# Investigating the Impact of System and Service Qualities on Customer Loyalty in Acceptance of E-Marketplace

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*Abstract*—This paper aims to investigate the influence of System and Service Quality on Customer Loyalty in their acceptance of e-marketplaces. The e-marketplaces are Tokopedia, Bukalapak, Lazada, Sophee, and others. Several variables from previous related studies on expectation–confirmation model (ECM) and TAM are employed on proposed model to explore the customers satisfaction and their impact on the acceptance of the e-marketplace. The model expresses the effect of System Quality, Service Quality on Confirmation and Satisfaction; Confirmation on Perceived Usefulness and Perceived Ease of Use; Perceived ease of use on Perceived Usefulness; Perceived Usefulness, and Confirmation on Satisfaction; and Perceived Usefulness and Satisfaction on Continuance Intension to use. The model was examined using 210 respondent data and Correlation Analysis was done after the validity and realibility check to reveal the correlation of variables. The analysis of causal effects of variables are tested using Structural Equation Modelling (SEM) using Partial Least Square (PLS). The result reveals that the Satisfaction of customer of e-marketplace platforms were more affected by System Quality, Service Quality and Confirmation than Perceived Usefulness. Whereas, the continue intention to use e-marketplace platform was determined by Perceived Usefulness and Satisfaction. The results have contribution on e-marketplace players and developers who have concern on customer loyalty to attract their continue intention in using the platform.

*Keywords—adoption, e-marketplace, system quality, service quality, satisfaction*

## I. INTRODUCTION

The digital era is moving very fast, especially driven during the Covid-19 pandemic where people are advised to live or work at home, to be used to do all digital-based activities carried out at home. It provides opportunities and challenges The scale of opportunity for businesses has changed, transactions and communication are no longer through traditional channels (physical encounters) but through e-commerce technology.

In today's dynamic movement, it presents opportunities and challenges for decision makers. Increased opportunities for digital businesses have increased, this increase has reached up to 10 or even 20 times that of traditional channels. Even individuals can expand markets from all over the world. Digital marketing provides powerful tools for creating audience engagement, identifying customers, increasing sales, and increasing efficiency and productivity in a variety of areas. To win the competition, companies must position themselves at the forefront of technology, be innovative in making attractive products, consider price and place, and use digital-based commercial platforms [1].

E-commerce platforms allow customers to sort and categorize information and even access opinions from online customer reviews and ratings to improve the shopping process and increase the number of choices available. On the other hand, decreased customer satisfaction can result mainly due to lack of security, relevant privacy, timely human contact [2].

Evidently, the Internet has produced fundamental changes in retail practices, created shifts in both consumer and business behavior, the positive relationship between e-customer satisfaction and consumer shopping at e-commerce retailers has been proven. Namely, the higher the e-customer satisfaction in this area, the more consumers are [3].

System quality is the user's perception of stability, acceptable response, and ease of use. It has been shown that an increase in perceived system quality is related to an increase in perceived usefulness, as well as an increase in user satisfaction with the system. Higher perceived system quality has a stronger effect on perceived usefulness and user satisfaction, leading to a positive influence on system adoption [4].

E-commerce today is part of the community because it can meet people's expectations. E-commerce has become one of the alternative shopping in addition to shopping in conventional marketplaces. The development of e-commerce is the result of the increasingly widespread role of technology use today. Meeting the expectations of performance aspects makes e-commerce like a "primadonna", an inclusive and unlimited digital era is one of the primary elements that make e-commerce warmly welcomed throughout the world. The thing that underlies fast-moving e-commerce in the modern world is because of the assumption that e-commerce is more comfortable and more practical (perceived usefulness) in its

use and has been proven to be able to meet effort expectancy [5-9].

In this research, the original ECM was modified with the addition of 2 components, namely System Quality and Service Quality to adopt the use of e-marketplaces. And this is the contribution proposed in this study.

## II. RELATED WORK

Theoretical base – expectation–confirmation model (ECM) and investment model (IM) Past research has applied different technology usage models to explore users' continuance intention, such as UTAUT2 [10], TAM [11,12] and ECM [13]. Although these studies provide insights into understanding users' continuance usage of fitness and health apps, by primarily applying a single model and including limited factors, previous studies could only provide an insufficient explanation of individuals' postadoption behavior. On the other hand, to explore what contributes to a sustained relationship, the IM that was initially developed to understand interpersonal relationship has been applied in the technology context [14,15,16,17,18]. The IM addresses the limitation of the ECM, which primarily focuses on users' perceptions toward the IT product/service [19]. However, the IM theory has not yet been used to investigate the user–app relationship. Therefore, this study integrates the ECM and IM to address the utilitarian and commitment perspectives of individuals' usage of fitness and health apps [20].

Research conducted by Aslam et al [21] examines the ECM model used for mobile social commerce. This study used the expectation confirmation model (ECM) in developing the model related to continuance usage intention of mobile social commerce. For testing the relationships, structural equation modeling (SEM) is used by using Amos 22. The findings of the study will help the brands in understanding key determinants that help in building brand loyalty in the mobile social commerce context and will expand the literature of mobile social commerce in the context of developing economies. The study provides numerous implications for brand managers in boosting brand loyalty. The paper is organized as follows; section 2 represents the theoretical background and literature. Section 3 emphasizes the development of hypotheses. Details related to the methodology are presented in section 4. Section 5 presents the results. Lastly, section 6 presents conclusion, recommendation and future area to research.

Expectation-Confirmation Model The expectation-confirmation model is a framework used by researchers to explain and understand matters relating to consumer satisfaction, trust and sustainability in purchasing or using a service [22,23]. Besides, some researchers explained that ECM is adopted to explain acceptance, use or adoption of a technology [24,25,26]. ECM shows that consumer behavior in purchasing based on their own decisions, on the other hand, consumers will rely on their expectations of how well the services they receive. In addition, the information received by consumers with regard to the product or service will greatly affect the decision in purchasing; of course the information is expected to be accurate and reliable [27]. Meaning of expectation refers to how far the level of user satisfaction in feeling something, based on his experience using technology. Meanwhile, perceived usefulness is a feeling experienced by users to measure how far a person is believing the use of technology whether it is useful or not. Satisfaction is a positive

emotional state resulting from the evaluation of the use of the technology, and continuance intention is useful as a reference to measure how far the customers intend to repurchase the technology or continue the use of the service [28]. If their expectations are met based on the use of such information technology, then the customers are likely to be satisfied and assume the technology is useful. In turn, customers tend to use technology continuously [28,29].

The adoption of e-commerce for generation Z has been researched by Lestari [30], in this study the variables used are Personal innovativeness, Self efficacy, Perceived usefulness, Perceived risk, Attitude, Intention.

In this study, we will use ECM development by adding a quality and service quality system to adopt the use of e-marketplaces.

## III. PROPOSED MODEL AND HYPOTHESIS

By using existing literature on research in the last six years regarding the adoption of e-commerce, mobile apps, and technology adoption, the model offered in this study is compiled as shown in Figure 1.
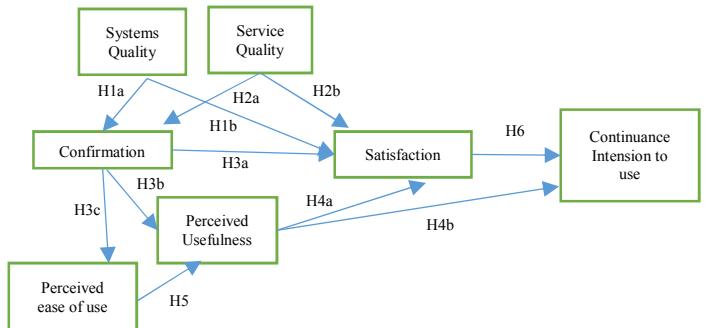


Fig. 1. Proposed model

### A. System Quality, service Quality, Perceived Usefulness, and Confirmation on Satisfaction (H2b, H1b, H3a, H4a)

In Park's research [31] between system and service quality has a positive correlation to satisfaction. This is reinforced by research by Daghan, G and Akkoyunlu, B [32] that between System Quality and Service Quality has a positive correlation to Satisfaction, so that the H1b and H2b hypotheses can be made. Likewise, confirmation and Perceived Usefulness have a positive relationship with satisfaction [31,32,33,28], so hypotheses H3a and H4a can be made.

**H1b: Systems Quality has a positive effect on Satisfaction**

**H2b: Service Quality has a positive effect on Satisfaction**

**H3a: Confirmation has a positive effect on Satisfaction**

**H4a: Perceived Usefulness has a positive effect on Satisfaction**

### B. System Quality and service Quality on Confirmation (H1a, H2a)

Gokhan [32] and Park [31] extended ECM with System and Service quality, based on this hypothesis H1a and H1b are made.

**H1a: Systems Quality has a positive effect on Confirmation**

**H2a: Service Quality has a positive effect on Confirmation**

## C. Confirmation on Perceived Usefulness and Perceived Ease of Use  (H3b, H3c)

According to Wijaya [29], Tam et al [33], and Park [31] Perceived Usefulness and Confirmation have a positive correlation. Meanwhile, Perceived Ease of Use and Confirmation also have a positive correlation [31], so that the H3b and H3c hypotheses can be compiled.

**H3b: Confirmation has a positive effect on Perceived Usefulness**

**H3c: Confirmation has a positive effect on Perceived ease of use**

## D. Perceived ease of use on Perceived Usefulness (H5)

In the research of Tam et al [33] there is a positive correlation between Perceived ease of use and Perceived Usefulness, so the hypothesis H5 can be made.

**H5: Perceived ease of use has a positive effect on Perceived Usefulness**

## E. Perceived Usefulness, satisfaction on Continuance Intension to use (H4b, H6)

In the ECM model [32,21,20,28,33] there is a positive correlation between Satisfaction and Continuance Intension to use and also Perceived Usefulness has a positive correlation with Continuance Intension to use [33,31,21,20]. On this basis, the hypotheses H4b and H6 are made.

**H4b: Perceived Usefulness has a positive effect on Continuance Intension to use e-marketplace**

**H6: satisfaction has a positive effect on Continuance Intension to use e-marketplace**

## IV. Methodology

In this study used data from 217 respondents who were distributed randomly using google form. Of these 217 respondents, only 210 data were used, because there were some invalid data, so 7 pieces of data had to be removed.

The test model used is SEM PLS. Previously, the common bias variance was tested first to find out how much bias between the variables used in this study using SPSS (Harman's single factor test). After this common bias meets the requirements, which is less than 50% according to Harman's single factor test criteria, then the Measurement Model Test is carried out, namely testing the validity, reliability, and Multicollinearity. After the measurement model test, the next is the Structural Model Test which includes the path coefficients test, the Coefficient of Determination, and the Hypothesis Test.

The validity test consists of 2 stages, namely Convergent validity and Discriminant Validity, then continued to test the reliability by measuring the price of Cronbach alpha and Composite Reliability. The price of Cronbach's Alpha and Composite Reliability must be above 0.7.

The path coefficient test is determined from the value of the path coefficient, while the test for the ability of the independent variable in explaining the variance of the latent variable uses the R Square value. It is said to be strong if its R Square is greater than 0.26 (26%). The final step of this SEM test is to look at the hypothesis that has been prepared based on its P value, if it is above 0.05 then the hypothesis is rejected and vice versa below 0.05 then the hypothesis is accepted.

## V. Data Analysis and discussion

### A. Demographic of Respondents

Demographics of respondents can be seen in table 1.

TABLE I.　　TABLE Demographics Respondens

| Total Responden (n=210) | | |
|---|---|---|
| **Age:** | | |
| <20 | 37 | 18% |
| 20-29 | 125 | 60% |
| 30-39 | 24 | 11% |
| >=40 | 24 | 11% |
| **Gender:** | | |
| Male | 130 | 62% |
| Female | 80 | 38% |
| **Education:** | | |
| <High School | 14 | 7% |
| Diploma - Undergraduate | 161 | 77% |
| Master-Doctor | 35 | 17% |

From table 1 it can be seen that the most users are aged between 20-29 years with a Diploma-Undergraduate education level.

From this respondent's data, the following is a commond method bias test using the Harman's single factor test. The result is that the total value of% of the variance is 45.2%, which means that there is no bias between variables in the model because it is less than 50%.

### B. Measurement Model Test

### 1. Convergent validity

The model above is as in Figure 1 when tested with PLS, the results of outer loading can be seen in table 2 below:

TABLE II.　　THE LOADING FACTOR VALUE TO TEST THE VALIDITY OF THE INDICATOR

| | CI | Con | PEoU | PU | SQ | SV | Sat |
|---|---|---|---|---|---|---|---|
| CI1 | 0.92 | | | | | | |
| CI2 | 0.931 | | | | | | |
| CI3 | 0.855 | | | | | | |
| Con1 | | 0.841 | | | | | |
| Con2 | | 0.854 | | | | | |
| Con3 | | 0.86 | | | | | |
| PEoU1 | | | 0.842 | | | | |
| PEoU 2 | | | 0.849 | | | | |
| PEoU 3 | | | 0.897 | | | | |
| PEoU 4 | | | 0.871 | | | | |
| PU 1 | | | | 0.872 | | | |
| PU 2 | | | | 0.834 | | | |
| PU3 | | | | 0.783 | | | |
| SQ1 | | | | | 0.795 | | |
| SQ2 | | | | | 0.809 | | |
| SQ3 | | | | | 0.865 | | |
| SQ4 | | | | | 0.785 | | |
| SV1 | | | | | | 0.819 | |
| SV2 | | | | | | 0.853 | |
| SV3 | | | | | | 0.822 | |
| Sat1 | | | | | | | 0.9 |
| Sat2 | | | | | | | 0.923 |
| Sat3 | | | | | | | 0.878 |

It can be seen that the value of each indicator loading outer value is greater than 0.7.

To see the Average Variance Extracted (AVE) value can be seen in table 3.

TABLE III. NILAI AVERAGE VARIANCE EXTRACTED (AVE)

| Variable | Average Variance Extracted (AVE) |
|---|---|
| CI | 0.815 |
| Con | 0.725 |
| PEoU | 0.748 |
| PU | 0.641 |
| SQ | 0.626 |
| SV | 0.692 |
| Sat | 0.811 |

Based on Table 3, all variables have an AVE value above 0.5. From Table 2 and Table 3, it can be seen that this model meets the requirements for convergent validity.

*2. Discriminant Validity*

For the discriminant validity test, the Fornell-Lacker criterion was used, the results of this test can be seen in table 4.

TABLE IV. FORNELL-LARCKER CRITERION VALUES

| | CI | Con | PEoU | PU | SQ | SV | Sat |
|---|---|---|---|---|---|---|---|
| CI | 0.903 | | | | | | |
| Con | 0.501 | 0.852 | | | | | |
| PEoU | 0.596 | 0.598 | 0.865 | | | | |
| PU | 0.622 | 0.663 | 0.664 | 0.801 | | | |
| SQ | 0.53 | 0.702 | 0.63 | 0.652 | 0.791 | | |
| SV | 0.575 | 0.768 | 0.637 | 0.663 | 0.706 | 0.832 | |
| Sat | 0.545 | 0.694 | 0.683 | 0.622 | 0.692 | 0.712 | 0.901 |

Based on the values listed in Table 4, each variable has the greatest value by itself compared to other variables. Therefore, this model qualifies for discriminant validity.

3. Reliability Test

Reliability refers to the consistency or stability of an indicator. Reliability is measured by the value of composite reliability and Cronbach's alpha. Table 5 will display the composite reliability and cronbach's alpha values of each construct.

TABLE V. THE VALUE OF COMPOSITE RELIABILITY AND CRONBACH'S ALPHA

| | Cronbach's Alpha | Composite Reliability |
|---|---|---|
| CI | 0.886 | 0.929 |
| Con | 0.811 | 0.888 |
| PEoU | 0.887 | 0.922 |
| PU | 0.719 | 0.841 |
| SQ | 0.797 | 0.869 |
| SV | 0.777 | 0.871 |
| Sat | 0.883 | 0.928 |

According to Table 5, it can be seen that all constructs have a composite reliability value above 0.7, which means that the variable is reable.

*C. Structural Model Test*

After doing the measurement model and this model has passed the measurement model test, the next step is to do the structural model test. The structural model test is to analyze the structural relationship between the measured variables and their latent variables. The structural model test includes path coefficients and coefficient of determination test.

*1. Test the path coefficients*

The basis for determining whether a hypothesis is accepted or not using path coefficients. The results can be seen in table 6.

TABLE VI. VALUE OF PATH COEFFICIENTS

| | CI | Con | PEoU | PU | SQ | SV | Sat |
|---|---|---|---|---|---|---|---|
| CI | | | | | | | |
| Con | | | 0.598 | 0.413 | | | 0.197 |
| PEoU | | | | 0.418 | | | |
| PU | 0.462 | | | | | | 0.027 |
| SQ | | 0.317 | | | | | 0.205 |
| SV | | 0.544 | | | | | 0.221 |
| Sat | 0.258 | | | | | | |

From table 6 it can be seen that the value less than 0.1 is from PE to Sat, which means that the PE variable is not correlated with the Sat variable.

*2. Coefficient of Determination*

Testing the coefficient of determination or R2 aims to find out how accurate the prediction of the model made in this study is. The coefficient of determination explains how much the ability of the independent variable to explain the variance of the latent variable. The results of the interpretation of the coefficient of determination can be classified into 3 levels, namely small, medium or large effect size. Table 7 shows the coefficient of determination of the three factors used in the research model.

TABLE VII. R SQUARE AND R SQUARE ADJUSTED VALUES

| | R Square | R Square Adjusted |
|---|---|---|
| CI | 0.428 | 0.422 |
| Con | 0.641 | 0.637 |
| PEoU | 0.357 | 0.354 |
| PU | 0.551 | 0.547 |
| Sat | 0.642 | 0.633 |

All determination values are above 0.26 or 26% which means large effect size (strong)

## 3. Hypothesis testing

Hypothesis testing was carried out using a two-tailed test by comparing p-values with a significance level of 5%. The results of hypothesis testing using SmartPLS will produce mean, standard deviation, t-statistics, and p-values. Hypothesis testing is conducted to check the structural validity of the model and determine which hypotheses are accepted and rejected from the comparison of p-values and significance levels. If the p-value is below 5%, the hypothesis will be accepted and if the p-value is above 5%, the hypothesis will be rejected.

TABLE VIII.    HYPOTHESIS TEST RESULTS

| | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (\|O/STDEV\|) | P Values | Hypothesis |
|---|---|---|---|---|---|
| Con -> PEoU | 0.595 | 0.064 | 9.342 | 0 | Accepted |
| Con -> PU | 0.414 | 0.054 | 7.618 | 0 | Accepted |
| Con -> Sat | 0.194 | 0.083 | 2.39 | 0.017 | Accepted |
| PEoU -> PU | 0.417 | 0.055 | 7.59 | 0 | Accepted |
| PU -> CI | 0.463 | 0.066 | 7.031 | 0 | Accepted |
| PU -> Sat | 0.03 | 0.066 | 0.411 | 0.681 | Rejected |
| SQ -> Con | 0.315 | 0.066 | 4.814 | 0 | Accepted |
| SQ -> Sat | 0.2 | 0.076 | 2.711 | 0.007 | Accepted |
| SV -> Con | 0.546 | 0.064 | 8.474 | 0 | Accepted |
| SV -> Sat | 0.226 | 0.087 | 2.548 | 0.011 | Accepted |
| Sat -> CI | 0.258 | 0.072 | 3.59 | 0 | Accepted |

From table 8, it can be seen that all the hypotheses are support, except for H4a not support because the P value is above 5% or 0.05. The following is a picture of the model after testing the hypothesis.
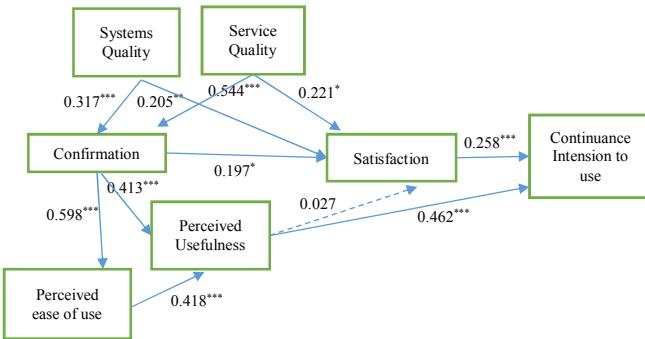


Fig. 2.   The final model after testing. $^*p < 0.05$, $^{**}p < 0.01$, $^{***}p = 0$

The findings in this study are that the largest users of e-marketplaces are people aged between 20-29 years with a diploma and undergraduate education level, namely 60% of 210 respondents.

Based on Figure 2, it can be seen that almost all of the hypotheses made in this study are accepted except for hypothesis 4a, namely Perceived Usefulness has an effect on user satisfaction. This is because most e-marketplace users are not satisfied with the benefits of shopping online, they still like to shop offline, they can see firsthand the items they are going to buy and they can also try or taste these items. This is in line with the research of Aslam et al, Prasetya and Harnadi [21,34] who also have the same result, namely Perceived Usefulness does not affect Satisfaction.

In Hypotheses 1a and 1b, namely the effect of the Quality System on Confirmation and Satisfaction, this is true or acceptable because e-marketplaces that have a good quality system will have an effect on confirmation from the user and will also lead to a feeling of satisfaction for the user. This is in line with research conducted by the 2017 gokhan [32]

Hypotheses 2a and 2b, namely the effect of Service Quality on Confirmation and Satisfaction, have been proven from the results of statistical tests, this proves that an e-marketplace that has good service will make its customers feel that it is what they expect and also make them satisfied. If customers feel satisfied, then they will usually become loyal customers.

If customers feel satisfied with the quality system and good service quality from the e-marketplace, then this will make customers loyal and will continue to use the e-marketplace.

From this research, it is proven that the desire to continue using the e-marketplace platform is determined by Perceived Usefulness and Satisfaction. This result implies that e-marketplace players and developers who have a strong interest in loyalty to attract their interest in using the platform in a sustainable manner.

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