017; Yamin & Kurniawan, 2011). Fornell-larcker based on the AVE root value on the correlation between variables, provided that each variable's value must be larger than the correlation with other variables and the requirement for the measurement of cross loading is that the value of the indicator on the variable itself must be greater than the value of the indicator on other variables. (Hair *et al.*, 2017). Based on Table 5 and 6, the cross loading and fornell-larcker values are appropriate so that it can be continued in the next test.

**Table 5.** Cross loading

| | C | CI | EE | PR | PU | S | SI | T |
|---|---|---|---|---|---|---|---|---|
| **C1** | **0.863** | 0.476 | 0.555 | -0.104 | 0.590 | 0.675 | 0.428 | 0.566 |
| **C2** | **0.878** | 0.548 | 0.477 | -0.208 | 0.578 | 0.670 | 0.455 | 0.522 |
| **C3** | **0.886** | 0.494 | 0.532 | -0.154 | 0.670 | 0.686 | 0.400 | 0.577 |
| **C4** | **0.846** | 0.490 | 0.604 | -0.042 | 0.686 | 0.704 | 0.423 | 0.617 |
| **CI1** | 0.545 | **0.922** | 0.498 | -0.226 | 0.537 | 0.665 | 0.640 | 0.607 |
| **CI2** | 0.494 | **0.934** | 0.468 | -0.235 | 0.488 | 0.638 | 0.637 | 0.581 |
| **CI3** | 0.571 | **0.934** | 0.505 | -0.200 | 0.514 | 0.687 | 0.672 | 0.626 |
| **EE1** | 0.516 | 0.431 | **0.878** | -0.121 | 0.520 | 0.575 | 0.276 | 0.425 |
| **EE2** | 0.565 | 0.453 | **0.908** | -0.183 | 0.571 | 0.613 | 0.310 | 0.470 |
| **EE3** | 0.551 | 0.480 | **0.900** | -0.075 | 0.584 | 0.676 | 0.390 | 0.521 |
| **EE4** | 0.591 | 0.507 | **0.874** | -0.075 | 0.552 | 0.677 | 0.412 | 0.531 |
| **PR1** | -0.161 | -0.170 | -0.148 | **0.898** | -0.103 | -0.248 | -0.119 | -0.179 |
| **PR2** | -0.114 | -0.191 | -0.097 | **0.930** | -0.025 | -0.198 | -0.210 | -0.136 |
| **PR3** | -0.185 | -0.272 | -0.169 | **0.940** | -0.051 | -0.243 | -0.223 | -0.204 |
| **PR4** | -0.072 | -0.187 | -0.045 | **0.911** | 0.021 | -0.169 | -0.216 | -0.098 |
| **PR5** | -0.104 | -0.239 | -0.087 | **0.877** | 0.008 | -0.167 | -0.233 | -0.108 |
| **PU1** | 0.634 | 0.503 | 0.547 | -0.033 | **0.865** | 0.627 | 0.373 | 0.505 |
| **PU2** | 0.651 | 0.469 | 0.580 | -0.064 | **0888** | 0.649 | 0.336 | 0.568 |
| **PU3** | 0.646 | 0.507 | 0.559 | -0.038 | **0.914** | 0.675 | 0.362 | 0.546 |
| **PU4** | 0.642 | 0.466 | 0.523 | 0.009 | **0.859** | 0.631 | 0.321 | 0.544 |
| **S1** | 0.737 | 0.686 | 0.661 | -0.223 | 0.643 | **0.901** | 0.585 | 0.681 |
| **S2** | 0.729 | 0.611 | 0.672 | -0.166 | 0.700 | **0.915** | 0.525 | 0.629 |
| **S3** | 0.686 | 0.633 | 0.640 | -0.191 | 0.668 | **0.890** | 0.532 | 0.630 |
| **S4** | 0.667 | 0.674 | 0.641 | -0.204 | 0.623 | **0.889** | 0.553 | 0.614 |
| **S5** | 0.700 | 0.580 | 0.584 | -0.236 | 0.639 | **0.872** | 0.477 | 0.595 |
| **SI1** | 0.393 | 0.577 | 0.312 | -0.199 | 0.271 | 0.472 | **0.857** | 0.386 |
| **SI2** | 0.373 | 0.559 | 0.255 | -0.194 | 0.268 | 0.463 | **0.884** | 0.349 |
| **SI3** | 0.416 | 0.578 | 0.374 | -0.095 | 0.387 | 0.514 | **0.835** | 0.430 |
| **SI4** | 0.476 | 0.659 | 0.399 | -0.254 | 0.407 | 0.588 | **0.864** | 0.492 |
| **SI5** | 0.376 | 0.527 | 0.286 | -0.165 | 0.301 | 0.444 | **0.719** | 0.405 |
| **T1** | 0.531 | 0.435 | 0.416 | -0.101 | 0.457 | 0.532 | 0.310 | **0.790** |
| **T2** | 0.555 | 0.568 | 0.480 | -0.168 | 0.501 | 0.613 | 0.430 | **0.894** |
| **T3** | 0.605 | 0.609 | 0.495 | -0.170 | 0.535 | 0.647 | 0.477 | **0.927** |
| **T4** | 0.608 | 0.637 | 0.522 | -0.127 | 0.635 | 0.663 | 0.497 | **0.879** |

**Table 6.** Fornell-larcker

| | C | CI | EE | PR | PU | S | SI | T |
|---|---|---|---|---|---|---|---|---|
| **C** | **0.868** | | | | | | | |
| **CI** | 0.578 | **0.930** | | | | | | |
| **EE** | 0.626 | 0.527 | **0.890** | | | | | |
| **PR** | -0.144 | -0.236 | -0.125 | **0.911** | | | | |
| **PU** | 0.729 | 0.552 | 0.626 | -0.036 | **0.882** | | | |
| **S** | 0.788 | 0.714 | 0.717 | -0.228 | 0.732 | **0.893** | | |
| **SI** | 0.491 | 0.699 | 0.394 | -0.220 | 0.395 | 0.599 | **0.834** | |
| **T** | 0.659 | 0.651 | 0.550 | -0.163 | 0.613 | 0.706 | 0.498 | **0.874** |

## 4.2 Evaluation of the Structural Model (Inner Model)

### 4.2.1 *Path Coefficient*

Path coefficient which shows the magnitude of the influence of each independent variable (Widarjono, 2020). If the path coefficient value is more than 0.1, then it will affect the model. Table 7 indicates that perceived usefulness, effort expectancy, and perceived risk on continuance intention have path coefficient value below 0.1, indicating that they have no effect. While the other eight variables have a significant positive effect and perceived risk on continuance intention has a significant negative effect.

**Table 7.** Path coefficient

| Hypothesis | Path | Path coefficient |
|---|---|---|
| H1 | C → PU | 0.729 |
| H2 | C → S | 0.329 |
| H3 | PU → S | 0.200 |
| H4 | PU → CI | 0.063 |
| H5 | T → S | 0.207 |
| H6 | T → CI | 0.218 |
| H7 | EE → S | 0.259 |
| H8 | EE → CI | 0.033 |
| H9 | PR → S | -0.107 |
| H10 | PR→ CI | -0.052 |
| H11 | SI → CI | 0.397 |
| H12 | S → CI | 0.240 |

### 4.2.2 *Coefficient of Determination ($R^2$)*

If the $R^2$ value is around 0.75, it is said to be strong, around 0.50 is said to be moderate, and around 0.25 is said to be weak (Hair *et al.*, 2017). According to the results in Table 8, the dependent variables are continuance intention and perceived usefulness, which can be said to be moderate. Meanwhile, satisfaction can be said to be strong. It can be interpreted that perceived usefulness, perceived risk, trust, effort expectancy, social influence, and satisfaction explain continuance intention moderately. In addition, confirmation moderates the perceived usefulness. While the confirmation, perceived usefulness, trust, effort expectancy, and perceived risk explain satisfaction strongly.

**Table 8.** Coefficient of determination

| Variable | $R^2$ | Description |
|---|---|---|
| Continuance Intention (CI) | 0.655 | Moderate |
| Perceived Usefulness (PU) | 0.532 | Moderate |
| Satisfaction (S) | 0.761 | Strong |

### 4.2.3 *T-Test*

Table 9 presents the results of hypothesis test on the structural model. The hypotheses were tested by a two-tailed test using the bootstrapping method with a significance level of 5%. If the

*t*-value is greater than 1.96 then the hypothesis can be accepted. The results show that there are nine accepted hypotheses because the *t*-value is greater than 1.96. The other three were rejected because they had a *t*-value of less than 1.96.

**Table 9.** T-test

| Hypothesis | Path | T-test |
|---|---|---|
| H1 | C → PU | 23.669 |
| H2 | C → S | 5.323 |
| H3 | PU → S | 3.842 |
| H4 | PU → CI | 0.925 |
| H5 | T → S | 3.145 |
| H6 | T → CI | 3.347 |
| H7 | EE → S | 5.214 |
| H8 | EE → CI | 0.571 |
| H9 | PR → S | 3.243 |
| H10 | PR→ CI | 1.602 |
| H11 | SI → CI | 6.419 |
| H12 | S → CI | 2.744 |

### 4.2.4 *Effect Size ($f^2$)*

Based on Table 10 show that confirmation of perceived usefulness has a large effect. Then, the three pathways that have a moderate effect are confirmation on satisfaction, effort expectancy on satisfaction, and social influence on continuance intention. The three pathways that have no effect are perceived usefulness, effort expectancy, continuance intention, and perceived risk on continuance intention. While the other five variable relationships have a small effect.

**Table 10.** Effect size

| Hypothesis | | $f^2$ | | | Influence |
|---|---|---|---|---|---|
| No | Path | $R^2 included$ | $R^2 excluded$ | $\sum f^2$ | $f^2$ |
| H1 | C → PU | 0.532 | 0.000 | 1.137 | Large |
| H2 | C → S | 0.761 | 0.721 | 0.168 | Medium |
| H3 | PU → S | 0.761 | 0.745 | 0.066 | Small |
| H4 | PU → CI | 0.655 | 0.654 | 0.005 | Not supported |
| H5 | T → S | 0.761 | 0.740 | 0.091 | Small |
| H6 | T → CI | 0.655 | 0.633 | 0.065 | Small |
| H7 | EE → S | 0.761 | 0.726 | 0.148 | Medium |
| H8 | EE → CI | 0.655 | 0.655 | 0.001 | Not supported |
| H9 | PR → S | 0.761 | 0.750 | 0.046 | Small |
| H10 | PR→ CI | 0.655 | 0.653 | 0.007 | Not supported |
| H11 | SI → CI | 0.655 | 0.558 | 0.282 | Medium |
| H12 | S → CI | 0.655 | 0.642 | 0.041 | Small |

### 4.2.5 *Predictive Relevance ($Q^2$)*

The predictive relevance test must have a value larger than zero so that the variable has a predictive relationship with other variables (Hair *et al.*, 2017). In Table 11, the overall value of the dependent variable, which is above zero, has a predictive relationship with other variables.

**Table 11.** Predictive relevance

| Variable | $Q^2$ |
|---|---|
| Continuance Intention (CI) | 0.556 |
| Perceived Usefulness (PU) | 0.410 |
| Satisfaction (S) | 0.596 |

### 4.2.6 *Relative Impact ($q^2$)*

If the relative impact value is about 0.02 then it has a small effect, has a medium effect if the relative impact value is around 0.15 and has a large effect if the relative impact value is 0.35 (Hair *et al.*, 2017). Based on Table 12, the relationship between confirmation and perceived usefulness which has a large effect, and social influence on continuance intention has a medium effect, perceived usefulness, effort expectancy, continuance intention, and perceived risk on continuance intention have no effect. While the other ten hypotheses have a small effect.

**Table 12.** Relative impact

| Hypothesis | | $q^2$ | | | Influence |
|---|---|---|---|---|---|
| No | Path | $Q^2$included | $Q^2$excluded | $\sum q^2$ | $q^2$ |
| H1 | C → PU | 0.410 | 0.000 | 0.695 | Large |
| H2 | C → S | 0.596 | 0.565 | 0.077 | Small |
| H3 | PU → S | 0.596 | 0.586 | 0.025 | Small |
| H4 | PU → CI | 0.556 | 0.556 | 0.000 | Not Supported |
| H5 | T → S | 0.596 | 0.580 | 0.040 | Small |
| H6 | T → CI | 0.556 | 0.538 | 0.041 | Small |
| H7 | EE → S | 0.596 | 0.569 | 0.067 | Small |
| H8 | EE → CI | 0.556 | 0.557 | -0.002 | Not Supported |
| H9 | PR → S | 0.596 | 0.588 | 0.020 | Small |
| H10 | PR→ CI | 0.556 | 0.555 | 0.002 | Not Supported |
| H11 | SI → CI | 0.556 | 0.473 | 0.187 | Medium |
| H12 | S → CI | 0.556 | 0.544 | 0.027 | Small |

### 4.2.7 *Model Fit*

Model fit aims to assess how well the hypothesized model structure fits the empirical data to help identify model specification errors (Hair *et al.*, 2017). The fit models used in this study were standardized root mean square residual (SRMR), chi-square statistic ($\chi^2$), and normal fit index (NFI). The results show that the SMRM is 0.051, which means that the suitability of this research model is said to be good (good fit). The chi-square value is 1609.276, which means that this research model has a good fit. While the NFI value, which is 0.845, which means the suitability of this research model is still acceptable (marginal fit). Values ranging from 0.80 < NFI < 0.90 are still acceptable (Khairi *et al.*, 2021). The results obtained for the fit model are shown in Table 13.

**Table 13**. Results of model fit

| | Limit | Value | Description |
|---|---|---|---|
| **SRMR** | < 0.08 | 0.051 | Good fit |
| **Chi-square** | > 0.05 | 1609.276 | Good fit |
| **NFI** | ≥ 0.90 | 0.845 | Marginal fit |

## 4.3 Discussion

Based on the findings, there are three hypotheses supported from 12 hypotheses. Perceived usefulness, effort expectancy, and perceived risk have no effect on continuance intention. Trust, social influence, and satisfaction have an effect on continuance intention. The three factors that have a large effect on continuance intention are social influence, followed by satisfaction, and trust.

The results indicate that perceived usefulness is positively influenced by confirmation. Previous literature has also confirmed this relationship (Bhattacherjee, 2001; Franque *et al.*, 2021; Mouakket, 2015; Yuan *et al.*, 2016). Based on the results that have been obtained, it shows that users feel that their initial expectations are appropriate, either the suitability of the service level or service function, and that the user feels that the QR code service really has benefits, so that it affects the perceived usefulness factor. Furthermore, users feel that if their initial expectations are appropriate and fulfilled, it tends to increase satisfaction. Developers and service providers such as OVO, GoPay, and ShopeePay must provide quality services to exceed user expectations and make users feel satisfied.

Perceived usefulness determines satisfaction positively, but does not determine on continuance intention. Previous literature has also confirmed this relationship (Bhattacherjee, 2001; Lai *et al.*, 2016; Susanto *et al.*, 2016). This finding contradicts previous research on perceived risk and continuance intention (Bhattacherjee, 2001; Franque *et al.*, 2021; Liébana-Cabanillas *et al.*, 2021). Based on the results that have been obtained, it shows that users will feel satisfied if they feel useful or beneficial when using the QR code m-payment service, such as making transactions faster because scanning or showing the code is easier, and can be done anywhere and anytime. However, the perceived usefulness of users such as ease, speed, and effectiveness in transactions, does not affect continuance intention to use QR code m-payment service. When users feel the benefits obtained from the service, it is not necessarily the case that they will use it again. Developers and service providers further improve performance to be able to increase the effectiveness of user performance, including in terms of data security and transaction reader speed.

Trust has a significant positive effect on satisfaction and continuance intention. Previous literature has also confirmed this relationship (Cao *et al.*, 2018; Kumar *et al.*, 2018; Poromatikul *et al.*, 2019; Susanto *et al.*, 2016). Based on the results obtained, it shows that when users feel that the QR code m-payment service is trustworthy, secure, and reliable, it will foster a sense of satisfaction and increase continuance intention. Developers and service providers must continue to improve QR code services with more attention to convenience and can further improve the security system strictly to maintain user trust when transacting.

Effort expectancy has a significant positive effect on satisfaction, but has no effect on continuance intention. Previous literature has also confirmed this relationship (Marinković *et al.*, 2020). However, these results are in line with previous research between effort expectations and continuance intention (Chopdar & Sivakumar, 2019; Zhao & Bacao, 2020). Therefore, the smaller the effort, the more user satisfaction there will be. However, effort expectancy does not affect continuance intention to use QR code m-payment. All of the items show that QR code m-payment service is easy to learn and use, but this convenience is not what affects on continuance intention. This can be due to direct transactions or cash, which can also be done easily, so that convenience is not their consideration. The recommendations that can be given are that service providers must update the ease of service, for example, by simplifying the payment process or transactions and being able to provide digital literacy to the public.

Perceived risk has a significant negative effect on satisfaction, but has no impact on continuance intention. Previous literature has also confirmed this relationship (Chen & Li, 2017; Yuan *et al.*, 2016) and Liébana-Cabanillas *et al.* (2015) found that perceived risk has no impact on continuance intention. Based on the results that have been obtained, it shows that the perceived risk of users of the QR code m-payment service will affect user satisfaction. However, users are not worried about the risks and it will not affect the user's intention to continue using the service. This can happen if the majority of respondents come from gene Z. Gen Z is not too concerned with risk because most of them already know how it works and want to do things quickly, easily, and instantly. So, the recommendations that can be given are that service providers must pay more attention to and improve security and convenience to avoid scams, or fraud that can occur in QR code services. In addition, the company can also provide warnings and directions to users regarding the potential for crime.

Social influence has a significant positive effect on continuance intention. Previous literature has also confirmed this relationship (Gao *et al.*, 2018; Lu *et al.*, 2017). It shows that continuance intention is influenced by the social environment, such as family, friends, relatives, or co-workers who have used the QR code m-payment service and recommend it. Social influence has the biggest effect on continuance intention so that social influence is the main factor affecting continuance intention to use QR code m-payment services. Recommendations that can be given are more socialization or dissemination of information to the public to influence the public to use the QR code m-payment service and also collaborate with various merchants to better reach users.

Continuance intention is positively influenced by satisfaction. Previous literature has also confirmed this relationship (Joo *et al.*, 2017; Kumar *et al.*, 2018; Yuan *et al.*, 2016). The author assumes that satisfaction in using the QR code m-payment service is one of them due to promos so that users feel happy and interested to continue using it. So, service providers must continue to

ensure that the QR code service can function properly. Provide promos in the form of discounts or cashback for users when making transactions to provide user satisfaction.

This study has several limitations, based on the demographic results of participants, users of the QR code m-payment service are dominated by ShopeePay users, so this study explains more about ShopeePay users than OVO and GoPay. The results are also more dominated by students. The results of data collection also found 17 invalid data that had to be deleted.

Future research can use different research subjects on m-payment applications that have a QR code feature for transactions, such as the type of mobile banking application. The research model can be further developed, such as combining the ECM model with other models. Perceived usefulness, effort expectancy, and perceived risk have no effect on continuance intention, so that further researchers can review each of the indicators on these variables.

## 5 Conclusion

The concept of continuance intentions are still not described in detail in this context based on the IS study. To fill this gap, it is proposed to combine ECM and UTAUT to investigate the continuance intention to use QR code m-payment. The results represent the factors that affect continuance intention to use QR code m-payment services are trust, social influence, and satisfaction. Social influence is the factor that has the greatest effect on continuance intention followed by satisfaction, and trust. Trust, perceived risk, social influence, perceived usefulness, effort expectancy and confirmation determine satisfaction. But, perceived usefulness, perceived risk and effort expectancy and have no effect on continuance intention. Based on this, social influences such as family, friends, relatives, or co-workers have the most important role in affecting the continuance intention to use QR code m-payment. The QR code service providers carry out more socialization or disseminate information to the public to influence the public's intention to use the QR code m-payment service and collaborate with various merchants to better reach users and affect the continuance intention to use QR code m-payment.

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